UAEU جامعة الإمارات العربية المتحدة United Arab Emirates University

Course Catalog 2021-2022

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College of Business and Economics

Department of Innovation, Technology and Entrepreneurship

ENTR300 Fundamentals of Innovation and Entrepreneurship (3 CH)

Entrepreneurship is often defined as the process of bringing in change (either market or social) through innovation by creating new ventures or within existing organizations. It is often argued that entrepreneurship begins with and ends with innovation. Creativity is a precursor to innovation, which is considered to be a driving force in entrepreneurship. In this course, students will learn how to generate and develop creative ideas through various techniques and sources, and understand how creativity and innovation are linked and connected. Students will also learn how to assess and evaluate creative ideas and turn them into viable, innovative and profitable opportunities in entrepreneurship. This course aims to equip the next generation of leaders in the UAE with an innovative and entrepreneurial mindset and its related core skills. This course will engender in the students a spirit of entrepreneurial behavior by challenging a student's own perception of self-fit with entrepreneurial activity by placing them within the role of an entrepreneur. Being exposed to entrepreneurial process, students will be able to learn how to develop a business model and launch a new venture.

Prerequisites

- MGMT200 with a minimum grade D

ENTR310 Innovation and Creativity (3 CH)

The path to entrepreneurship lies through creativity and innovation. Creativity while the basic ingredient is not sufficient for innovation. Innovation also requires the development, production and implementation of that creative idea. However, the key difference between creativity and innovation is execution. And the process by which creative ideas become useful innovations is called Entrepreneurship. The students will be encouraged to be creative through simple projects that will exercise their minds and make them think in a very different way. They will also learn that creative ideas do not make people successful but it is the other way around. The difference between innovation and invention will also be ingrained again through some simple student

assignments. Finally, to understand the essence of innovation they will be taught that it is necessary to examine the main characteristics of entrepreneurs such as opportunistic mind set, formal training to detect new opportunities and a high degree of persistence as they are the driving force of innovation.

Prerequisites

- MGMT200 with a minimum grade D

ENTR320 Entrepreneurship (3 CH)

Entrepreneurship is the driving engine of an economy and Entrepreneurs are its life blood. Entrepreneurs turn problems into opportunities; the bigger the problem the bigger the opportunity. They never accept that the problem is unsolvable. The challenge is in teaching people how to turn problems into opportunities. The students will learn that the path to entrepreneurial success is littered with setbacks and obstacles that can be overcome with a mindset of putting the intentions into action. They will be taught that to be a successful entrepreneur one has to learn how to analyze the key parts of various start up business models. In other words, an entrepreneur is not only a leader or a guide but one who also knows how to handle the challenges of marketing, financing, operations and the like. The course will emphasize that entrepreneurs are developed and not born. They will learn the process of generating ideas and of being creative and innovative. Furthermore they will get drilled the concept or methodology of asking the right question and that the formulation of the problem is more important than its solution. Finally they will be taught through some case studies or real life examples that it is fine to make mistakes in the process as “Mistakes are a cost of doing business"

Prerequisites

- MGMT200 with a minimum grade D

ENTR330 Social Entrepreneurship (3 CH)

Social Entrepreneurship has been lately embraced by the world of business and interest in it continues to soar. It is still evolving with no clear definition. The question is what differentiates a Social Entrepreneur from a plain old vanilla entrepreneur as all Entrepreneurship at one level is social as it generates jobs and stimulates the economy. If a firm recycles used materials and installs solar panels on its roof, it is socially responsible. In fact a firm

does not have to be a Not-for-Profit to be socially responsible. The course will try to make the student understand the different dimensions and set a baseline for understanding social entrepreneurship. The course will focus on problem solving, developing innovative solutions and the emerging needs in the social development sector. Further the course will teach through examples and short case studies on how to develop innovative ventures with exponentially scalable models that can trigger or enable social change in GCC and especially UAE. At the end of the course it is expected that students will realize that Social Entrepreneurs are problem solvers, not idealists. Moreover, they are driven by innovation and not charity. And that they do not believe in getting grants or handouts, rather they use entrepreneurial strategies to effect social change.

Prerequisites

- MGMT200 with a minimum grade D

ENTR340 Financial Management for Entrepreneurs (3 CH)

The course covers the financial aspects of small business entrepreneurship for owners of sole proprietorships, partnerships, and small nonpublic corporations. The course focuses on: (1) updated financial statement coverage; (2) forecasting definitions and formulas; (3) equipment replacement by using the low cost model; (4) application of operation techniques to examples of small businesses including capital budgeting and working capital management; (5) use of financial statements for horizontal, vertical and ratio analysis; and, (6) basic math formulas for readers with limited mathematical backgrounds. Practical applications will include the time value of money and a computerized spreadsheet primer using Microsoft Excel.

ENTR350 New Venture Creation (3 CH)

Students develop the skills, values, and attitudes needed for success as an entrepreneur whether starting a new venture from scratch, joining or acquiring an existing business, or creating a new venture inside a larger organization. The primary activity is the development of a comprehensive business plan. Topics include an overview of entrepreneurship and small business in UAE; entrepreneurial mindset, characteristics, competencies and ethics; creativity, idea generation and feasibility studies; business plans; part-time and full-time entrepreneurship; location and capacity planning; marketing research for new ventures; financing new ventures; creating a financial plan; legal structures and issues; new venture development team; and risk analysis and management.

Prerequisites

- ENTR300 with a minimum grade D
- ENTR340 with a minimum grade D

ENTR400 Family Business (3 CH)

This course examines the issues and challenges faced by family businesses. Family businesses require governance structures that can accommodate both the business and family relationships. The success of family businesses also depends on successful intergenerational transfer. For continued growth, there may be a need to introduce professional management in the form of practices and professional personnel. The introduction of modern management into family businesses is needed yet this is an area that family businesses have great difficulty with particularly with the introduction of professional managers who are not family members.

Prerequisites

- ENTR300 with a minimum grade D

ENTR415 Developing an Entrepreneurial Venture (12 CH)

In this course, students will learn the processes involved in creating a business start up. Working over a 16 week period students, participating in teams, will perform a series of “design sprints” ending with a Demo Day. Students will drive the entrepreneurial process by working through the idea generation process, conducting a feasibility study, developing value propositions, designing a viable offering, building a prototype of the offering (if tangible), developing a business model to achieve a “product-market fit”, and constructing a sales and marketing strategy. Students will also devise a robust Business Plan to kick off an exciting and innovative new venture and develop a ‘business growth roadmap’. The philosophies and mindset of an innovative organizational founder will guide student teams through this process. Throughout the course, students will work alongside others and collaborate with a local entrepreneur, who will act as a mentor to the team with the course instructor. Students are given the opportunity to practice their entrepreneurial skills immediately upon completion of every two modules in three “pit stops” - Pitch Deck, Business Model Presentation and Demo Day - across the 7 module course. These pit stops allow students to present their work as it progresses

and to receive external feedback to help perfect their business ideas. Students are required to complete at least 76 credit hours to register this course

Prerequisites

- GEIE222 with a minimum grade D
- GEIT112 with a minimum grade D

ENTR420 Technology Entrepreneurship (3 CH)

This course focuses on technology entrepreneurs and their new ventures. It helps the student who is majoring in science, engineering, or other non-business disciplines to understand key aspects of entrepreneurship and the formation of new technology companies so that they can decide if a technology business path is right for them. Major class topics include learning to identify and evaluate innovation opportunities, assessing an industry, intellectual property strategies, the founding team, business models, and funding a new venture. Students will gain the skills and tools to turn technical ideas into profitable sustainable businesses.

Prerequisites

- ENTR300 with a minimum grade D

ENTR460 International Entrepreneurship (3 CH)

International entrepreneurship is entrepreneurship in which global factors like commercial, socio-cultural cum political and economic landscape either play an important role or influence in some fashion the success of a new venture. The new ventures can transcend their land boundaries for instance by either partnering with a local entity or by establishing a strong beachhead in many national markets like GCC or MENA and various other means of creating differentiation. The students will effectively realize that there are three major challenges in going global. The first one pertains to the local environment. GCC for example with its own laws, rules and regulations cannot be a region to focus growth on unless these aspects are well understood. Secondly, mobilization of resources is another unique challenge as the manpower, raw materials and the supply chain may not be in the same place or region. And finally distance from headquarters inspite of the advances in communication technologies sometimes becomes an impediment. The students will be exposed to some international business models and they will acquire the skills

to determine which one more closely aligns with the specified objectives of a firm. They will also learn how to identify opportunities that are far away from a firm's home base and management of contingencies as the venture grows.

Prerequisites

- ENTR310 with a minimum grade D

MKTG200 Principles of Marketing (3 CH)

This course provides students with knowledge about the importance of marketing as a basic function in enterprises, which deal with goods, services, and ideas. It clarifies the marketing functions related to the marketing mix: product, price, place, and promotion. It also describes the ultimate consumer and industrial buyer and the marketing strategies needed to deal with them. This course covers the different types of marketing enterprises and some other topics such as international marketing and services marketing. This course uses both the qualitative and quantitative methods in presenting and analyzing data.

Prerequisites

- MGMT200 with a minimum grade D

MKTG310 Marketing Research (3 CH)

This course provides students with the conceptual and the analytical aspects of marketing research. It is structured from the point of view of the marketing manager, consultant or entrepreneur who uses marketing research to make key business decisions. It covers topics of research design, dissemination of appropriate data, scaling and questionnaire construction, sampling procedure, data collection methods, data analysis and interpretation, and reporting.

Prerequisites

- MKTG200 with a minimum grade D
- STAT130 with a minimum grade D

MKTG320 Consumer Behavior (3 CH)

A study of the concepts, techniques, and models of consumer behavior including the decision making processes and the influence of environmental forces. The study of psychological and social factors that influence buying decisions are discussed as well as the managerial implications for planning executing, and evaluating marketing strategies. Theories of consumer behavior to develop managerial frameworks for the development and launch of new products, segmentation, and brand management

Prerequisites

- MKTG200 with a minimum grade D

MKTG330 Services Marketing (3 CH)

This course focuses on the unique challenges of marketing and managing services and delivering quality service to customers. The course is equally applicable to organizations whose core product is service (e.g., banks, transportation companies, hotels, hospitals, educational institutions, professional services, telecommunication, etc.) and to organizations that depend on service excellence for competitive advantage (e.g., high technology manufacturers, automotive, industrial products, etc.). The basic concepts covered in the course include: the difference between marketing services versus products; the key drivers of service quality; the customer's role in service creation; service design and innovation; technology's impact on services; managing customer service expectations; and customer service metrics.

Prerequisites

- MKTG200 with a minimum grade D

MKTG340 International Marketing (3 CH)

The course covers different aspects of international marketing activities from the perspective of small and medium size firms as well as multinationals with special emphasis on GCC countries. At the macro level, the course covers the environment of international marketing, institutional aspects, mechanisms, and recent developments that affect marketing activities. At the micro level, the

course deals with the development and formulation of the firm international marketing strategy.

Prerequisites

- MKTG200 with a minimum grade D

MKTG420 Strategic Marketing Management (3 CH)

The objective of this course is to study marketing within the overall corporate system of business policy-making. Strategic Marketing Management is an integration of all marketing elements in a strategic planning framework. It emphasizes areas of strategic importance, especially those that have significant implications and relevance for marketing policy decisions in competitive situations. The course investigates marketing from a managerial perspective, including the critical analysis of the functions of marketing, marketing planning and programming, marketing leadership and organization, and evaluating and adjusting the marketing effort.

Prerequisites

- MKTG310 with a minimum grade D

MKTG605 Marketing Management in an E-Age (3 CH)

This course provides students with a senior managerial approach to advanced problems in marketing with primary emphasis on case studies that examine structural complexities facilitated by electronic communication and choice of marketing tools. New knowledge and value propositions are developed using strategic marketing plans and decisions commensurate to changing needs of sophisticated consumers, markets, and multinational corporations. Current trends to translate to corporate proficiency, profitability, and sustainability in a competitive global marketplace are evaluated.

MKTG610 Contemporary Issues in Customer Behavior (3 CH)

This course aims to familiarize students with the nature and behavior of consumer markets. The purpose is to investigate and understand how customers make specific decision and behave in different situations and circumstances. In addition students will be taught the practicalities of

experimental consumer behavior research, which is fundamental to both understanding the consumer and assessing the effectiveness of consumer focused marketing interventions. Understanding the nature of contemporary customers is an important issue in maintaining and enhancing profit outcomes of a business.

SCML200 Supply Chain Management & Operations (3 CH)

This course focuses on methods and principles of operations and supply chain management in manufacturing and services firms. The course offers basic methods of analysis in planning, organizing and controlling supply chain operations. The course also examines topics such as operations and supply chain strategies, forecasting, location planning, inventory control, MRP, JIT, managing quality, capacity management, and process analysis.

Prerequisites

- MGMT200 with a minimum grade D

SCML310 Supply Chain & Logistics Modeling (3 CH)

This course is an introduction to the application and development of mathematical modeling tools for the analysis of strategic, tactical, and operational supply chain and logistics problems. Students will learn to apply several quantitative tools commonly used in the field of supply chain management, which include linear and integer programming, network models, queuing models, decision analysis, and simulation.

Prerequisites

- MGMT200 with a minimum grade D
- SCML200 with a minimum grade D

SCML320 Procurement & Supply Management (3 CH)

This course provides a comprehensive grounding in the differences between strategic and tactical aspects of purchasing, and covers the procurement process and the role of the procurement function within any organization. It addresses the purchasing function's role in fulfilling the organization's operations and competitive strategies, supplier evaluation, selection and

development, relationships with suppliers, supplier base management, supply information systems and e-commerce, purchasing services, negotiation, commodity planning, ethics, and cost, price, and value analysis. Applications in manufacturing, services, and government.

Prerequisites

- MGMT200
- MKTG200

SCML330 Logistics & Transportation Management (3 CH)

This course examines the role of transportation and logistics in supply chains, the major modes of transportation, their respective capabilities and limitations, transportation infrastructure, and transportation management practices. The course also examines the role of information technology in logistics and transportation, order processing, inventory and warehousing decisions, network design and facility location, and reverse logistics systems.

Prerequisites

- MGMT200
- SCML200

SCML410 Global Supply Chain & Logistics (3 CH)

This course introduces a number of supply chain concepts with an emphasis on issues of a global operating supply chain. Topics include globalization, international trade, identifying and managing global risks, global supplier selection, evaluation and management, global distribution and logistics management, international contracts and documents, and development and maintenance of international buyer-supplier relationships and alliances, and global practices.

Prerequisites

- SCML310 with a minimum grade D

SCML460 Supply Chain Applications Strategy (3 CH)

This capstone course covers a comprehensive range of supply chain and logistics topics and case studies across product, service and government settings. This course builds on the skills and concepts acquired in previous supply chain courses. Topics covered include strategic supply chains, supply chain design, and the role of supply chain management in attaining and sustaining competitive advantage.

Prerequisites

- SCML310 with a minimum grade D
- SCML320 with a minimum grade D
- SCML330 with a minimum grade D

SCML655 Supply Chain Management (3 CH)

This course covers the major issues in supply chain management including supply chain performance and strategic alignment, supply chain optimization and network design, inventory and safety stock management, forecasting, aggregate planning, sourcing principles, and supply chain coordination. The course will also provide students with quantitative modeling tools to analyze, model and solve supply chain problems, using appropriate software.

Prerequisites

- MEME621 with a minimum grade C

Department of Leadership and Organizational Agility

DBA900 The Philosophy of Social Research (1.5 CH)

The course will cover the philosophical underpinnings of social research, setting the scene for your work as a doctoral student. It starts with an introduction to the purposes of universities and academic work. In order to help you structure your approach to your own research work we will spend most of our time on explaining what is meant by the following concepts: research

problem, research questions, the researcher's posture, research strategies, and research paradigm. This course covers also questions of theory development and hypothesis generation, advances in management theory, an introduction of qualitative, quantitative, and mixed research methodologies, and ethical issues in management research.

DBA901 Qualitative Research Methods (4.5 CH)

The course will cover the philosophical and theoretical underpinnings of qualitative research, the various approaches and methodologies, as well as particular research methods. Although the course will place qualitative approaches and methods within the broader research design, mostly the course will give a practical experience to participants to help guide their progress in the formulation of their problem statement, their research design, qualitative data collection, and analysis of qualitative data and writing up of the findings.

Prerequisites

- DBA900 with a minimum grade D

DBA902 Quantitative Research Methods (4.5 CH)

This course focuses on the use of statistics in business research. In addition to mastery of common statistical tools, it discusses the design and execution of typical business research projects using such methods as surveys, archival data, and direct observation. It covers some important modeling and analysis tools which include Analysis of Variance (ANOVA), Analysis of Covariance (ANCOVA), multiple regression, logistic regression, forecasting, factor analysis, and structural equation modeling. Comprehensive statistical packages will be used to analyze the data, such as SPSS, and Minitab.

Prerequisites

- DBA900 with a minimum grade D

DBA903 Literature Review and Critique (1.5 CH)

This course will demonstrate the "search to insert" process and also details the purpose and process of reviewing and critiquing (summarising and

synthesising) source materials. It will involve a number of applied elements so as to ensure all candidates are familiar with locating materials relevant to their area of research and how to catalogue and use reference data (EndNote bibliographic, "Cite While Your Write" software) and also, how to summarise and synthesise source materials.

Prerequisites

- DBA902 with a minimum grade D

DBA904 Research in Support Business Functions (7.5 CH)

This course illustrates and discusses research issues and research methods across the functional business areas of Human Resources Management, Accounting, Finance, Marketing Management, Supply Chain Management and Operations, Information Systems and Technology Management, Business Economics, and SME's, Strategy. The aim is to help the course participants to develop a cross-functional perspective in business research.

Prerequisites

- DBA903 with a minimum grade D

DBA905 Introduction to Business Research (1.5 CH)

This course introduces the concept of business research and its usefulness for businesses to better understand products, processes, markets and competition. The course emphasizes how research outcomes assist in developing policies, strategies and tactics. The course also integrates complete research methodologies (both qualitative, quantitative and mixed research) at the doctoral level in example business researches that are related to improving business practice.

Prerequisites

- DBA904 with a minimum grade D

DBA906 Human Factors & Social Responsibility (1.5 CH)

"Based on different conceptions of the institutional role of corporations in society, the course offers students a range of perspectives including different theoretical frameworks to increase their awareness of growing stakeholder demands for financial, environmental and social performance. Students will be encouraged to think about how to create sustainable business value, incorporating concepts such as externalities, accountability and transparency. A key concern of the course is to think critically about what responsible management means for modern organizations. Students will be introduced to the historical background and the contested terrain of business ethics and the emergence of CSR and sustainability debates. Students will be engaged to discuss the macro-level challenges for governments and businesses today and the resulting pressure waves. For instance, students will be asked to think about the ecological crisis and the emergence of sustainable development as a public policy and business goal. The shift of CSR and sustainability from the margins to the core of business strategy and the passage from public relations' CSR initiatives to sustainability strategies are discussed. Also, the link between workers' rights, employment legislation, and CSR will be discussed (First and second sessions). The course will demand students to think critically about their organizations within the context of sustainable development. For that purpose, students are required to describe their organization' current CSR and sustainability initiatives. Later, they will be required to write a roadmap on how to build a sustainability strategy for their (third session). Finally, students will be engaged to think about how to bring organizations to account for their social and environmental impacts. For instance, students are called to think about the role of the corporation and to whom managers are accountable? The limits of reporting systems are discussed and solutions towards achieving a strong conservation of financial, environmental and human capitals are considered (Fourth session)."
Prerequisites

- DBA905

DBA907 Research Elective (1.5 CH)

In depth research design,methodology, and research process discussion within a chosen area of specialization. The Research Elective course can also be a related graduate research course from an approved university discipline (external to FBE) .

Prerequisites

- DBA906

DBA908 Dissertation-Research Proposal (6 CH)

The overall aim of this research course is to enable students to write a proposal, and defend it. Topics include planning, research and documentation, style and editing, document design, ethics, abstracts, and oral presentation of the proposal. Students will learn how to deal with basic research proposal components, such as literature review, research questions, aims and objectives, research paradigms and methodologies, the significance and feasibility of their study, as well as other relevant factors for their particular research projects.

Prerequisites

- DBA907 with a minimum grade D
- DBA906 with a minimum grade D

DBA909 Dissertation Research Part 1 (6 CH)

The course goal is to help students apply their cumulative understanding and skills to their own research questions. This course does not aim to deliver to students additional substantive material or methodological teachings, as they have been delivered in the Course component of the program (DBA900 – DBA908A).

Prerequisites

- DBA908 with a minimum grade P

DBA910 Dissertation Research Part 2 (12 CH)

"The aim of this research course is to enable the students to finalize the writing up and defense of their dissertation, to proceed to graduation. This course deals with both the theoretical and practical aspects of writing a dissertation and successfully defending it in front of an examination panel. The purpose of the course is to assist the students through the writing up and following through from the previous research courses. In this course participants are expected to apply the state of the art research methodologies that have been acquired in previous taught courses in the DBA as well as from their respective Advisors , to study some managerial and business issues pertaining to their organizations or the wider professional field in which they operate. The course

requires that a dissertation is written by the end of it, which will make an important contribution and/or provide innovative insights to the practice of the participant’s profession. The course overall goal is to help students apply their cumulative understanding and skills to their own research questions. Upon completion of the course the students should be able to defend their dissertation successfully."

Prerequisites

- DBA909 with a minimum grade P

GBUS201 Personal Development: Leadership and Team Competencies (3 CH)

At every level of an organization, effective leadership and teamwork are required for organizational success. This course will engage students in a variety of activities designed to enhance their understanding, knowledge, and competency of the leadership challenges which confront today's business professionals. Throughout the course, students will demonstrate knowledge of leadership traits and behaviors, how leaders motivate and form relationships with followers, and how leaders inspire followers to pursue higher goals, to behave ethically and authentically, and to work effectively in teams. Students taking this course will be open to reflecting and developing their own independence and ethical leadership skills as a Personal Case Study. A Personal Case Study approach will help students maximize the relevance of course material making it a meaningful experience. The competencies developed in the course include leadership, self-management, project collaboration, inclusion.

GBUS250 Digital Economy (3 CH)

The emergence of the digital economy has opened new opportunities for businesses and other organizations. Meanwhile, it has created new modes of competition in both the traditional and new sectors of the economy. Digitalization enables reducing costs, improving performance, capturing of value from innovations, and providing new services. The identification of multiple technologies that can be integrated within companies, together with the development of new digital strategies, is essential for corporate success, although it can often be a complicated task. This course provides the background knowledge on the emergence of digital organizations, key concepts, technologies, and their applications. The course presents the different challenges that organizations face as they seek to capitalize on digital

technology. Students will gain the skills to appreciate, examine, and capitalize on the capabilities of digital technologies, while understanding and adapting to the organizational context in the digitalization process. They will be able to distinguish between alternative digital channels and channel partners, as well as analyze the role of transparency in the digital economy.

GBUS300 Research Methods in Business and Economics (3 CH)

The aim of the course is to supply students with an understanding of the issues and problems of conducting research in business or economics, and the tools available to them. The course will enable students to develop skills necessary to conduct applied research. Methodological aspects of scientific research are examined in more detail, such as the translation of a problem into a research question, the elaboration of a conceptual model, the choice of a research design, the operationalization, the various data collection and data analysis techniques, and the standards around academic writing. During the course, students will develop original research question(s) and hypotheses, conduct a literature review and use bibliographic software to manage their citations and references, analyze the problem(s) using appropriate research methods (quantitative/qualitative) according to ethical standards, test their analysis or model of the problem, interpret their results, and write up findings using appropriate academic language.

Prerequisites

- STAT202 with a minimum grade D

GBUS301 Personal Development: Career Preparation and Orientation (3 CH)

The aim of this course is to make the students aware of the challenges of the professional workplace and enhance their career-readiness. The course will assist students in the various aspects of their career planning. These aspects include the assessment of their strengths, abilities, aptitudes, and priorities, creation of curriculum vitae (CV) and cover letter, preparation for interviews, and systematic job searching. Through a comprehensive understanding of self, industries, and the paths available to them, students can match their personal and professional aspirations with their planned career choices. The course will also provide students with the career-related knowledge and skills for problem-solving, communication, teamwork, leadership, and adaptation to the professional workplace.

Prerequisites

- GBUS201 with a minimum grade D

Corequisites

- (GBUS460 with a minimum grade D or ENTR415 with a minimum grade D)

GBUS460 Internship (12 CH)

The course aims to bring together theory and practice to students through their participation in practical training. The objectives of such practical training are to better understand work environments, gain on-job practical training and enhance students' work ethics and communication skills. The student will be given the opportunity to perform real work and actively participate in the operations of different business institutions during their actual working hours. Written reports and oral presentation are required from the students at the end (and during) the term training program. (The internship is conducted over 12 Weeks in the last semester (after a four week preparation session). No courses are allowed to be registered during the internship)

GBUS670 Corporate Governance, Social Responsibility and Ethics (3 CH)

The aim of this course is to make students recognize the importance of good and ethical corporate governance and corporate social responsibility when doing business. This course covers a wide range of subjects related to corporate governance systems, mechanisms, fundamental theories, and practices. Through developing a critical understanding of corporate governance practices in a national and international context, the student will be exposed to ethical reasoning and moral decision-making dilemmas embedded throughout the course.

GBUS680 Business Research (3 CH)

This course is designed to provide the MBA student with the required skills to develop and demonstrate competency in business research methodology and

techniques. It includes the development of a clear and well structured research proposal. Topics covered include, but not limited to, the stages of research processes, primary data collection methods, data coding, and survey analysis and critique. At the end of this course, MBA students will be able to develop a research plan and conduct basic business research. They will understand and be able to apply both qualitative and quantitative research methods to a UAE-related business problem

GBUS690 Field Research Project (3 CH)

The Field Application Project is the culmination of the UAEU MBA experience. In consultation with their employers, MBA students identify a significant business challenge or opportunity to which to apply their skill in Action Research toward actual problem solution or goal achievement. MBA students will be guided to frame unstructured business problems or goals, to identity the central issues, and to develop an effective investigative strategy, drawing on the tools and concepts developed during study for the UAEU MBA. Under UAEU MBA faculty supervision, MBA students will conduct the study and present their findings in a live defense with the objective of achieving approval from their employers for workplace implementation. Students will produce their Field Application Project in the form of a bound volume as a condition for graduation.

HRMD310 Organizational Behavior (3 CH)

In today's dynamic and rapidly changing business environment, the success of any organization depends on the ability of its members at all levels to work concertedly to achieve the strategic goals of the organization. This course covers basic analysis and applications of modern theories and techniques for understanding human behavior in organizational contexts. The course discusses the basic knowledge on the dynamics, determinants, and outcomes of individual and group behavior in organizations. Topics covered include determinants of motivation, individual and group decision making, organizational communication, team dynamics, leadership, power and politics in organizations, and conflict resolution.

Prerequisites

- MGMT200 with a minimum grade D

HRMD320 Human Resources Management (3 CH)

This course provides a basic knowledge of the key aspects of managing human resources, emphasizing the link between human resource policies and practices and the organization's strategy. Topics covered in the course include HR planning, job (work) analysis, staffing, performance appraisal, employee compensation and benefits, orientation and training, and employee relations.

Prerequisites

- MGMT200 with a minimum grade D

HRMD330 Staffing Organizations (3 CH)

This course covers various activities and techniques used for effective human resource staffing in organizations. Students will conduct job analyses, develop HR plans, and develop recruitment and selection programs using human resource information systems to support these activities. Topics covered include an analysis of objectives, techniques, and procedures for forecasting manpower needs, recruiting candidates, and selecting employees. The course emphasizes understanding basic types of assessment tools and procedures for choosing new employees. Basic concepts in measurement and validity are discussed. Issues relating to organizational entry and socialization may also be covered.

Prerequisites

- HRMD310 with a minimum grade D
- HRMD320 with a minimum grade D

HRMD410 Human Resources Performance Management (3 CH)

This course provides and intensive discussion and application of concepts and tools used for appraising and enhancing human performance in organizations. Topics covered include designing, implementing, and evaluating programs to assess employee job performance, developing training and development programs to improve performance, and linking rewards to performance. The course addresses the ethical issues inherent in appraising and rewarding employees as well as the challenges of developing appropriate practices and techniques.

Prerequisites

- HRMD310 with a minimum grade D
- HRMD320 with a minimum grade D

HRMD420 Compensation & Benefits Management (3 CH)

This course provides a systematic study of effective management of compensation and benefits in organizations. Topics covered include strategic compensation planning, components of the total pay mix, job evaluation systems, the compensation structure, governmental regulation of compensation, employee benefits and employee services programs, administering incentive plans, and other significant compensation issues such as variable pay plans, skill and knowledge based pay plans, and linking pay to performance.

Prerequisites

- HRMD310
- HRMD320

MGMT200 Fundamentals of Management (3 CH)

This course provides students with basic management knowledge. It also improves students' ability to diagnose and solve managerial problems as well as gaining familiarity with new issues in the management area. Topics covered include an overview of the history of management science, ethics, organizational culture, organization structure, human resources and leadership theory. The four functions of management (Planning, Organizing, Leading and Controlling) are thoroughly examined.

MGMT415 Strategic Management (3 CH)

This capstone course examines how organizations can analyze their environments and use the insights from this analysis to formulate and implement new strategies. Topics covered include: industry analysis, vertical and horizontal integration, SWOT analysis, strategy formulation at the corporate level, business level, and functional level, strategy implementation,

and strategy evaluation and control. A minimum of 87 completed credit hours are required to register in the course.

Prerequisites

- MIST200 with a minimum grade D
- SCML200 with a minimum grade D
- MKTG200 with a minimum grade D
- FINC240 with a minimum grade D
- ACCT225 with a minimum grade DSTAT130 with a minimum grade D

MGMT510 Business Environment (3 CH)

This is a foundation pre-requisite course for those who do not have a first degree in accounting or business. It is aimed at providing an introduction to fundamental business concepts from a global managing perspective. Students will gain insights into key business activities during different stages of a firm's lifecycle. The course is based on an integrative framework that especially emphasizes the relationships, connections and dependencies among functional areas in different lifecycle situations. The course develops a critical understanding of the nature, behavior and outcomes associated with the economic, social, political and legal systems that govern corporations.

MGMT610 Strategic Human Resources Management (3 CH)

This course is designed to examine the strategic challenges faced by senior managers in formulating and administering human resources policies and procedures in different types of organizations. Contemporary issues related to strategic human resources management, human resource planning, job/work analysis, hiring, training, performance management, and compensation will be examined.

MGMT620 Entrepreneurship & Innovation (3 CH)

The course will expose the student's minds to the vagaries of the journey of being an Entrepreneur in a simulated setting. They will learn that Innovators are creative and capable of changing existing business models. Team practice is linked to real-world entrepreneurial projects, which balances theory and practice through business case studies. The students will be tasked to come up with an innovative idea that they will commercialize in a theoretical setting. This will involve developing a business model, a business plan, funding,

commercialization and managing growth, via the creation of a comprehensive business pan. This course appeals to individuals who have a desire to start-up new for-profit ventures (mainstream entrepreneurship), corporate employees interested in initiating new projects within organizations (intra-preneurship), and philanthropists with civic innovative mindsets (social entrepreneurship).

MGMT621 Leadership & Organizational Behavior (3 CH)

This course discusses individual and group behavior within organizations and its relation to the social and economics roles of modern organizations. The course covers contemporary issues related to individual and group motivation and performance, organizational culture, the role of leadership, power and politics in organizations, managing organizational change, organizational restructuring, and workforce diversity.

MGMT622 Staffing Organizations (3 CH)

This course covers the basic conceptual and practical issues in the areas of recruitment, selection, and retention of staff in modern organizations. Topics covered include developing a staffing strategy, recruiting candidates, and selecting employees. The course emphasizes understanding basic staffing support systems including legal compliance, HR planning, job analysis, and various types of assessment tools used in employee selection

MGMT623 Performance and Rewards Management (3 CH)

This course is designed to introduce students to the basic issues in managing and rewarding employee performance. The course provides an in-depth understanding of performance management and the various tools and techniques that can be used to enhance an employee's contribution to the organization. This course also discusses the role that employee total reward systems play in organizational success and emphasizes the importance of linking rewards to performance.

MGMT624 HR Development in UAE Context (3 CH)

This course provides an overview of major challenges and issues in developing human resources within the UAE and the regional contexts. Issues of cross-cultural HRM will be discussed. The course then provides an in-depth discussion of themes and trends in training and development, individual and

adult learning principles, training needs assessment, training evaluation, and management development.

MGMT650 Global Operations Management in the Service Environment (3 CH)

The key to improve productivity in the service sector lies in the effective management of service operations. This course focuses on analyzing and improving service operations in organizations. Topics covered include: service strategy, service quality, service operations, service process design and facility location, service process flow management, managing supply and demand, managing waiting lines, and service capacity planning. The topics will be taught through a mix of quantitative models and qualitative frameworks and concepts.

MGMT660 Strategic Management in a Dynamic Environment (3 CH)

This course explores why effective strategic management leads to quality business performance. The basic concepts and tools of strategic analysis, developing the craft of a well-conceived strategy, and the execution of a strategic plan are covered. Students will be called upon to probe, question and evaluate all aspects of a company's external and internal situation thereby sizing up a company's standing in the marketplace and its ability to compete with rivals.

MGMT675 Management and Leadership (3 CH)

This course covers the basic skills and competencies required to enhance managerial effectiveness. The course introduces students to the main functions and responsibilities of managers and leaders in modern organizations. Topics covered include the major challenges facing managers in today's organizations, employee behavior and motivation, team dynamics, distinction between management and leadership, effective leadership in today's organizations, determinants of individual and group decision making, power and politics in organizations, and conflict resolution in organizations.

MGMT691 Total Quality Management (3 CH)

This course emphasizes the importance of quality and excellence in today's organizations. It reviews the history of quality and examines the wide variety of

concepts, tools and techniques for managing, controlling and improving, quality. Topics covered include the philosophy and practice of Total Quality Management (TQM), quality certificates such as ISO, Six Sigma, quality awards, quality costs, quality tools and quality assurance.

MGMT692 Organizational Excellence Modeling (3 CH)

This course emphasizes the importance of organizational excellence (OE) in today's organizations. Topics examined include origins of OE, a variety of frameworks for understanding organizational excellence, current models of organizational excellence such as European Foundation for Quality Management (EFQM) excellence model, and different pillars of OE.

MGMT693 International Business Management (3 CH)

This course aims to help participants to develop basic decision-making skills required to successfully manage different aspects of international business in global markets. Among the topics to be covered are the national differences in political economy, culture, and ethics, international business strategies (i.e., localization strategy, global strategy, etc.), headquarter-subsidiary relationships, entry strategies into international markets, global marketing and R&D, global production, outsourcing, and logistics, and global human resource management.

MGMT694 Organizational PM & Benchmark (3 CH)

This course emphasizes the importance of organizational performance management. Topics examined include concepts of performance measurement and management, principles of performance management, current approaches of performance management such as balanced scorecard and business process engineering (BPE). It also addresses how to use benchmarking in measuring and improving organizational performance; and provides an updated methodology for benchmarking in order to enable organizations to adopt best practices and excel.

Department of Analytics in the Digital Era

BANA200 Managing with Analytics (3 CH)

Every business is now a data business. Managing with analytics starts with deciding strategic data needs. Then this data is used to improve business decisions and operations and to yield benefits and profits. This course describes the concepts and processes of sourcing & collecting data and turning data into insights. Managing and competing with analytics requires creating the technology and data infrastructure and building data competencies in the organization. In the meanwhile, data ethics and governance ensures that data does not become a liability. To this end, the course also reviews organizational and technological infrastructure, as well as data governance. Throughout the course, illustrations and case problems are provided for demonstrating how data strategy is executed in practice.

BANA250 Business Intelligence (3 CH)

Data has become an essential strategic asset for many organizations in achieving competitive advantage and success. This course is designed to deliver a comprehensive introduction to visual analytics and business intelligence concepts and provide students with the knowledge and technical skills to support data-driven decision-making. Topics covered include data preparation and quality, dashboard implementation, and spatial analysis. The course uses state-of-the-art visual analytics software Tableau to provide hands-on experience. Students will work in groups to learn how to apply analytical techniques to sift through data and provide actionable business insights.

Prerequisites

- BANA200 with a minimum grade D

BANA310 Data Management and Organization (3 CH)

The objective of this course is to provide students with an introduction to the core concepts in data and information management. Enterprise data management systems are at the heart of modern business information systems. They facilitate information sharing across the organization and, therefore, support the notion that data is a corporate asset. Corporate data must be managed effectively to ensure the continued success of the organization. Data management, which focuses on data collection, storage, and retrieval, is a central activity for any organization. Topics covered include the principles of database design, modeling using the entity relationship model, the relational data model and relational database constraints, design techniques of relational database systems, and the Structured Query Language (SQL). In addition to developing database applications, the course helps the students understand how large-scale packaged systems such as business intelligence are highly dependent on the use of database systems.

Prerequisites

- BANA250 with a minimum grade D

BANA380 Business Analytics (3 CH)

Business analytics is the application of visual, statistical, and computational models and methods systematically, for developing new business insights and for improving performance. Business analytics projects and processes are empowered by data-analytic thinking and executed through data science: Data is collected, processed, modeled, and analyzed through descriptive, predictive, and prescriptive methods. Besides providing the definition, goals, and process of business analytics, this course presents a discussion of various technical topics of analytics. Topics covered include machine learning, predictive modeling, and model evaluation. Methodological foundations are supported by case study discussions and illustrated through experiential learning, where real-world datasets are analyzed with state-of-the-art analytical modeling & analysis software.

Prerequisites

- (STAT202 with a minimum grade D and BANA250 with a minimum grade D) or STAT210 with a minimum grade D
- STAT380 with a minimum grade D

BANA400 Business Analytics Applications (3 CH)

Analytics is vital for any organization, because every organization, regardless of its size or industry, has data that can be harnessed for benefit and sustainable success. In this course, a multitude of real-world cases and data are discussed. A multitude of business functions, such as marketing and finance, and industry domains are covered. The KNIME software suite is used as the analytical modeling environment.

Prerequisites

- BANA380 with a minimum grade D

BANA410 Text Analytics (3 CH)

Text analytics is used to extract meaningful information and actionable insights from the text data, to improve decision making. For example, a company can assess positive and negative trends by monitoring how customers discuss products on social media and user-generated content websites. This course aims to be a primer for text analysis, at both conceptual and practical dimensions. After completing this course with success, students gain skills to independently collect, process, and analyze text data to uncover hidden patterns. Topics discussed in the course include: capturing textual data sets, stemming text documents, duplicate detection, cleaning data sets, document clustering, text classification, sentiment analysis, and topic modeling.

Prerequisites

- BANA380 with a minimum grade D

BANA420 Graph Analytics (3 CH)

What do social networks, road networks, electric networks, protein networks, food webs, and the Internet all have in common? They are all networks, i.e. graphs. A graph is a structure that represents relations between entities, where entities are shown as nodes (vertices) and their relations are shown with links (edges). Graph analytics is the application of statistical and computational techniques for the analysis of graph data, for obtaining insights into the relations between the entities and the full graph. The course introduces the various types of graphs and the metrics, methods, and software tools for analyzing them. Throughout the course, graphs from a multitude of domains

will be introduced and analyzed through constructing graph visualizations and computing graph metrics with state-of-the-art software.

Prerequisites

- BANA380 with a minimum grade D

BANA430 Applied Optimization (3 CH)

Optimization problems are real-world problems we encounter in many areas such as manufacturing, transportation, financial planning, and scheduling. Optimization is an analytical technique for finding the best solution from within a set of solutions or solution space. A fundamental structure in optimization is to minimize an objective function under a set of constraints. This course introduces linear programming (LP), a modeling technique for optimization problems where the objective function and constraints are all linear. Practical modeling of LP problems with spreadsheet software is illustrated through a collection of illustrations and case studies. Other topics include what-If analysis for LP, binary integer programming, and mixed integer programming.

Prerequisites

- BANA250 with a minimum grade D

BANA520 Digital Business Innovation (3 CH)

This course introduces the students to digital business transformation and innovation. The dimensions of digital businesses, namely, customers, competition, data, innovation, and value, are introduced. The course describes the harnessing of customer networks, building of platforms, transforming of data into assets, and innovating by rapid experimentation to create business value. Other introduced topics include e-commerce, disruptive business models and self-assessment.

BANA540 Visual Analytics & Business Intelligence (3 CH)

Data has become an essential strategic asset for many organizations to achieve competitive advantages. The course is designed to deliver a comprehensive introduction to visual analytics and business intelligence concepts and provide students with the knowledge and technical skills to

support data-driven decision making. Upon successful completion of this course, students gain insights into managerial, strategic, and technical issues associated with developing and deploying BI solutions. The course advances the understanding of corporate performance management metrics and key performance indicators (KPIs). Topics covered include dimensional modeling principles, data extraction techniques from source systems, data profiling, data transformation methods, data preparation and quality, dashboard implementation, and spatial analysis. The course uses state-of-the-art BI software tool Tableau to provide hands-on experience. Students work individually and in groups to learn how to apply visual analytics to sift through massive amounts of data and discover actionable business insights.

BANA560 Applied Optimization (3 CH)

Optimization is an analytical method for finding the best solution from within a set of solutions or a solution space. A fundamental structure in optimization is to minimize an objective under a set of constraints. This course introduces linear programming (LP), an optimization modeling technique for problems where the objective function and constraints are linear. Practical modeling of LP problems with spreadsheet software is illustrated through a collection of illustrations and case studies. Other topics include what-If analysis for LP, network optimization, binary integer programming, mixed integer programming, and non-linear programming.

BANA600 Business Analytics Applications (3 CH)

Analytics is vital for any organization, because every organization, regardless of its size or industry, has data that can be harnessed for benefit and sustainable success. In the course, real-world data and the related business cases are introduced, covering a comprehensive spectrum of business functions and industries. Functional application domains include accounting, finance, marketing, social networks, human resources, and operations. The fundamental concepts of each business function are introduced in parallel with the presented case studies. A visual modeling software suite is used as the data modeling environment, for modeling and analyses in the presented cases.

Prerequisites

- BANA520 with a minimum grade D
- BANA540 with a minimum grade D
- STAT555 with a minimum grade D

BANA652 Analytics for Accounting & Finance (3 CH)

This course is designed to cover the data analytics technologies used in the accounting and finance. Data analysis has become a crucial skill for all accounting and finance professionals. It is especially important for accountants to grasp a better understanding of internal and external data. In this course, students develop an understanding of the data available to finance and accounting managers, its use and limitations, and the measurement of financial performance. Students gain hands-on analytics experience with audit data, using statistical and predictive methods. Upon successful completion of this course, the students acquire the skills for cleaning and visualizing data from accounting and finance, and applying analytical methods for financial risk modeling, credit risk analysis, investment modeling, and auditing.

Prerequisites

- BANA520 with a minimum grade D
- BANA540 with a minimum grade D
- BANA560 with a minimum grade D
- STAT555 with a minimum grade D

BANA655 People Analytics (3 CH)

Human Resource Management (HRM) aims at providing sustainable growth and competitive market advantage through people. People drive organizational performance, and performance depends on measurement. HR professionals should be good at planning and interpreting the "person statistics" of an organization. This requires a solid understanding of HR analytics, such as systematic data collection, analysis, and interpretation, to improve decision making for people and organizations. This course introduces the principles and strategic concepts of HR analytics, which utilizes data-driven metrics and models to measure and improve decisions to attract, manage, and retain employees. Students learn quantitative decision-making techniques such as data-driven recruitment, employee engagement, turnover, reward mechanism, educational evaluation, and performance management. The skills learned in this learning process allow HR managers to make evidence-based decisions through data collection, analysis, and presentation. The use of HR analytics is and will continue to shape the way HR professionals quantify and develop an organization's most valuable asset, namely, the human talent.

Prerequisites

- BANA520 with a minimum grade D
- BANA540 with a minimum grade D
- STAT555 with a minimum grade D

BANA656 Analytics for Operations & Supply Chains (3 CH)

Operations are manufacturing and service processes are used to transform resources into products/services. A supply chain is the complete set of processes, as well as the physical system itself, that delivers products and services. This course introduces the concepts of operations and supply chains, along with the goal of sustainability and in consideration of risks. Topics covered include queueing systems, material requirements planning (MRP), and quality management. Operations and analytics along the supply chain are discussed; including forecasting, inventory management, sourcing, transportation, and warehousing. Analytics software are used for modeling and analysis throughout the course, for applying the analyses presented in the cases.

Prerequisites

- BANA520 with a minimum grade D
- BANA540 with a minimum grade D
- BANA560 with a minimum grade D
- STAT555 with a minimum grade D

BANA661 Marketing Analytics (3 CH)

Business organizations are increasingly relying on data-driven marketing to better understand the customers' needs and wants. Many companies have readily harnessed extensive data on consumer’s purchasing behavior, social relationships, or attitudes. Through analyzing this data, companies can gain customer and market insights and strengthen their marketing decisions. Yet, few organizations have the expertise to intelligently manage and thrive upon such data and information. In this course, students learn systematic and analytical approaches to marketing decision-making. Students gain hands-on experience with marketing analytics techniques and tools to analyze customer and market data, develop marketing strategies, and allocate resources. Topics covered include market segmentation, market basket analysis, customer profitability, product recommendation systems, mobile geo-location analysis, and digital & social media marketing.

Prerequisites

- BANA520 with a minimum grade D
- BANA540 with a minimum grade D
- BANA560 with a minimum grade D
- STAT555 with a minimum grade D

BANA690 Analytics Project (3 CH)

This course challenges students with applying, for a real-world case study, the new knowledge they gained in their program courses. This single course requires the student(s) to conduct the complete life cycle for an analytics project with an independent research-oriented mindset, using readily available data. Students apply the proper research methods and the principles of project management, while gaining practical experience and extracting value from data with business analytics and its tools. Students who take this course/path cannot take BANA 691 & 692 Capstone Project I & II courses, and are required to take three electives, from the pool of restricted electives.

Prerequisites

- BANA520 with a minimum grade D
- BANA540 with a minimum grade D
- BANA560 with a minimum grade D
- STAT555 with a minimum grade D

BANA691 Capstone Project I (3 CH)

This series of two capstone courses uses the case teaching approach to enable students to synthesize and deepen their knowledge of business analytics methods tools learned from the previous courses. These two courses require the student(s) to conduct the complete life cycle for an analytics project, using data obtained from a company or collected as a part of research. Students are expected to apply the most suitable research methods, adhere to professional conduct, and communicate the results in a clear and comprehensive way through technical reports and presentations. They apply the proper research methods and the principles of project management throughout the project. Students with an industry project are expected to complete both of these courses, not only the first one. Students who take this

path of two courses cannot take the BANA 690 Analytics Project course and are required to take two electives, from the pool of restricted electives.

Prerequisites

- BANA520 with a minimum grade D
- BANA540 with a minimum grade D
- BANA560 with a minimum grade D
- STAT555 with a minimum grade D

BANA692 Capstone Project II (3 CH)

This series of two capstone courses uses the case teaching approach to enable students to synthesize and deepen their knowledge of business analytics methods tools learned from the previous courses. These two courses require the student(s) to conduct the complete life cycle for an analytics project, using data obtained from a company or collected as a part of research. Students are expected to apply the most suitable research methods, adhere to professional conduct, and communicate the results in a clear and comprehensive way through technical reports and presentations. They apply the proper research methods and the principles of project management throughout the project. Students with an industry project are expected to complete both of these courses, not only the first one. Students who take this path of two courses cannot take the BANA 690 Analytics Project course and are required to take two electives, from the pool of restricted electives.

Prerequisites

- BANA691 with a minimum grade D

MIST200 Foundation of MIS & Technologies (3 CH)

Management information systems and technologies (MIST) are an integral part of all business activities and careers. This course is designed to introduce students to contemporary information systems and demonstrate how these systems are used throughout organizations. The focus of this course is on the key components of management information systems and technologies - people, processes, software, hardware, data, and communication technologies, and how these components can be integrated and managed to create competitive advantage. Through the knowledge of how MIST provides a competitive advantage, students gain an understanding of how information is

used in businesses and how business information technologies enable improvement in quality, speed, and agility. This course also provides an introduction to business information systems and development concepts, business information technology acquisition, and various types of application software that have become prevalent or are emerging in modern organizations and society.

MIST215 Computer Application in Business (3 CH)

Information Technology (IT) and information systems (IS) are becoming core elements of any business. This course is directly concerned with the role of computers in business systems and different business functions. It takes a structured view of managerial decision making. Everyday examples of finance, marketing, supply chain management and logistics, and human resource management and development are studied using hands-on and learn-by-example model development. The emphasis of this course is the practical implementation of real world model rather than traditional theoretical approach. This course helps students to put theoretical concepts into practical applications. It focuses on the ingredients of student knowledge necessary for success in business administration and to cope with the challenges inherent in the implementation of rapidly advanced information technologies and systems. The course's active learning approach encourages the student to focus on developing skills in "how" to build a model while summarizing the mathematical logic as to "why" the model is constructed. Microsoft Excel and Access are the main tools used in this course.

Prerequisites

- MIST200 with a minimum grade D

MIST280 E-Business Strategy, Architecture & Design (3 CH)

e-Business has changed the way emerging and current businesses operate and compete. This course focuses on the fundamentals of e-business, its architecture, business models, challenges, and promises. It illustrates how business process re-engineering (BPR) can achieve effective e-Business strategies. This course emphasizes the innovative nature of e-business models, which includes B2B, B2C, B2E, B2G and others. It provides an overview of e-Commerce from a managerial perspective. The course introduces students to e-marketplaces, e-procurement, e-business infrastructure, online payment systems, e-Business strategic issues, and the role of ethical and social issues.

Prerequisites

- MIST200 with a minimum grade D

MIST610 Information Systems in Business (3 CH)

The ultimate goal of this course is to provide students a holistic and in-depth understanding of information systems (IS) role in supporting, shaping, and enabling business strategies and achieving corporate objectives. Information systems are one of the major tools available to business managers for achieving operational excellence, developing new products and services, improving decision making, and achieving competitive advantage. A fundamental question that is answered by this course is “how information systems and technologies are efficiently and effectively utilized in managing the information as a business resource?”. The divide that currently exist between IT and business can be bridged by increasing the IS and IT-knowledge of decision makers. This course provides an understanding of the different types of information systems in business organizations, the role of IT in business decision-making, E-business, IT infrastructure and emerging technologies, business intelligence, MIS ethical and social issues, and enterprise information systems.

MIST625 Management of Technology (3 CH)

The focus of this course is management of technology and innovation (MoT+I) which is a powerful tool organizations use to compete in an increasingly challenging global economy. Technology Management is at the intersection of science, engineering, management and behavioral science. Participants will: (1) Understand the dynamics of technological innovation, (2) be familiar with how to formulate technology strategies, (3) know how to implement technology strategies, and (4) understand how to manage ideas in a technological based organization.

MIST630 Strategic IS Management (3 CH)

This course is about information systems strategy and management from a top management perspective. Information technology (IT) is an integral part of most products and services of the post-industrial society of the 21st century and has changed the top management job. Topics include business models and organization forms in the information age, IT as a business enabler, IT and

competitive strategy, information for management control, analysis and redesign of business structure and processes, knowledge management and information networks, interorganizational networks, sourcing strategies, interfacing with the IT function, reliability and security, and ethical and policy issues. The course relies extensively on the case method and the students will supplement their analyses with current information obtained from the Web, or directly from the firms under study in the cases.

MIST640 Business Intelligence & BPM (3 CH)

This course develops an understanding about the essentials of Business Intelligence, Data Warehousing, Business Analytics, Data Visualization, Data, Text and Web Mining. Focus will be on use of above technologies in decision support systems and business performance management. The course also covers decision support systems concepts, methodologies, and technologies. Through lectures, case studies and class discussions this course aims to develop participants? ability to identify key performance indicators (KPIs) that are affecting business performance and subsequently monitor the same using decision support and business intelligence systems using online analytical process (OLAP) and other performance management (BPM) techniques.

MIST650 E-Business: Technology, Strategies & Applications (3 CH)

This course focuses on the concepts and applications of e-business, its infrastructure, business models, challenges, and promises, particularly to the discipline of business and in general to all other areas. The course contents extend to the several of electronic communications and collaborations, including e-government applications. This course will highlight e-business in general, the opportunities it brings about, as well as its limitations and risks. Examples of various types of e-business will be examined in detail.

MIST660 Enterprise IS (3 CH)

Traditionally information systems have been introduced into organizations as functionally specialized applications serving the specific needs of individual departments. Enterprise Information Systems, more commonly referred to as ERP systems, provide a more holistic view of the organization, helping eliminate narrower departmental perspectives. Introducing ERP applications has the potential of adding enormously to organizational value, if undertaken properly. This course discusses how these applications can best be applied to realize those organizational benefits and will discuss the associated topics of

supply chain management (SCM), human resource management (HRM), customer relationship management (CRM) and knowledge management (KM).

STAT101 Statistics in the Modern World (3 CH)

The course helps students explore and learn about popular real-world topics using statistics as a tool. It discusses statistical application in population growth, economic developments, income distribution and environmental changes. Key statistical tools will be introduced through their applications in real world issues.

STAT102 Business Statistics I (3 CH)

This course introduces students to decision making based on data in a business context. It covers basic concepts, sources and methods of data collection, tabular and graphic presentation of data, descriptive statistics (measures of location, dispersion, skewness and kurtosis), measures of association between variables, introduction to probability, random variables and probability distributions, sampling distributions, and statistical estimation including interval estimation.

STAT130 Statistics for Business (3 CH)

This course introduces students to the fundamental concepts of statistics and trains them to apply the basic methods and techniques of statistical analysis in business and economics problems. It covers basic concepts, sources and methods of data collection, tabular and graphical presentation of data, descriptive statistics, introduction to probability and probability distributions, sampling distributions, statistical estimation, hypotheses testing, analysis of variance, chi-square test of independence, and correlation and regression analysis.

Prerequisites

- MATH115 with a minimum grade D or MATH105

STAT180 Psychological Statistics I (3 CH)

This course introduces the basic concepts and elementary applications of statistics that are widely utilized by psychologists. It covers data description, central tendency measures, variability indicators, and degrees of peakedness and asymmetry of data distributions. In addition, the normal distribution, standard scores, correlation and their applications in psychology and as well as hypothesis testing will be studied in this course. Statistical packages will be used throughout the course to work out psychological applications.

STAT202 Business Statistics II (3 CH)

This course builds on the knowledge acquired in the Business Statistics I course. It introduces students to the basic methods and techniques of statistical inference and their applications in business and economics. Topics include inference involving one and two populations, analysis of variance, Chi-square tests, nonparametric tests, regression analysis, and time series analysis.

Prerequisites

- STAT102 with a minimum grade D

STAT210 Probability and Statistics (3 CH)

This course introduces students to events and sample space, probability, conditional probability, random variables, cumulative distribution function and probability density function, moments of random variables, common distribution functions, elementary introduction to statistics with emphasis on applications and model formulation, descriptive statistics, sampling and sampling distributions, inference, t tests, one and two factors analysis of variance, randomized complete block design, correlation and regression, and chi-square tests.

Prerequisites

- MATH110 with a minimum grade D or MATH1110 with a minimum grade D

STAT230 Principles of Probability (3 CH)

This course is an introduction to the principles and laws of probability. It gives the student a thorough understanding of the concepts of probability, conditional probability, random variables and probability distributions, moment generating functions, bivariate and marginal distribution functions, conditional distributions and expectations. While the primary focus of the course is on a mathematical development of the subject, it also includes a variety of illustrative examples and exercises that are oriented towards applications in social and physical sciences, and business.

Prerequisites

- MATH110 with a minimum grade D
- STAT202 with a minimum grade D

STAT235 Statistics for Biology (3 CH)

This is an introductory course for students in biological sciences who have no formal background in statistics. It covers the basic statistical methods for describing and analyzing data arising in the biological sciences. The emphasis will be on the intuitive understanding of concepts rather than the underlying mathematical developments. Applications and data analysis will be based on the statistic package Minitab.

Prerequisites

- MATH105 or MATH115

STAT240 Data Exploration and Analysis (3 CH)

This course provides an introduction to exploratory data analysis through statistical programming. The data analytics process will begin with acquiring data from data sources, cleaning the data, and preparing it, through preprocessing, for statistical & computational analysis. The course will lay the foundation of fluency in handling, processing, and transforming data to a structure that enables its analysis. Topics covered in the course include the above steps of data preparation, as well as managing data frames, working with text data, exploratory graphs, visualizing clusters and distributional shapes.

Prerequisites

- STAT202 with a minimum grade D

STAT250 Statistical Graphics (3 CH)

This course introduces students to statistical graphics. It covers principles of graphical design, perceptual psychology, dimensionality reduction, statistical smoothing, trellis/lattice graphs, mosaic plots, 3D and dynamic graphics. Students will be trained to use appropriate statistical software libraries for graphics, reporting, and user interface.

Prerequisites

- STAT240 with a minimum grade D or STAT210 with a minimum grade D

STAT280 Psychological Statistics II (3 CH)

This course introduces the basic concepts of statistical inference and their applications in psychology. It covers sampling distributions, point and interval estimation, statistical hypothesis testing, correlation, regression and prediction, analysis of variance and factorial ANOVA. Statistical packages will be used throughout the course to work out psychological applications.

Prerequisites

- STAT180

STAT300 Introduction to Statistical Inference (3 CH)

The course starts by reviewing the basics of probability and counting, random variables and distributions, bivariate random variables. The course then covers the basic theories underlying statistical analysis techniques in point estimation, interval estimation, and hypothesis testing. Point estimation methods include methods of moments and maximum likelihood. It also elaborates the concepts of bias, variance, and mean-squared error of estimators. Confidence interval construction methods include likelihood-based intervals, inversion methods, intervals based on pivots, Bayesian credible and highest posterior density

regions, and resampling based intervals. Various Markov Chain Monte Carlo (MCMC) computational techniques will be introduced. Hypothesis testing methods include classical and Bayesian approaches.

Prerequisites

- STAT230 with a minimum grade D
- STAT240 with a minimum grade D

STAT330 Survey Methods (3 CH)

This course prepares students to plan and implement surveys, and to analyze survey data. Topics include survey planning and formatting, guidelines to develop questionnaires, data collection methods, various sampling methods (simple random, cluster, systematics, and multiple stages), and methods to maximize response rates and minimize survey errors. The course also covers survey weights for unequal probability sampling, non-response and post-stratification, and standard error estimation for complex samples. Appropriate practices for protecting data privacy and sensitivity in survey research will also be discussed.

Prerequisites

- STAT230 with a minimum grade D
- STAT240 with a minimum grade D

STAT331 Design Of Experiments (3 CH)

This course helps students select the appropriate design for an experiment and analyze its results using statistical packages. It includes complete randomized designs, ANOVA, multiple comparisons, residual analysis, factorial experiments, ANCOVA, randomized block designs, Latin squares.

Prerequisites

- STAT130 with a minimum grade D or STAT210 with a minimum grade D or STAT235 with a minimum grade D

STAT360 Applied Regression (3 CH)

This course introduces students to regression analysis, ridge and robust regression, non-parametric regression and Lasso, and General Linear Models (GLIMs). The emphasis of the course is on practical data analysis and interpretation. Real-world examples and data are analyzed throughout the course using the statistical software R.

Prerequisites

- (MATH140 with a minimum grade D and STAT230 with a minimum grade D and STAT240 with a minimum grade D) or (STAT210 with a minimum grade D and CSBP123 with a minimum grade D)

STAT370 Mathematical Statistics (3 CH)

This course provides a foundation in statistical theory. It covers methods of estimation and properties of estimators with a focus on likelihood-based approaches, interval estimation, tests of hypotheses with a focus on likelihood ratio tests, and theory of linear models. The course illustrates the theoretical concepts and methods through the derivation of some common confidence intervals and tests for means, variances, and proportions.

Prerequisites

- STAT300 with a minimum grade D

STAT380 Statistical Machine Learning (3 CH)

This course introduces students to the principles and techniques of data mining and statistical machine learning, including artificial neural networks. It covers various statistical machine learning techniques, such as data exploration and visualization, supervised and unsupervised machine learning techniques, e.g., classification, regression, cluster analysis, principal component analysis, and ensemble methods for machine learning e.g., boosting and random forests. The course also includes the cross-validation techniques. The emphasis is on the practical implementations and the discovery of patterns and insights from data.

Prerequisites

- STAT360 with a minimum grade D

STAT400 Applied Multivariate Analysis (3 CH)

This course introduces students to the methodology and applications of multivariate statistical analysis. It covers multivariate analysis of variance and regression, canonical correlations, principal components, factor analysis, discrimination, classification, and cluster analysis. The emphasis is on practical implementations and applications to the various disciplines and sciences.

Prerequisites

- STAT360 with a minimum grade D

STAT420 Applied Time Series (3 CH)

This course trains students in selecting and constructing appropriate time series models, estimating their parameters and forecasting with the constructed models. Topics include time series regression, classical decomposition, exponential smoothing, autocorrelation and partial autocorrelation functions, stationary and homogeneous time series; autoregressive, moving average, ARMA and ARIMA models, seasonal models, Box-Jenkins methodology and business applications.

Prerequisites

- STAT360

STAT422 Sampling Techniques (3 CH)

The course develops an understanding of survey research methodologies and data collection methods from scientific and practical perspectives. It emphasizes training students on alternative sample designs used to produce statistical inferences to solve real-life problems. In addition to discussing survey methods and design, it covers: simple, stratified, systematic and cluster sampling, ratio and regression estimates, errors in sample surveys and case studies.

Prerequisites

- STAT130 with a minimum grade D
- STAT230

STAT430 Categorical Data Analysis (3 CH)

This course is an introduction to topics in categorical data analysis. It is an applied course emphasizing the modeling and analysis of categorical data using mainly the R statistical software. Both descriptive and inferential methods are discussed. The covered topics include measures of association, tests of goodness-of-fit, tests of independence, exact tests, logit and probit models, and discriminant analysis.

Prerequisites

- MATH140 with a minimum grade D
- STAT230 with a minimum grade D
- STAT240 with a minimum grade D

STAT460 Bayesian Statistics (3 CH)

The aim of this course is to introduce students to the Bayesian statistical modeling and inference and to the related computational strategies and algorithms. The course starts with the logic behind Bayesian data analysis, including the mathematical formalization of updating beliefs under uncertainty, followed by the treatment of simple models, such as those based on normal and binomial distributions. Concepts of conjugate and non informative priors are illustrated, for single and multi-parameters models. Basic treatment of hierarchical models and linear regression models are also covered. Bayesian computational methods such as the Gibbs sampler and Metropolis-Hastings algorithms are briefly presented, with an emphasis on their implementation and use on simple cases.

Prerequisites

- STAT300 with a minimum grade D

STAT470 Introduction to Statistical Computing (3 CH)

The course introduces students to common computational techniques needed in statistics. It covers topics such as data manipulation, generation of random variables, simulation, resampling, bootstrapping, and jackknifing. The course also covers probability density estimation and elementary Bayesian analysis using MCMC methods. Furthermore, parallel computing and cloud computing implementations are introduced with basic practical examples. These techniques are demonstrated using a statistical programming language.

Prerequisites

- STAT230 with a minimum grade D
- (STAT240 with a minimum grade D or STAT360 with a minimum grade D)

STAT475 Selected Topics in Statistics and Data Analytics (3 CH)

This course covers topics in statistics and data analytics that broaden the students understanding of statistical theory and methods, which are not covered in the other courses offered in the Bachelor of Science in Statistics and Data Analytics program.

STAT480 Capstone in Statistics and Data Analytics (3 CH)

This capstone course uses the case teaching approach to enable students to synthesize and deepen their knowledge of statistical methods and theories and data analytics techniques learned in earlier courses. Students work individually and in groups to analyze a variety of data-centric cases drawn from the real-world. Covered topics include sampling and survey design, techniques for handling, cleaning, extracting, organizing, and processing real data, as well as data ethics and quality. Students apply their statistical modelling and computational skills to develop comprehensive solutions to data-driven problems. Through a multitude of case studies drawn from the real-world, students advance their skills, exposure, and experience in diverse applications of statistics and analytics.

Prerequisites

- GBUS300 with a minimum grade D
- STAT330 with a minimum grade D
- STAT380 with a minimum grade D

- STAT400 with a minimum grade D
- STAT460 with a minimum grade D
- STAT470 with a minimum grade D

STAT482 Capstone in Analytics for Business (3 CH)

This capstone course uses the case teaching approach to enable students to synthesize and deepen their knowledge of statistical methods and theories and data analytics techniques learned in earlier courses and apply this knowledge for business analytics. Students work individually and in groups to analyze a variety of business analytics problems, including issues posed by big data drawn from real-world problems. Covered topics include techniques for handling, cleaning, extracting, organizing, and processing real world data from business and industry, as well as data ethics and quality. Students apply their statistical modelling and computational skills to develop comprehensive solutions to data-driven problems. Through a multitude of case studies drawn from the real-world, students advance their skills, exposure, and experience in diverse applications of analytics for business.

Prerequisites

- GBUS300 with a minimum grade D
- BANA400 with a minimum grade D
- STAT300 with a minimum grade D
- STAT400 with a minimum grade D

STAT500 Bridging Statistics (1 CH)

The bridging course in statistics aims to give students with no statistical background a good knowledge of descriptive statistics and probability and probability distributions. These topics, covered in most introductory statistics courses, are a pre-requisite knowledge for the course STAT 609 (Decision Techniques and Data Analysis).

STAT503 Applied Statistics (2 CH)

This course is dedicated to graduate students from College of Science. It introduces the students to the basic statistical procedures commonly used in the analysis of scientific and environmental problems. These statistical applications complement and reinforce scientific and environmental concepts and methods, particularly in practical, development and assessment models,

and interpretation of data and results. It includes numerical and graphical description of data, techniques for significance evaluation and relationships

STAT520 Foundations for Analytics (3 CH)

This course introduces probability and statistics, as the primary foundations of analytics. Topics include data and summary statistics, descriptive statistics - both graphical and numerical-, basic concepts of probability, normal distribution, survey design, sampling, inference: hypothesis testing and analysis of variance, and correlation. The course also presents simple linear regression, significance tests, multiple regression, and time series analysis. Application of the topics and methods is demonstrated with real world data, using spreadsheet software and effective statistical packages.

Prerequisites

- STAT130 with a minimum grade D or STAT500 with a minimum grade D

STAT555 Data Analytics & Machine Learning (3 CH)

Data analytics applies visual, statistical, and computational models and methods systematically, for discovering insights from data. In the context of enterprises, such insights are essential for improving performance and achieving success in the markets. In data analytics, data is collected, processed, modeled, and analyzed through descriptive, predictive, and prescriptive methods. Some of the most powerful methods of data analytics come from the field of machine learning, a branch of artificial intelligence (AI), where algorithms automatically learn hidden patterns from data. Besides providing definitions, goals, and processes, this course presents a multitude of technical topics and methods, including supervised (regression, classification) and unsupervised (association mining, clustering) machine learning, predictive modeling, model fitting, overfitting and its avoidance, model evaluation, and visualization of model performance. Methodological foundations are supported with case study discussions and illustrated through experiential learning, where real-world datasets are analyzed with powerful modeling software.

Prerequisites

- STAT520 with a minimum grade D

STAT609 Decision Techniques and Data Analysis (3 CH)

The course provides a structured approach for describing, analyzing, and finalizing decisions involving uncertainty. It introduces various decision analysis techniques and principles of designing decision support systems for carrying out sensitivity analysis. It also presents key probability and statistical techniques used in modeling and analyzing business data and providing empirical evidence for action recommendation. Topics include decision analysis techniques, descriptive and inferential statistics, one-way and two-way analysis of variance, modelling using regression analysis, times series regression, exponential smoothing and forecasting.

Prerequisites

- STAT210 with a minimum grade D or STAT130 with a minimum grade D or STAT500 with a minimum grade D

STAT612 Experimental Design & Analysis (3 CH)

This courses provides students with an understanding of the required steps in planning experiments; principles of experimental design; application of some designs in product development systems and evaluation factorial design; linear programming, CRD, RCD, LS, regression and correlation: and inspection of mean differences.

STAT615 Design/Analysis of Experiments (3 CH)

This course focuses on design of experiments, optimum selection of input for experiments, and the analysis of results. Full factorial as well as fractional factorial designs, response surface designs, complete randomized designs, ANOVA, multiple regression, normal probability plot, importance of analyzing interactions, signal to noise ratios, confidence intervals, and variance reduction analysis are covered in this course. Statistical analysis software such as SPSS and Minitab will be used.

Prerequisites

- STAT210 with a minimum grade D or STAT220 with a minimum grade D or STAT503 with a minimum grade D

STAT621 Multivariate Systems & Modeling (3 CH)

This course provides students with an understanding of mathematical models for evaluating resource management strategies. It covers stochastic and deterministic simulation for optimization, System control structures and team modeling approach.

STAT640 Statistics & Quantitative Analysis (3 CH)

This course prepares MBA students to design and conduct research to address and solve business challenges. It provides an empirical basis for the analysis and action recommendations for the solution of business problems or for the achievement of business objectives. MBA students will learn to frame, plan, and conduct research projects as well as developing and fine-tuning forecasting models. Students will apply key statistical techniques used in modeling and analyzing research findings and business data.

STAT661 Geo-Statistics (2 CH)

This course provides students with an understanding of computer-based methods in geographical analysis. It focuses on bivariate and multivariate regression, discriminant analysis, factor analysis, and analysis of spatial and temporal data.

STAT710 Advanced Statistical Models (3 CH)

The course provides an in-depth study of regression and analysis of variance models. Topics include multiple regression and model building, multiple and partial correlation, analysis of residuals, analysis of variance, multivariate analysis of variance, generalized linear model, and various applications of statistical modeling. Computer software packages such as SAS, SPSS, or R will be used to carry out the data analysis. This course is designed for doctoral students to get familiar with statistical modeling for their research projects. The emphasis of the course is on the applications and fine-tuning of statistical modeling techniques.

STAT712 Advanced Quantitative Research Methods (3 CH)

The course provides an in-depth study of advanced statistical methods used in quantitative research. It covers important modeling and analysis tools which

include Analysis of Variance (ANOVA), Analysis of Covariance (ANCOVA), multivariate analysis of variance (MANOVA), multiple regression including interactions, logistic regression, discriminant analysis, factor analysis, and structural equation modeling. The course emphasizes applications using a comprehensive statistical packages such as SPSS, MINITAB, SAS or R.

Prerequisites

- CURR710 with a minimum grade C

STAT715 Design and Analysis of Experiments in Applied Sciences (3 CH)

This course focuses on the design and analysis of experiments in applied sciences. It covers ANOVA, full and fractional factorial designs, blocked designs, response surface designs, robust designs, experimentation and modeling strategies, and parameter design optimization. Statistical analysis software such as Minitab and R will be used.

Prerequisites

- STAT235 with a minimum grade D or STAT503 with a minimum grade D

Department of Accounting and Finance

ACCT100 Principles of Financial Accounting (3 CH)

This course aims at introducing the financial accounting principles and framework. It covers the preparation of financial statements,the accounting cycle in both service and merchandising organizations, and problems of accounting measurement

ACCT225 Fundamental of Cost & Management Accounting (3 CH)

This is an introductory course to the discipline of Cost & Managerial Accounting. As College requirement, it is conceptually oriented. The course

focuses on the role of cost and managerial accounting as an information system to help various management levels to perform their functions efficiently. It is designed to introduce that role to students with different specialization interests not only accounting. Generally, the course discusses the basic cost and managerial accounting concepts and application, the relationship of cost and volume with profit, decision making differential analysis, flexible budgeting and performance analysis and measurement.

Prerequisites

- ACCT100 with a minimum grade D

ACCT235 Intermediate Accounting I (3 CH)

This course facilitates the transition from financial accounting principles to the financial reporting in order to prepare students for professional accounting careers. It covers the accounting and reporting process. This course covers components of the income statement, balance sheet, followed by the cash flow statement.

Prerequisites

- ACCT100 with a minimum grade D
- ESPU240 with a minimum grade D

ACCT245 Intermediate Accounting II (3 CH)

This course expands the knowledge acquired in fundamentals of financial accounting and intermediate accounting 1. It develops required topics to facilitate the transition to the large environment of financial reporting. Intermediate accounting 2 is devoted to apply international accounting principles and standards related to recognition and valuation of assets (topic 1), liabilities (topic 2) and equity (Topic 3). Consequences of these issues on financial reporting and financial statements are discussed.

Prerequisites

- ACCT235 with a minimum grade D

ACCT311 Islamic Accounting (3 CH)

This course is designed to enable accounting students to identify and apply the accounting principles and procedures of the various modes of Islamic financial transactions. It covers topics such as Islamic banking and finance, zakat, takaful, insurance and awqaf. The course also emphasizes ethics and accountability in accounting for the Islamic products and services. While the course is based on AAOIFI accounting standards, comparison to IFRS standards are also included.

Prerequisites

- ACCT245 with a minimum grade D

ACCT315 Principles of Auditing (3 CH)

This course will introduce the student to auditing. The major concepts of materiality, audit risk and evidence will form the conceptual framework for the course. Topics emphasized will include the necessity of the auditing function, professional ethics, the auditor's objectives, responsibilities, and liabilities in relation to a company's financial statements. The student will become familiar with the auditor's approach to various audit decisions under International Standards for Auditing (ISAs), applied in the UAE. Finally, the student will learn about the formation of the auditor's opinion and the basics of writing the audit report. Skills needed and developed in this course include mainly writing and critical thinking skills. The course will contribute to the student's research skills as well.

Prerequisites

- ACCT235 with a minimum grade D

ACCT324 International Accounting (3 CH)

The primary objective of this course is to provide students with an appreciation of the variety of accounting systems prevalent worldwide and the extent, causes and possible effects of the international diversity of financial accounting and reporting. Students get an overview of the main topics in international accounting and an introduction to the international dimensions of financial statement analysis. They will learn about differences in financial measurement and reporting practices that exist internationally, the reasons for

these differences, their resultant financial statement effects and methods that they can employ to cope with such differences. Students will also learn about the international financial reporting standards (IFRS) movement and the implications of reading financial statements based on IFRS.

Prerequisites

- ACCT245 with a minimum grade D

ACCT334 Governmental Accounting (3 CH)

This course introduces the theory and concepts underlying accounting, control, and financial reporting in governmental and non-profit (G&NP) organizations with emphasis on funds and fund accounting. It acquaints students with full knowledge of the budget cycle for governmental organizations. It also covers the financial accounting and reporting for colleges and universities and for health care organizations.

Prerequisites

- ACCT225

ACCT351 Cost and Managerial Accounting (3 CH)

This is an intermediate level course in Cost & Managerial Accounting. The course covers various costing systems such as: job costing, process costing, and activity based costing, as well as cost allocation methods. It includes intermediate management accounting concepts such as budgeting, variance analysis, and organizational performance.

Prerequisites

- ACCT225 with a minimum grade D

ACCT352 Oil and Gas Accounting (3 CH)

This course describes the features of the oil and gas industry and provides the fundamentals of accounting treatments of oil and gas operations such as exploration, drilling, development, and production. It covers the accounting

standards related to recording and disclosure of oil and gas activities especially under successful efforts method. An overview of the full cost method is also provided.

Prerequisites

- ACCT235 with a minimum grade D

ACCT353 Internal Auditing (3 CH)

This course introduces students to the internal auditing profession as the function responsible for providing assurance in a corporate governance context. Students will learn the concepts of risk management, business process analysis and internal control systems based on the COSO Framework and in accordance with the International Professional Practices Framework (IPPF) for Internal Auditors. Students will practice the application of those concepts to real life organizations through conducting a field project, which is an integrated major learning approach in this course.

Prerequisites

- ACCT315 with a minimum grade D

ACCT413 Advanced Auditing (3 CH)

This course provides the students with the knowledge and skills to exercise judgment in the management of the audit process as well as the application of some audit techniques. The emphasis of this course is on the auditor's decision making process. It equips the students with the concepts needed in determining the nature and amount of evidence. The above is conducted in the context of best practice and current developments.

Prerequisites

- ACCT245 with a minimum grade D
- ACCT315 with a minimum grade D

ACCT422 Accounting Information Systems (3 CH)

This course aims at helping students understand accounting information systems and their role in organizations. In this course, students will understand business cycles and the role of AIS in capturing, manipulating, and disseminating accounting information. Topics to be covered include transaction processing, systems documentation techniques, revenue cycle, and expenditure cycle. Students will also have hands-on experience using an accounting software.

Prerequisites

- ACCT225 with a minimum grade D
- MIST215 with a minimum grade D

ACCT423 Advanced Accounting Information Systems (3 CH)

This course provides students with the AIS knowledge, skills needed in transactions control procedures, and financial reporting cycle. In addition, students will have hands-on experience using an Enterprise Resource Planning system (ERPs). Topics to be covered include databases, integrated accounting systems, ERPs, computer crime and ethics, computer control for AIS, and the use of eXtensible Business Reporting Language (XBRL) in accounting reporting.

Prerequisites

- ACCT422 with a minimum grade D

ACCT451 Advanced Accounting (3 CH)

This course covers the conceptual basis and practical aspects of accounting for business combinations. It focuses on three themes: accounting for business combinations, foreign currency transactions, and the translation of financial statements of foreign affiliates. The course adopts an experiential approach to learning and teaching where real life business information and students own everyday experiences are drawn upon to demonstrate concepts explored.

Prerequisites

- ACCT245 with a minimum grade D

ACCT452 Advanced Managerial Accounting (3 CH)

This course focuses on various advanced management accounting topics. The unit provides an insight into some contemporary management accounting practices/techniques. It covers two main perspectives: strategic management accounting techniques and performance management / measurement and controlling techniques

Prerequisites

- ACCT351 with a minimum grade D

ACCT453 Accounting Theory (3 CH)

This course helps students to clearly identify the elements of accounting theory and then relate these elements to significant problem areas in accounting. The students should thus acquire an increased depth of understanding of the major problem areas of accounting and the related standards going well beyond a mere technical grasp of debts and credits. This course is a sequential course to other accounting courses in that it furnishes students with necessary knowledge of the theoretical framework of financial accounting. After successful completion of those recording and reporting financial accounting courses, students are ready to learn about the theoretical concepts and framework behind accounting processes. The Financial Accounting Standards Board (FASB) contributes to the development process of ethical standards and accountants are required to apply their knowledge and skills and make decisions according to the Code of Ethics and Professional Code of Conduct. This course refers to issues of ethical standards (throughout the whole chapters) to enhance the application of students to such standards. Students are expected to be assessed in case studies of ethical standards.

Prerequisites

- ACCT235 with a minimum grade D

ACCT455 Comprehensive Accounting Seminar (3 CH)

This capstone course is designed to extend, integrate, and critically reflect students' understanding of theoretical and practical issues in accounting, including the analytical and decision making processes for business enterprises. The course focuses on developing students' soft skills including problem solving, critical thinking, teamwork, communication, and research.

Prerequisites

- ACCT245 with a minimum grade D
- ACCT315 with a minimum grade D
- ACCT351 with a minimum grade D

ACCT500 Elements of Accounting and Finance (3 CH)

This is a foundation pre-requisite course for those who do not have a first degree in accounting or business. The course introduces financial accounting, its role, nature, purpose and limitations of accounting conventions. Regulatory accounting framework. Financial statements construction, use and interpretation. Legal and economic considerations including elements of taxation. Basic principles of corporate governance. The course also covers introduction to finance. The financial system and flow of funds. The financial decisions of firms, investment appraisal, and life-cycle financial planning. The module also introduces managerial accounting.

ACCT505 Financial and Corporate Reporting (3 CH)

This is a foundation pre-requisite course for those who do not have a first degree in accounting. In this course, students will learn the environmental and theoretical structure of financial accounting, the accounting process, and preparation of an income statement, balance sheet and statement of cash flows. Students will also learn how to measure income, do profitability analysis and to apply time value of money concepts to financial accounting measurements. In this course students will learn how to account for the economic resources and liabilities of an enterprise.

ACCT510 Management and Cost Accounting (3 CH)

This is a foundation pre-requisite course for those who do not have a first degree in accounting. Students study the information needed by managers to

plan, monitor, and improve their critical processes, products, and services. This course stresses the application of information technologies to tasks such as measuring costs to produce, market, and deliver products and services; planning via flexible budgets and cost volume profit analysis; Students communicate implications of their analyses to stakeholders using database, spreadsheet, and word processing skills.

ACCT600 Advanced Financial Accounting (3 CH)

This course is designed to deal with financial accounting and reporting by corporations. It focuses on three main themes. The first theme covers the conceptual basis and practical aspects of accounting for business combinations. The second theme focuses on the measurement, reporting and disclosure issues associated with foreign currency transaction and the accounting implications of hedging foreign currency exposed assets and liabilities. The final theme deals with the translation of the financial statements of foreign affiliates into reporting currency of the investor company.

ACCT601 Accounting for Senior Managers (3 CH)

This course is designed to help students appreciate the role of accounting and the functions accounting performs inside and outside the business entity. It comprises two distinct but related components: (1) Financial accounting and the development of financial accounting systems that perform stewardship and governance functions of business entities. Students will be exposed to issues related to agency relationships, financial reporting, concepts and theoretical foundations underlying financial statements, financial statement analysis and diagnosis, use of accounting information in managerial planning, decision making, control, and performance evaluation. (2) Managerial accounting, covering internal cost management, cost control, cost analysis in developing organizational budgets, performance evaluation, and strategic decision making.

ACCT603 Management Accounting & Financial Analysis (3 CH)

This course covers financial and management accounting tools and techniques applied in economic decision-making in a variety of organizational contexts. It addresses how managers use accounting information to choose strategies, implement them into day to day management and communicate with internal and external stakeholders. Upon completion of the course students would have gained ability to understand, financial statements and statement analysis, make capital investment decisions, the effects of overhead costs on Product costing and Pricing, various methods of building operational budgets and be

familiar with modern Process Management and Accounting and making capital investment decisions.

ACCT610 Accounting Analysis & Governance (3 CH)

The course helps students develop their ability to understand accounting analysis and governance in a way that suits the needs of those who are looking to improve their decision making process as entrepreneurs, mangers or executives. The course uses practical examples and real-world cases, including more recent frauds and scandals, to enhance the discussions of accounting analysis. It provides valuable guidance to assess risks, measure performance and conduct valuations processes to create shareholder value. It discusses corporate governance systems and mechanisms as evidenced by the role of boards, institutional investors, transparency (i.e., disclosure, internal control, and audit), and other internal and external mechanisms. It links the roles and responsibilities of all those involved in corporate governance and the financial reporting process to improve the quality, reliability, relevance, and transparency of accounting information.

ACCT611 Accounting for Strategic Decisions (3 CH)

"The main objective of this course is to discuss ways management accounting tools/techniques can be used for strategic planning, control and performance measurement. It is divided into four interrelated parts: 1) accounting and strategic management, where it sheds light on using management accounting tools to help in utilising organisational resources in pursuit to achieve strategic goals; 2) performance measurement/management at various organisational levels, whereas it provides participants with frameworks of measuring/managing organisational performance in relation to overall strategy; 3) strategic investment decisions and control; and 4) using management accounting tools in addressing issues related to environmental awareness as a strategic objective. "

ACCT615 Advanced Management Accounting (3 CH)

This course focuses on management accounting techniques to be used in cost management; decision making under uncertainty, and planning. The course provides useful information on using effective methods for costs management, which enhances execution of organisational objectives at operational level. It discusses decision making under uncertainty and financial modelling (sensitivity analysis, scenario analysis, Monte Carlo analysis) in analyzing impact of uncertainty on future financial outcomes. It, also, discusses

contemporary trends in effective budgeting practice. The course applies excel applications in accounting techniques.

ACCT620 Auditing, Accountability and Assurance Services (3 CH)

The aim of this course is to enable students to understand: the social importance, nature and objectives of the audit function; the audit process and the principles of audit practice, and evaluate their relevance for wider processes of accountability and governance. This course develops students' knowledge of auditing, attest, and assurance services in traditional and e-business environments. Topics include the role of such services in society, evidence relevance and reliability, materiality, risk and control, information integrity, and methods of verification.

ACCT630 Financial Accounting Standards, Theory and Policy (3 CH)

The course focuses on conceptual framework of financial reporting, including issues of definition, valuation and presentation of contents of financial reports. The course explains alternative approaches to presenting information in financial statements as mandated by accounting standards. It discusses the reasons of moving towards a concept of comprehensive income and what this means for users of accounts. The course addresses important issues such as accounting theories as a basis for developing standards and policies, the impact of harmonisation on accounting standards, accounting earnings quality in an international context, the impact of corporate governance, and earnings management amongst others.

ACCT635 Financial Statements Analysis (3 CH)

This course takes a user-oriented approach to the study of financial statements. It helps students use the information provided in financial statements to make reasoned decisions in different business environments. The course focuses on the analysis and interpretation of corporate financial statements and explains how competitive forces and business strategies affect firms’ financial statements. The course also provides the student with the knowledge and ability to identify how and when firms are managing earnings and manipulating other items in financial statements.

ACCT640 Management Control Systems (3 CH)

This course examines a wide range of fundamental managerial techniques used by companies in their internal planning and control functions. In particular, it focuses on investment analysis techniques, international transfer pricing, types of control systems, issues of contracting and management control across organizational and international boundaries, financial and non-financial performance measures, and incentive systems in various organizations.

ACCT645 Seminar on Applied Research in Accounting (3 CH)

This course helps students develop applied professional research skills in accounting and auditing. The course provides concrete applied research guidance. It discusses relevant sources and methods to research standards issued by FASB/IASB and to find solutions to current accounting problems. The course also emphasizes how applied research could generate empirical results that advance professional interests and capabilities.

ACCT661 Accounting in Special Contexts (3 CH)

This elective course will be tailored depending on the professional background of the students enrolled in it. Topics covered (but not all) should be related to issues in management accounting and financial management in government and public sector, and not-for-profit organizations. In addition, topics selected can cover issues related to Ecommerce Business and the role of budgeting in governmental and not-for-profit organizations.

ACCT662 Risk-based Internal Auditing (3 CH)

This elective course will build on some of the material covered in the core modules relating to corporate governance and control. Internal audit is one of the most important and basic business functions that are increasingly gaining more importance, especially after many corporate collapses such as Enron and WorldCom. Topics covered include the Enterprise Risk Management (ERM) framework, business risks, business process analysis and internal control systems. Application of the concepts taught to real life organizations is an integrated fundamental part of this course.

ACCT663 Accounting for Islamic Financial Institutions (3 CH)

This elective course is designed for students with special interest on accounting in Islamic financial institutions. It is designed to enable students to identify and apply the accounting principles and procedures of the various modes of Islamic financial transactions. It covers topics such as Islamic banking and finance, zakat, takaful, insurance and awqaf. The course also emphasizes (accountants and auditors) ethics and accountability in accounting for the Islamic products and services.

ACCT664 Legal Environment and Taxation (3 CH)

This elective course covers business legal environments and taxation issues and accounting. The first part discusses the structures and legal environments for corporate and non-corporate business organizations. Contract and agency framework are also covered in this part. The second part teaches the administration, management and accounting methods for individuals, corporate and non-corporate organizations and consumption (Value Added Tax) taxation. The conditions and computation of capital allowances for plants and machineries are included next. The course concludes with a discussion on the ethical issues, legal and financial implication of taxation and zakat.

ACCT665 Strategic Management Accounting (3 CH)

This is an elective course that compliments managerial accounting courses in the core. This course aims to examine the use of financial and non-financial information for the purpose of analyzing business strategy and associated processes to achieve superior organizational performance. The course introduces a number of strategic management accounting tools and techniques that can be used to analyze how business strategy and associated processes consume resources, create value for a firm and its customers, and how this value may be enhanced through continuous improvement.

ACCT666 Selected Topics in Financial Reporting (3 CH)

This elective course highlights some of the main issues that need particular attention within the financial reporting area. These topics include, but not limited to, issues of uncertain tax positions, XBRL, issues of fair value, servicing assets and liabilities, issues of complexity in financial reporting, derivatives, and pensions.

FINC240 Principles of Financial Management (3 CH)

This course focuses on the role of financial management in maximizing the value of the firm. The course covers the basic building blocks of financial management, which will be needed in more advanced courses in finance and banking. The core of this course is on the principles of modern corporate finance and financial management. It emphasizes important concepts and techniques needed for financial decision-making. Topics covered include: Business ownership, time value of money, valuations of bonds and stocks, money and capital markets, financial analysis, financial planning, risk and return analysis, capital budgeting, cash flow analysis, capital structure, financial planning, dividends policy, cost of capital, working capital management.

Prerequisites

- ACCT100 with a minimum grade D

FINC261 Financial Institutions & Risk Management (3 CH)

This course takes a risk management approach to the analysis of financial institutions operations and is designed to develop an understanding of the challenges in the management and regulation of financial intermediaries. As such, this course is designed to provide students with a conceptual framework necessary for analyzing and comprehending the current problems confronting managers of depository institutions and other intermediaries. It begins with a description of the institutional structure of financial institutions and the current global initiatives to regulate the risk management of banks (Basel accords on capital adequacy). It then characterizes the primary risks financial institutions confront. This is followed by development and use of risk management tools by financial institutions. The emphasis will be on the risk structure, operations and regulation of depository institutions.

Prerequisites

- FINC240
- ECON215

FINC341 Corporate Finance (3 CH)

The course reviews and reinforces the basic concepts covered in principles of financial management (FINC 240) and completes on them. Building on students? knowledge of ratio analysis, financial statements, time value of money, stock and bond valuation and capital budgeting, the primary objective of this course is to expand on that knowledge by introducing students to real world examples of how these concepts are used in day to day corporate strategic planning and decision making. Topics covered include financial analysis using both quantitative and qualitative data, theories of capital structure & dividends, long-term financing decisions and the appropriate use of debt/equity, calculation of optimal capital structure, sources and uses of short-term financing and cash management, mergers & acquisitions, bankruptcy & financial restructuring and corporate governance. A large array of applications and case studies is used to support the practical side of the different topics of this course.

Prerequisites

- FINC240 with a minimum grade D

FINC344 Islamic Finance and Banking (3 CH)

This course aims to provide the essential understanding of Islamic economics and Islamic finance, including the setting up of traditional Islamic financial tools and practices and the development of modern Islamic banking and financial instruments and institutions. The course examines and relates the theory of Islamic finance to recent development in Islamic banking and financial industry. Topic covered include money policy, profit sharing, Islamic financial and banking institutions and their operations, Islamic banking model and alternative models of financing and structuring of Islamic investment funds.

Prerequisites

- FINC240 with a minimum grade D

FINC348 International Finance (3 CH)

This course provides a foundational knowledge of the international business environment as well as introduces ideas on how financial management helps multinational firms operate optimally in that environment. The course focuses

on international financial management within the multinational firm and provides an understanding of international regulatory and environment differences, the different foreign exchange regimes, balance of payments, access to money and capital markets, use of derivatives to hedge exchange rate risk, measurement and management of exposure to exchange rate and interest rate fluctuations, and international diversification. Emphasis is on international financial decision-making through the extensive use of cases and real-world examples.

Prerequisites

- FINC240
- ECON215

FINC377 Investment (3 CH)

The course builds upon the concepts covered in the principles of financial management course (FINC 240). This course introduces the students to the analysis of investment information, evaluation of risks and returns, and principles of portfolio selection in investment decisions. This course focuses on securities markets, investment risk-return tradeoff, asset pricing models, and stock price behavior in relation to capital market efficiency hypotheses. Particular emphasis is placed on stocks, bonds, mutual funds and financial futures and options contracts. Special prominence is given on the study of the operations of securities markets, investment policies, valuation of individual securities, and techniques of investing in securities. Topics covered include investment instruments and their characteristics, introduction to portfolio and capital market theory, theory of valuation of stocks, bonds and the term structure of interest rates, options, commodity and financial futures, investment companies and mutual funds, and international investments.

Prerequisites

- FINC240 with a minimum grade D

FINC434 Financial Statement Analysis and Business Valuation (3 CH)

This course is designed to prepare the students to interpret and analyze financial statements in various decision-making contexts. Indeed, Mergers, acquisitions, distress prediction, credit analysis, and security analysis rely on financial data and require full awareness of the financial position of the firm.

Therefore, in order to analyze corporate decisions in those contexts, analyzing financial statements becomes vital as a milestone to conduct prospective analysis and valuation. Moreover, the financial performance of the firm crucially depends on various other factors among them: the business policy and the business environment. This course integrates financial statement analysis and performance evaluation in various corporate decision contexts. Ultimately this course aims to familiarize students with firm valuation using financial statements in view of the business strategy and the accounting policies adopted by the firm. The course briefly familiarizes students with understanding business policies, reporting policies then it offers a good platform for analyzing financial statements and conducting prospective analysis aiming to evaluate M&A decisions, distress prediction, credit analysis and equity security analysis etc...

Prerequisites

- FINC341

FINC463 Case Studies in Finance (3 CH)

This course emphasizes the case study approach to intermediate financial management (corporate finance and security analysis). It focuses on examining a theoretical or practical topic proposed by the faculty beyond what is offered in existing finance and banking courses. The course deals with the applications of principles and techniques of corporate finance to the real-world situations through the intensive use of case studies. Topics covered include advanced capital budgeting, corporate governance, mergers and acquisitions, capital structure, dividend policy, short-term financial management and advanced security analysis techniques.

Prerequisites

- FINC341
- FINC377

FINC472 Portfolio Management (3 CH)

The course deals with the theoretical and operative framework of advanced investment management using modern portfolio theories and money management techniques. It builds and expands on the knowledge the students gained in FINC 377 (Investments). It studies how optimal portfolios are

constructed, the relation between risk tolerance and asset allocation, the use of hedging instruments to manage risk or/and enhance expected returns, and performance evaluation given the investor's objectives and constraints. In this course, students will apply portfolio models and concepts to actual market data to perform analytical skills and evaluate equities, fixed income securities and other investments. Asset pricing, diversification and other financial models are covered in detail. Active versus passive investment strategies, trading practices and the role of derivatives in managing securities risk, through case study and simulation approach, will be highlighted throughout the course.

Prerequisites

- FINC377 with a minimum grade D

FINC474 Selected Topics in Finance (3 CH)

The course covers highly specialized topics in finance with a special focus on advanced financial strategies. The course builds on the contents covered in earlier finance courses and provides a gate for students to broaden their understanding of various finance topics that are applicable in the industry nowadays. The course can be designed to focus on restructuring topics such as mergers and acquisitions including various types of M&A transactions, merger motives, performance of the merging parties, the method of financing M&As, the valuation of target firms and evaluation of synergies, in addition to related topics such as corporate governance and restructuring such as divestiture, spin-offs, buyouts, etc. The course can also cover other topics such as venture capital and private equity as well as other contemporary selected topics in finance of particular interest such as behavioral finance and real estate finance.

Prerequisites

- FINC341
- FINC377

FINC475 Derivatives Securities (3 CH)

This course emphasizes derivatives products theories and its applications in financial markets. The course covers the conceptual and practical aspects of the use of derivative products for speculation and hedging purposes. Comprehensively studies equity and debt-based options, futures and other

derivative instruments. It discusses the functioning of options and futures markets and the role of the market participants. Derivative instruments are analyzed with a focus on pricing, hedging techniques and arbitrage applications. Topics covered include derivatives products theories and applications, derivatives exchanges, valuation of derivatives (futures, forward, swaps and options contracts on different underlying assets), trading practices and regulations and the corporate management of financial risks. Case work and analysis is emphasized throughout the course.

Prerequisites

- FINC377 with a minimum grade D

FINC610 Financial Management (3 CH)

This course aims at introducing MBA students to the essentials of modern corporate finance, financial management, and the process of financial decision-making at the corporate level. It focuses on the role of financial management in maximizing the value of the firm. It provides a framework for understanding the financial dimensions of implementing a competitive strategy in an unpredictable global economy. Throughout this course, students will examine the three responsibilities of a financial manager: (i) Making good investment decisions; (ii) Making good financing decisions; and (iii) implementing appropriate payout policies. Emphasis is on financial decision-making through the extensive use of cases and real-world examples.

FINC640 Advanced Corporate Finance (3 CH)

The course builds on FINA 610 Financial Management course and analyzes a variety of issues. The course is concerned with analyses of the financial policies and strategies of corporations using the case study approach. The topics covered include advanced project valuation using real options, cost of capital and capital structure, distribution policy including dividends and share repurchases, raising capital, mergers and acquisitions, leverage buyouts, corporate failure and restructuring. The course is useful for any student who is contemplating an eventual senior management position in a corporation. The course is also useful for investment managers and analysts. The course bridges the gap between theory and practice by using real life cases for international and regional corporations, where students are exposed to strategic financial decisions faced by corporation and will be stimulated to apply their analytical skills and reasoning in proposing optimal solutions to the problems in place.

FINC650 International Finance & Banking (3 CH)

The course focuses on the unique problems encountered by the international treasurer or chief financial officer of multinational corporations. It is the international sequel of a corporate finance course and as such it revisits the same funding/financing and investment questions within a multi-currency setting. This course is designed to provide a foundational knowledge of the international business environment and to introduce ideas on how financial management helps multinational firms operate optimally in that environment. Emphasis is on international financial decision-making through the extensive use of cases and real-world examples.

FINC660 Investment & Portfolio Management (3 CH)

This course introduces the students to the analysis of investment information, evaluation of risks and returns, and principles of portfolio selection in investment decisions. It offers an analysis of investments in financial securities, with an emphasis on portfolio theory and provides the theoretical and operative framework for portfolio and advanced investment management in the securities markets. This course focuses on securities markets, investment risk-return tradeoff, asset pricing models, and stock price behavior in relation to capital market efficiency hypotheses. Particular emphasis is placed on stocks, bonds, mutual funds and financial futures and options contracts. Special prominence will be given on the study of the operations of securities markets, investment policies, valuation of individual securities, and techniques of investing in securities. A large array of applications and case studies is used to support the practical side of the different topics of this course. At the minimum the course should include the following topics: the purpose and operations of security markets; investment instruments and their characteristics; introduction to portfolio and capital market theory; theory of valuation of stocks, bonds and the term structure of interest rates; options, commodity and financial futures, investment companies and mutual funds; and international investments.

FINC670 Advanced Risk Management (3 CH)

Managers with financial responsibilities are expected to have a working knowledge of the principles and practices of pure and financial risk management. Financial reporting is now seen as less important than skill in financial decision making. The volatility in financial and commodity markets clearly shows that firms face risks. Financial risk management aims to analyze,

control, and if necessary, reduce those risks to an acceptable level. This is an essential aspect of financial management and one increasingly sought by practitioners. The course focuses on the application of risk management to the issues and problems of financial theory. Topics will include risk exposures (pure and speculative), methods of risk handling, interest rate risk and gap analysis, linear and nonlinear products, capital risk and Basel II, the VaR measure of market risk, credit risk and probability of default measures, operational risk, model risk and liquidity risk, and currency risk. The course will build upon the analytical skills developed in Financial Management and Corporate Strategy.

FINC680 Islamic Finance & Financial Institutions (3 CH)

This course covers the basic concepts of Islamic Finance and the functioning of Islamic financial institutions, such as banks, insurance companies and investment funds. After reviewing the basic concepts of economics from an Islamic perspective, the course introduces and analyzes the financial instruments and techniques developed and used by Islamic financial institutions in the process of collecting savings and making investments. Islamic financial products, such as murabaha, musharaka, mudaraba,Istisna'a, Bai Salam, and Ijara will be introduced and discussed. This course covers also special topics such as the worldwide development of the Islamic finance industry, its challenges and opportunities and the regulation and governance of Islamic financial institutions.

Department of Innovation in Government and Society

ECON105 Principles of Microeconomics (3 CH)

This course provides students with an introduction to economic analysis and institutions. The course starts with developing simple graphical and mathematical models of decision making by individual economic agents: consumers, workers and businesses. Students are directed to analyze interactions between the agents in product and factor markets using the concepts of demand, supply, and equilibrium. It also introduces students to various market structures from perfect competition to monopoly, and describes the roles of government in market economy that include the pricing system in resource allocation and income distribution.

ECON110 Principles of Economics (3 CH)

This course studies basic economic concepts and theories of both microeconomics and macroeconomics. It covers such topics as supply and demand, the firm and its cost structure, the public sector, national income accounts, inflation, unemployment, the business cycle, economic policies, the monetary and banking systems, international trade and finance, and economic growth. This course does not replace nor is it equivalent to ECON 105 or to ECON 125. (Not offered to students in the program)

ECON125 Principles of Macroeconomics (3 CH)

This course introduces students to macroeconomic analysis and its applications. It starts with an understanding of how composition, size, and distribution of national income are determined, and continues with exploring the problems of inflation and unemployment in a modern economy. Students are expected to understand government roles in macroeconomics through the effectiveness of fiscal and monetary policies. Attention is also given to the sources and consequences of economic growth and to the nature of international linkages faced by an economy through goods and capital markets.

Prerequisites

- ECON105 with a minimum grade D or ECON110 with a minimum grade D or AGRB200 with a minimum grade D

ECON211 Theory of Microeconomics (3 CH)

This course further develops student understanding of the economic behavior of individuals and firms—how they respond to changes in opportunities and constraints and how they interact in markets. Topics include consumer theory, theory of the firm, competition, and factor markets. Moreover, the course looks at market failures such as imperfect competition (monopoly and oligopoly) and externalities, as well as their consequences on welfare. Throughout the course students will get a sense of the conditions under which market economies are efficient, as well as the way governments can make the economy less or more efficient.

Prerequisites

- ECON105 with a minimum grade D
- MATH115 with a minimum grade D

ECON212 Theory of Macroeconomics (3 CH)

This course introduces students to basic macroeconomic theories, with emphasis on macroeconomic policies in an open economy. The course focuses on the determination of national income, money and inflation, unemployment, aggregate demand and aggregate supply, short-run fluctuations, and the determinants of productivity and long-run economic growth. Fiscal and monetary policies, and associated automatic stabilizers, will be discussed. Considering that macroeconomics consists of different, sometimes conflicting, interpretations of how the economy operates, students will be exposed to different schools of macroeconomics—Austrian and Post-Keynesian schools, New Classics, Monetarists, and New Keynesians—and how they interpret and recommend policies with regards to current events.

Prerequisites

- ECON125
- MATH115 with a minimum grade D

ECON215 Money and Banking (3 CH)

This course focuses on understanding the links among money, banking, financial markets, and central banks. The main goal of this course is to explain how the interest rate is determined in the economy. This requires to introduce students to the bond market. The course expands the analysis and shows that the interest rate is also determined in the money market. Thus, it explores how the money supply is determined in the economy via the interactions among banks, central banks, and households. This interaction is explained via introducing the balance sheet of the commercial bank and the central bank. Further, this course explains how the interest rate influences the foreign exchange market and demand for money.

Prerequisites

- ECON125 with a minimum grade D

ECON231 Econometrics (3 CH)

This course introduces students to regression analysis in order to be able to create a good model that can capture the relationship between the underlying

variables. The necessary assumptions for a good model, such as a correct functional form, no autocorrelation, constant variance and normality, will be tested one by one. Potential remedies will be sought in case any assumption is not fulfilled. Other topics that will be covered include hypothesis testing, forecasting and distinguishing between causality and correlation. All estimations will be performed via econometric software, EVIEWS or GRETL (which is a free version of EVIEWS).

Prerequisites

- STAT130 with a minimum grade DECON125 with a minimum grade D

ECON236 Project Economics (3 CH)

This course introduces students to the basic techniques of project appraisal. The course is applied in nature but starts with the theoretical rationale of project appraisal, resource allocation and efficiency, and the Kaldor-Hicks compensation criterion. It evolves to explore different investment criteria and focuses on cost-benefit analysis (CBA) as a major technique widely used in assessing public investment opportunities. Students will examine real CBA case studies and try to apply the concepts they have learned. The course also considers other alternative techniques such the cost-effectiveness analysis (CEA), multi-criteria analysis (MCA), and the qualitative (non-economic) techniques of project assessment.

Prerequisites

- ECON105 with a minimum grade D

ECON237 Environmental and Energy Economics (3 CH)

This course introduces timely topics related to the Environment-Energy-Economy relation. Topics include the economics of pollution, the greenhouse effect and global warming. We use data for the UAE and GCC region to analyze the relationship between different patterns in energy production and consumption, economic diversification, and emissions growth. We also study market-based policy solutions to reduce carbon footprint, such as carbon trading and carbon taxes, in light of the world’s environmental obligations. The second part of the course focuses on energy and the essential transition to renewable resources. We study the economics of oil and the behavior of oil prices and the OPEC, new trends in the production of natural gas, and the

prospects for renewable energy with special focus on Abu Dhabi's MASDAR city initiative and other environmental policies.

Prerequisites

- ECON105 with a minimum grade D

ECON239 Competition and Business Strategy (3 CH)

This course provides students with economic foundations for strategic analysis and helps them understand the basic theoretical and policy implications of concepts related to the different types of market structures. Students will get familiar with the behavior of firms and their strategic interrelations. Among the topics covered are basic game theory; agency problems and incentives; boundaries of the firm and product diversification; competition and evolution of industry structure; firm strategic positioning and sustaining of competitive advantage; and the origins of competitive advantage innovation. The coverage of these topics will be illustrated with applications related to current events and policies. The course will cultivate the students' analytical thinking and, among other things, develop their ability to comprehend different firm and industrial issues from the firm, industry and social desirability perspective.

Prerequisites

- ECON105 with a minimum grade D

ECON333 Economic Development and Institutions (3 CH)

This course introduces students to the field of economic development. It examines a number of definitions and measures of development and highlights the structural diversity and common characteristics of Less Developed countries LDCs. In addition, the course reviews different theories of development and underdevelopment. The role of globalization and international trade in development is discussed. Major issues in economic development of the Arab world are also addressed.

Prerequisites

- PHIL120

ECON338 International Economics and Globalization (3 CH)

This course introduces students to the concepts of international economics and international business, focusing on two main themes: international trade and globalization. The course covers Ricardo's comparative advantage theory and the allocation of trade based on specialization and opportunity costs, the Heckscher-Ohlin model of resource abundance and factor intensity as the main source of comparative advantage and direction of international trade in the modern world, the role of different market structures, such as monopoly, oligopoly, and monopolistic competition, in international trade from the business perspective, and the welfare implications of barriers to trade, such as tariffs, quotas, and regulations. Last, the process, trends, historical facts, and effects of globalization will be discussed in conjunction with international trade.

Prerequisites

- ECON212 with a minimum grade D

ECON344 Public Economics (3 CH)

The aim of this course is to develop an understanding of the role of the government and the public sector in mixed economies in theory and practice. The course discusses the ideal situation of perfectly competitive markets and how market structure relates to economic efficiency. Under perfectly competitive markets, externalities result in inefficiency. Inefficiency is also the result of monopoly. Government has a role to play in market failure to improve efficiency, but it also plays a role in the redistribution of resources in the society. Government expenditures to improve efficiency and how revenues finance these expenditures are discussed. Topics covered include market efficiency, market failure, externalities, equity, public goods, public expenditure, taxation, and fiscal federalism. The applied nature of these topics will also be considered.

Prerequisites

- ECON125 with a minimum grade D
- ECON211 with a minimum grade D

ECON432 Research Methods in Economics (3 CH)

The aim of this course is to supply students with an understanding of the issues and problems of conducting research in economics and the tools available to them. The course will enable students to develop skills necessary to conduct applied research in economics or an allied field. During the course students will develop original research question/s and hypotheses, conduct a literature review and use bibliographic software to manage their citations and references, analyze the problem/s using appropriate research methods (quantitative/qualitative) according to ethical standards, test their analysis or model of the problem, interpret their results, and write up the findings using appropriate academic language.

Prerequisites

- ECON211 with a minimum grade D
- ECON212 with a minimum grade D
- ECON231 with a minimum grade D

ECON433 Applied Economics of the Middle East (3 CH)

This course aims to provide students with an understanding of the socio-economic and structural characteristics of the Middle East and North African economies. The course analyses the contemporary opportunities and challenges facing these economies, with a specific focus on the Gulf region. Learning methods require students to analyze academic articles on the region and utilize econometric techniques. Among the topics covered are developments in the oil and gas sector, labor markets and migration, the implications of changing demographics such as declining birth rates, the role of inter-regional and international trade, capital flows, the role of government policy, economic reforms and diversification, and finally the significance of banks and financial markets in the region’s economic development.

Prerequisites

- ECON105 with a minimum grade D
- ECON212 with a minimum grade D
- ECON231 with a minimum grade D

ECON441 Labor and HR Economics (3 CH)

This course exposes students to the key aspects of labor economics and human resource development theory: demand and supply; market equilibrium; productivity; and incentive structures. It also highlights the synergies between these two fields. It introduces the main tools used to analyze, evaluate and understand labor market dynamics. In addition, it concentrates on the labor markets of the UAE and the Arab Gulf. It introduces UAE specific case studies and labor market data for empirical applications. Topics covered include: national unemployment; labor nationalisation; investments in human capital; and the strategic goal of transitioning to a more knowledge-based economy.

Prerequisites

- ECON211 with a minimum grade D
- ECON212 with a minimum grade D
- ECON231 with a minimum grade D

ECON455 Selected Topics In Economics (3 CH)

This course introduces students to the art of applying different economic theories and concepts to specific “real world” topics in economics. The course topics may vary to reflect changing interests and state of the art topics. Depending on faculty interest and availability, the course may cover a wide range of special topics in economics with an applied orientation. For instance, it may cover topics that belong to Health Economics, Public Economics or Sustainable Development Economics. The present course topics are related to sustainable development. This course is aimed at giving an introduction to the basic concepts of “sustainable development” and how these concepts have been implemented through “sustainable development policies” at the micro and macro level. The theoretical contents of the course is based on the concepts of environmental and resource economics and macroeconomics. Theoretical issues are illustrated by case studies with a special emphasize on the UAE and/or GCC cases. It covers topics such as: definitions and intellectual backgrounds of sustainable development, measurement of sustainable development, sustainable urban management, sustainable management of resources, sustainable development and firms environmental strategies.

Prerequisites

- ECON211 with a minimum grade D
- ECON212 with a minimum grade D

ECON541 Economics for Policy Analysis (3 CH)

The course will focus on the principles and techniques of economics important for analyzing economic aspects of public policy. First, the course will focus on the working on the aggregate economy highlighting topics like employment, productivity, trade and fiscal deficits, inflation, interest rate and exchange rates and their impacts on public policy. Then the course will focus on micro issues like the models of economic behavior, the price system, market failure and interventions, and related policy instruments. The course will examine Islamic principles and theories of the above topics, as appropriate

ECON544 Financial Management and Public Budgeting (3 CH)

This course will examine the major aspects of financial planning and public budgeting focusing on topics like the philosophy of public finance, financial analysis and planning techniques, theories of budgeting and budget as a mechanism for planning and control, accounting and auditing in the public sector, government responsibility for capital facilities planning, etc. The course will also look at the contemporary issues in public budgeting and financial management, and how they interface with public management drawing on comparative regional and international experiences, as available and appropriate.

ECON605 UAE in the Global Business Environment (3 CH)

Deeper global economic integration is a key strategic goal for the UAE and is seen as a catalyst for the UAE's sustainable economic development. This course will provide students with an in depth understanding of how international business issues affect the UAE and how the UAE is positioning itself in the global economy. The course will provide a clear framework for understanding the process of globalisation, international transactions, financial issues, global economic trends and their significance for UAE organisations, as well as how government policy is facilitating the UAE's deeper integration into the global economy.

ECON610 HR & Personnel Economics (3 CH)

This course applies economic analysis to the study of human resource management issues. In particular, it focuses on the economic rationale for formulating specific personnel strategies and policies such as those related to

incentive systems to enhance performance and stimulate innovation within organizations. The course covers the key topics of personnel economics within five aspects of employment relationships: incentives, matching firms with workers, compensation, skill development, and the organization of work. In each of these aspects, the course aims at bringing valuable cutting-edge economics research findings and case studies to managers which can help them develop a deeper understanding of human resource issues and tradeoffs in the complex business environment of today. The course starts by studying firms' hiring decisions and how the job offer can be structured to improve the effectiveness of recruiting under imperfect information and the presence of search costs. So, we study the latest research on matching firms with workers under asymmetric information and the firm's decision to investment in workers' skills and human capital. We then study issues related to job design and the economics of teamwork. The course then moves to a central issue in personnel economics: incentives and encouraging employees' efforts. In this we critically analyze the trade-off between risk and incentives, performance evaluation, rewarding performance and compensation models. Lastly, the course considers benefit design issues.

ECON651 Managerial Economics (3 CH)

This course covers the essential principles and tools of Managerial Economics. The course examines the principles of microeconomics, and illustrates how they apply to managerial decision-making. Students who master this material will be better prepared for leadership positions in business, not-for-profit, and government entities. The first part of the course discusses basic economic concepts such as supply, demand and costs. We move from these basic concepts to studying how firms behave when they have market power. Topics include differences between perfectly and imperfectly competitive markets, optimal pricing for firms with monopoly power, and the use of advanced pricing such as bundling and versioning to capture value. The final section of the course focuses on advanced topics in market analysis. These include the role of externalities and imperfect or asymmetric information.

College of Education

Curriculum & Instruction

CURR101 Educational Technology (3 CH)

The aim of this course is to introduce educational technology as an essential and integral component of the teaching/learning process, and to highlight the different roles it plays in improving the effectiveness of learning and instruction. The course covers the learning principles and strategies for integrating technology into teaching. It emphasizes the teacher's role in designing, developing, utilizing, and evaluating instructional technology effectively. The candidates will learn the production skills and the effective procedures of selecting, producing, utilizing and evaluating various instructional media.

CURR102 Principles of Curriculum & Instruction (3 CH)

The course aims at introducing candidates to the basic principles of curriculum and instruction. Among the topics covered are curriculum planning, design, implementation and evaluation. Emphasis is placed on designing and adapting curriculum materials to suit various students' needs.

CURR103 Early Childhood Development & Learning (3 CH)

This course focuses on the development and learning of young children (birth through age 6), emphasizing an in-depth understanding of children's developmental stages and implementing developmentally appropriate practices. It focuses on in-depth study of young children's physical, cognitive, social, emotional and language development. Students will apply various theoretical perspectives of development and learning to teaching. Contextual factors that affect young children's development and learning will also be studied.

CURR211 Planning and Implementation of ECE Curriculum (3 CH)

This course provides students with knowledge and skills to design and implement a developmentally appropriate curriculum using a wide array of effective approaches, strategies, and tools to positively influence young

children’s development and learning. Students will have the opportunity to learn the connection between theories of child development and learning and actual practice with young children.

CURR212 Language Development and Emergent Literacy_AR (3 CH)

An in-depth investigation into the theoretical and philosophical underpinnings of literacy development, birth to age 8; students read and discuss with colleagues the research and theory supporting instructional strategies for early literacy. Students consider means for determining the appropriateness of various literacy strategies, including concepts of print, story language, comprehension and literacy-rich environments. Assessment tools of early literacy acquisition will be presented and reviewed. This course aims at highlighting early literacy and the importance of setting a developmentally appropriate environment for literacy development. It covers the stages of reading and writing and the implementation process of literacy in early years. The course also emphasizes the integration of the language arts in the curriculum which is characterized by the inter-relationship of listening, speaking, reading, writing, viewing and visual representation. The course will cover wide arrays of topics including but not limited to: emergent literacy definition, foundations of literacy, phonemic awareness, family literacy, environmental print, and reading difficulty prevention.

Prerequisites

- CURR101 with a minimum grade D
- CURR102 with a minimum grade D
- FOED101 with a minimum grade D
- SPED101 with a minimum grade D

Corequisites

- CURR211 with a minimum grade D

CURR218 Methods of Teaching English Language in Preparatory & Secondary Schools (1) (3 CH)

This course equips students to teach English as a second/foreign language in preparatory and secondary schools. Students will develop knowledge and understanding of relevant teaching theories and practices to meet the language learning needs of ESL/EFL students in preparatory and secondary school

contexts. The course aims to expose students to different learning and teaching strategies relevant to oral language development. Explicit and implicit approaches to vocabulary and grammar instruction will be examined. Students will also be exposed to effective assessment techniques for evaluating students' oral language in preparatory and secondary schools. Planning for instruction and microteaching will be an integral part of the course to advance the students experience in applying the theories, methods and strategies they are exposed to in the course. Students will be exposed to opportunities where they can evaluate and reflect on their teaching practices and what they have learned.

CURR225 Curriculum Development in Physics (3 CH)

This course is intended to introduce teacher students with the key components of physics curriculum development. Principles of physics curriculum planning, development, and implementation of key physics standards, concepts as well as theories will be discussed in this course.

CURR301 Colour Theory (3 CH)

Through a series of creative projects, students will explore colour theory. Discussions of colour and its relationship to composition and interpretation through harmony and contrast will be explored. Additionally, this course involves the science of colour perception, expression, and application in traditional and digital methods. The major theories of colourists such as Itten, Albers, Goethe, and Hofmann will be used as the basic structure to study specific colour properties and functions. There will be intensive exercises in colour mixing focused on exploring hue, value, intensity, transparency, and colour interaction. The course combines lecture, demonstration, and critique.

CURR302 Introduction to Art Museum Practices (3 CH)

This lecture course will introduce students to the historical and cultural significance of visual art museums. Throughout the course, students will consider the role of the museum and its importance to the community. As part of their investigations, they will make many museum visits to familiarize themselves with artwork, its arrangement in a museum, and how viewers interact with it.

CURR311 Creative Arts for Young Children (3 CH)

The aim of this course is to explore the principles, methods and materials for teaching young children music, movement, visual arts and dramatic play through process-oriented experiences to support divergent thinking, to develop a personal and professional foundation, the confidence and knowledge base, and techniques and approaches to support a highly creative atmosphere in the classroom.

CURR312 Development of Religious and Social Concepts in ECE (3 CH)

This course aims at helping candidates provide opportunities for children to develop basic religious and social studies concepts. It covers the planning, implementation, and evaluation of religious and social studies activities and provided activities in religious and social studies relate to everyday experiences in childrens' lives.

CURR314 Family, Community, Culture and Early Childhood Education (3 CH)

This course provides candidates with the skills necessary to effectively draw sources of learning from the children’s family, community, and cultural contexts in order to advance children’s learning. It reviews family systems theory and covers the processes and skills involved in the teacher’s collaborative relationships with families, and community service agencies. The course emphasizes the teacher’s need to foster responsible relationships that support children’s well-being.

CURR317 Child Health and Care (3 CH)

The course aims at familiarizing candidates with the knowledge and skills necessary for health and psychological care for kindergarten children. It covers topics such as: the basics in health and nutrition, ways of dealing with problems of health and safety. It places emphasis on first hand experiences and applications.

CURR319 Science Education for Young Children (3 CH)

The course aims at familiarizing candidates with the knowledge and skills necessary to teach science for young children. It covers topics such as methods of teaching science for young children, and concepts and inquiries for teaching children science such as light energy and color, heat energy, sound energy, magnetic interactions, electrical energy, plant life, animal life, human life, water, air, and weather, the earth-changing surface, and the earth and space. It places emphasis on first hand experiences and inquiry applications.

CURR320 Math Education for Young Child (3 CH)

This course focuses on planning and implementing developmentally appropriate mathematics curricula for young children (birth through age 6). The application of principles of whole child development to the nurturance of mathematical and pre-mathematical concepts in early childhood education will be emphasized.

CURR324 Children's Play (3 CH)

This course provides students with theories on development of play and how it can be guided. It will place an emphasis on how young children use play to develop individually, to understand the physical and creative ability. It also includes a section on selection and construction of play materials

CURR343 Thinking and Learning in Teaching Mathematics (3 CH)

This course aims to help students study the types of reasoning students engage in during learning of mathematical concepts and processes. Students will learn to embed thinking skills training in a wide variety of instructional activities to promote logical reasoning, argumentation, critical analysis and inference. Prospective teachers will be exposed to different pieces of literature and ways of teaching them to enhance learners' mathematical abilities. Reflection and self-evaluation will be integrated into selected components of the course.

CURR411 Special Topic in ECE (3 CH)

This course covers contemporary topics of interest to early childhood educators. Topics include childhood education in different environments, early

intervention, inclusive education in early childhood settings, childcare policy, and comparative instructional strategies. Emphasis is placed on ways of employing the topics in enhancing strategies of learning as well as children's care.

CURR414 Early Childhood Learning Environments (3 CH)

This course will help prospective teachers of early childhood education to design and evaluate appropriate learning environments for young children. Students, in this course, will explore many aspects of the learning environment, such as physical arrangements of the classroom, materials, the curriculum, adaptations for individual children, the social environment created by the relationships among the children, the way the teacher interacts with the entire class and with individual children, and teacher guidance. This course also includes a field experience component.

CURR416 Assessment in Early Childhood Education (3 CH)

This course is designed to help prospective teachers of young children conduct informal and formal assessments and develop an assessment system that draws information from various assessment sources. The course will help prospective teachers learn to work with young children, understand how changing development affects assessment and evaluation of these children. Teacher candidates will also learn effective ways for assessment partnerships with other colleagues, families, and children.

CURR417 Art in Public Places (3 CH)

This course is designed to provide students with avenues for the exploration of art in public places. Students investigate the processes involved in the production, acquisition, and display of art in public places. The issues of funding, management, and utilization of art in public spaces are discussed. The social, cultural, and economic significance of art in public places within the micro community and macro society is examined.

CURR425 Capstone Experience in ECE_AR (3 CH)

This course aims at integrating knowledge, concepts, and skills associated with the courses in the ECE program. It emphasizes situations and challenges that exist in the real world. Students are expected to creatively analyze, synthesize, evaluate and reflect on learned knowledge in a project having a professional focus, while demonstrating capacity for being a teacher leader and fostering school change.

Corequisites

- CURR465

CURR465 Student Teaching in ECE (9 CH)

Student Teaching in Early Childhood Education: During this course, candidates will demonstrate mastery of all standards for beginning teachers that have been adopted by Faculty of Education's teacher education programs. Planning, instruction, the learning environment, and interactions with students, parents, and colleagues should reflect knowledge gained through courses and field experiences. Students are expected to spend a full semester practice teaching in one of the public kindergartens. (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Corequisites

- CURR425 with a minimum grade D

CURR612 Introduction to Educational Research (3 CH)

This course aims at introducing educators to the research processes utilized primarily in education. Quantitative and qualitative research paradigms will be emphasized. Educators will gain knowledge and skills in conceptualizing, developing, and carrying out research problems related to their specialty. Furthermore, various measurement tools used in educational research as well as specific concepts related to ethics of research and copyright and rights protection of human subjects will also be introduced in order to develop the concept of educational research.

CURR613 Advanced Technology Application in Education (3 CH)

This course will focus on the application of contemporary learning theories in the design of interactive environments for information retrieval and performance support. Students learn a variety of tools appropriate for computer-based development. They are also expected to work in teams to produce and evaluate products for interactive learning and technology-enhanced educational environments such as hypertext, hypermedia, micro-

worlds, simulations, internet resources, instructional games and virtual learning environments.

CURR614 Advanced Educational Research (3 CH)

This course aims at developing graduate students' research skills in applying statistical concepts. Using a statistical package to analyze data will be emphasized. Students are expected to critique and interpret published research articles. Furthermore, this course will highlight the process of developing and reporting research studies. Thus, students are expected to develop research topics, select study designs, develop research instruments, collect and analyze data, etc.

CURR617 Current Issues in Teaching and Learning (3 CH)

Students in this course will be exposed to new developments in the areas of teaching and learning and are expected to think critically, reflectively, reasonably, creatively, and ethically about these new trends. In this course, students will be challenged to purposefully examine their beliefs and knowledge about teaching and learning based on new trends in this filed. Students will view teaching as a practice grounded in a system of values, theories and beliefs. Also, they will utilize inquiry as a tool for professional development. Implications for teaching and learning will be explored. Thus, this course will focus on students' field experiences and improving practices in teaching and learning based on research and scholarship work of others.

CURR618 Growing up in a Digital World (3 CH)

This course provides an overview of the digital landscape for young children from an ecological perspective that includes digital media exposure in both home environment and early childhood settings. The course highlights critical questions surrounding the consequences of growing up in the digital age and examines the notion of early childhood digital pedagogy. Specifically, the course explores a legitimate and appropriate approach to utilizing digital technologies to enhance children’s holistic development and play-based learning, including particularly in literacy, numeracy as well as speech and language.

CURR619 Advanced Educational Research in ECE (3 CH)

This course is designed to facilitate a high level of knowledge of the research methods used in early years. Students will exit this course with knowledge, skills and dispositions which they can use to conduct research in appropriate ways with young children. The course presents both conventional and critical approaches with a focus on qualitative, quantitative and mixed-methods designs. This course is designed to encourage students to consider ethical issues as paramount, both in designing and conducting research with a focus on critiquing the appropriateness of various research methods. Through this course, students will finely tune their skills in reviewing research papers in the area of early childhood education.

CURR620 STEM Education in ECE (3 CH)

This course will focus on STEM education as an interdisciplinary approach to learning where students learn and apply concepts in science, technology, engineering, and mathematics separately or in combination. By their very nature, early childhood settings are primed to support STEM learning. The course is designed to provide students with knowledge and experience to assist them in becoming an effective ECE teachers. Emphasis will be on modes of instruction, engaging students in discourse and active learning, use of technology, effective assessment, and recent research in the field of STEM education. Students will extend their professional knowledge and develop the stills and dispositions necessary to meet the college of education CF element, planning for teaching.

CURR621 Advanced Studies in Curriculum and Instruction (3 CH)

The primary purpose of this course is to enable learners to critically examine current curriculum practices and approaches and explore a range of curriculum theories and models.The course will also focus on curriculum design and development with an emphasis on anticipating future change. Students will be involved in curriculum evaluation activities such as examining curriculum research attempts particularly those within the UAE context and designing a research study to evaluate selected curriculum development efforts. The overall intent is to enable educators to more critically analyze both school curricula and proposals for curricular change and construct sound alternative proposals of their own.

CURR622 Class Assessment and Program Evaluation (3 CH)

The aim of this course is to enable candidates to gain an advanced knowledge and understanding of current issues and research topics in classroom assessment in schools, acquire conceptual and technical skills in developing authentic standard-based assessments, and explore the impact of those assessments on student learning in the classroom. The course will also emphasize reflection on current research in assessment and evaluation and on how that research can be incorporated into classroom practices and otherwise used in schools. This course focuses on the use of assessment evidence in evaluating secondary school programs and improving classroom instruction

CURR623 Language and Literacy in Early Childhood (3 CH)

This course examines contemporary theories and practices in the area of language and literacy learning and development for infants, toddlers and young children in both UAE and international contexts. Topics covered in the course include: developmental stages in learning to read and write; modern definitions of language and literacy in ECE; oral language and emergent literacy; factors that influence learning to read and write; social cultural approach to language and literacy teaching in ECE; creating a language and literacy rich environment; supporting language and literacy development for children from diverse cultures, languages, and developmental backgrounds; promoting language and literacy in young dual language learners; early intervention on language and literacy for school readiness.

CURR624 Birth to Four - Caring and Learning Environments (3 CH)

This elective course offers an in-depth exploration of the physical and emotional adaptations of parenthood and the needs and experiences of babies. There will be an emphasis on the particular role of early childhood practitioners and partnerships with health and social care professionals in supporting parents as they negotiate their roles as mothers and fathers. Underpinned by different theoretical frameworks, students will explore areas such as emotional and physical wellbeing throughout pregnancy and the postnatal period, the political and social context of motherhood/fatherhood, normative constructs of parenthood, attachment and emotion in early childhood work, touch, early language and creativity, feeding and early relationships with food.

CURR625 Assessment, Evaluation and Planning in ECE (3 CH)

This course explores a range of early childhood assessment and evaluation practices essential to child assessment, intervention and planning from pre-school through kindergarten. Students explore international policy trends, perspectives, and challenges in assessing young learners, with a focus on the UAE kindergarten context. The course develops the knowledge and skills required to collect and apply assessment data to improve early learning outcomes.

CURR626 Child Guidance: Family; Community; and Care. (3 CH)

This course provides an in-depth view of best practice for working with children and the families and carers, based on research evidence. The course focuses on using ethical practices and reflection when working with young children and their families. The course addresses various issues which children may face and discusses research on these areas. Students are encouraged to consider how they might apply these aspects into their own educational practice with early years' children within the UAE context.

CURR627 Critical Concepts & Issues in Early Childhood (CCIEC) (3 CH)

This course allows for a critical exploration of theory and practice and ways these inter-relate and extend each other, for the Early Childhood Practitioner. The course encourages students to engage with wider reading and scholarly work in order to apply conceptual and theoretical lenses within early childhood to develop criticality, reflexivity within their practice. Content may include, but not limited to, current practice, mentoring, theoretical models, approaches to ECE, national and international policy, and teacher-parent partnership working.

CURR628 Early Childhood Pedagogy in Practice (ECPP) (3 CH)

This course aims to encourage students to apply historical, philosophical, and theoretical perspectives to current Early Childhood contexts in order to develop their understanding of Early Childhood Pedagogies in educational and care for children 0 – 6 years. Key pedagogic issues will be explored, including but not restricted to; play, complex needs, learning environments, collaborative spaces, and relationships.

CURR629 Integrated Curriculum in the Early Years (3 CH)

This course explores a wide range of early childhood curriculum models from pre-school through kindergarten and the philosophies, theory and research that inform them. The course emphasizes integrated, activity-based curriculum and learning with a focus on the UAE Ministry of Education KG curriculum. Students conduct an observational case study that involves reflecting on an integrated curriculum model in practice. The course applies early childhood pedagogy, research, and curricular knowledge to thematic unit and lesson planning. curricular content areas to plan developmentally appropriate units, lessons and activities for teaching and learning that meet curriculum outcomes and appropriately challenge learners.

CURR630 Advanced Teaching Methods in Mathematics 1 (3 CH)

This course will focus on current issues in mathematics education and their application to classroom instructional practices and procedures. Topics will be based upon recent concerns and developments in the field of mathematics education. The course is designed to provide students with knowledge and experience to assist them in becoming an effective mathematics teacher. Emphasis will be on modes of instruction, engaging students in discourse and active learning, use of technology, effective assessment, recent research and national standards. Special attention will be given to teaching with understanding and learning to enhance student's appreciation and enjoyment of mathematics. Students will extend their professional knowledge and develop the stills and dispositions necessary to meet the college of education CF element, planning for teaching.

Prerequisites

- CURR621 with a minimum grade D
- CURR622 with a minimum grade D

CURR631 Advanced Teaching Methods in Mathematics 2 (3 CH)

This course focuses on learning processes for mathematics. It introduces national and ADEC standards regarding content and methodologies for teaching mathematics. It also examines instructional methods and materials in relation to secondary mathematical content, curriculum and assessment.

Prerequisites

- CURR630 with a minimum grade D

CURR632 Advanced Teaching Methods in Science 1 (3 CH)

This course introduces science teacher candidates to contemporary methods and approaches for teaching science effectively for all students. Emphasis will be placed on inquiry-oriented instruction. Such knowledge, together with their own science experience, will form the foundation for them to reflect upon and understand the events of science classroom and to make decisions that guide their teaching practices. Further, this course will provide candidates with diverse and frequent opportunities to reconstruct, reflect upon and apply personal and professional knowledge, skills, beliefs and attitudes regarding effective science teaching.

Prerequisites

- CURR621 with a minimum grade D
- CURR622 with a minimum grade D

CURR633 Advanced Teaching Methods in Science 2 (3 CH)

This course emphasizes science teaching methods, teaching issues, multiculturalism, the role of the local communities and environments in science teaching, and professional development. This course emphasizes the essential elements of classroom management, asking questions, guiding activities, and engaging in community and environmentally-centered projects through science education for community development. This course is also unique in that you will be asked to critically analyze environmental literacy resources related to science teaching and further develop your understandings of teaching investigation, writing, nature journaling and observation, safety and ethics. This course emphasizes how teachers work with students to foster sustained scientific interests, and become informed and will have greater access to environmental decision-making.

Prerequisites

- CURR632 with a minimum grade D

CURR634 Advanced Teaching Methods in English 1 (3 CH)

This course explores instructional theories and strategies for teaching preparatory and secondary English. The course provides comprehensive views about instruction in preparatory and secondary schools to help candidates manage and monitor instruction as well as consolidate their knowledge of teaching through applying a number of instructional methods. The course will provide students with theoretical bases needed for understanding the multifaceted nature of instruction in English language as well as opportunities to read, analyze, and critique related literature on instruction. Social, psychological, philosophical, and practical influences are explored through the analysis of research and applied to international, national, regional, local, and individual preparatory and secondary classroom contexts.

Prerequisites

- CURR621 with a minimum grade D
- CURR622 with a minimum grade D

CURR635 Advanced Teaching Methods in English 2 (3 CH)

This course exposes students to different perspectives in the fields of language teaching and learning in order to prepare them to select and apply effective instructional methods and techniques for the teaching of reading, writing, and vocabulary to English language learners in the UAE. The course examines important connections between educational theories, research findings, teaching practices, and materials in an effort to help each student devise effective instructional methods for their particular teaching contexts. It reviews research on instructional strategies and critically examines evidence for the effectiveness of a variety of methods that are useful for primary, preparatory, and secondary students.

Prerequisites

- CURR634 with a minimum grade D

CURR636 Advanced Teaching Methods in Arabic 1 (3 CH)

This course introduces the learner to the modern theories and strategies of teaching of Arabic language in general education, starting from the principles of modern theories in planning and implementing the teaching of the Arabic

language, relying on building knowledge and teaching skills on many educational practices and theories that make the student an active learner, researcher and producer of knowledge. In addition, the course provides a theoretical base that helps the learners understand the nature of teaching in the various educational stages. The course also gives opportunities to them to review previous studies in the field of Arabic language teaching, especially reading and writing strategies, and study, analyze, and criticize them and express an opinion in order to use it in developing their educational studies. Taking advantage of the results of analyzing these studies, the course reviews the social, psychological and philosophical factors that will affect learning, by discussing and comparing them and examining its applications globally, regionally and locally.

Prerequisites

- CURR621 with a minimum grade D
- CURR622 with a minimum grade D

CURR637 Advanced Teaching Methods in Arabic 2 (3 CH)

This course introduces the learners to the modern theories and strategies in teaching of Arabic at the secondary level, which helps them to build their own knowledge system, which enables them to provide content to the students in a variety of innovative ways. The course provides a theoretical base that helps the learners understand the nature of teaching at the secondary stage, the nature of students, their inclinations and needs at this stage. In addition, the course provides opportunities to them to self-learn by reviewing previous studies in the teaching of Arabic language in the secondary stage and analyze and criticize them and express an opinion in light of previous experiences. The course reviews social, psychological and philosophical factors that will affect the learning at the secondary level, so that the learner can discuss, compare and find its applications globally, regionally and locally.

Prerequisites

- CURR636 with a minimum grade D

CURR638 Advanced Teaching Methods in Social Studies 1 (3 CH)

This course aims to examine a variety of theories of social studies education. It will research and reflect on successful educational practices and synthesize

our findings with current standards of social studies education. It covers studying the nature, structure, concepts, interdisciplinary relationships, inquiry and discovery methods, problem solving, law-related education, Fink's theory of objectives, environmental issues, active learning, contemporary teaching strategies, diversity, values and attitudes, and the original sources

Prerequisites

- CURR621 with a minimum grade D
- CURR622 with a minimum grade D

CURR639 Advanced Teaching Methods in Social Studies 2 (3 CH)

This course aims to examine national and international social studies standards. It also explores current trends in teaching social studies besides investigating the effectiveness of teaching strategies in social studies in real classroom. The course also illustrates different types of assessment in social studies classrooms.

Prerequisites

- CURR638 with a minimum grade D

CURR640 Thesis (6 CH)

The purpose of the thesis course is to integrate and apply knowledge from earlier relevant courses in the program and to tackle a specific research problem. Each student should select a specific topic within the area of their specific specialization and adopt appropriate procedures for data collection and analysis. The graduate student will work with an advisory committee of three faculty members from the same academic discipline. One of the committee members will assume the role of the major advisor and will guide the student throughout her/his entire work on the thesis. Upon completion, the student must defend his/her thesis in a special session and evaluated and approved by the examination committee which must include 3 members and one of the committee members should be an external examiner. The discussion session is made public for the academic community.

Prerequisites

- CURR612 with a minimum grade D

CURR650 Master Graduation Project (6 CH)

The aim of this course is to assist students in preparing their final project which will be a summative of what they have learned throughout their graduate program. Students are expected to complete this course within 6 credit hours. The Master's graduation project could be completed as a creative project or an action research project. So, master students will have an opportunity to choose whether they are interested in preparing a creative project or action research. Creative projects are the tangible products of creative behavior and/or creative thinking. Creative projects are expected to benefit school. For instance, creative projects may include, but not limited to, activities, art, crafts, websites, games, applications and toys.

Prerequisites

- CURR612 with a minimum grade D

CURR651 Introduction to Educational Research_AR (3 CH)

This course aims at introducing educators to the research processes utilized primarily in education. Quantitative and qualitative research paradigms will be emphasized. Educators will gain knowledge and skills in conceptualizing, developing, and carrying out research problems related to their specialty. Furthermore, various measurement tools used in educational research as well as specific concepts related to ethics of research and copyright and rights protection of human subjects will also be introduced in order to develop the concept of educational research.

CURR654 Current Issues in Teaching and Learning_AR (3 CH)

This course is aimed at exploring current trends and issues in teaching and learning in education. The course includes issues and practices pertinent to teaching and learning literature which enables Master candidates to think critically and ethically by creating general profiles about these issues. The course will explore issues pertinent to new practices in teaching, learning theories, innovative instructions, learning standards, curriculum and educational policies, professional development, new technologies, learning institutions/communities, assessment and paradigms shifts. In this course, Master candidates' strategies beliefs and views will be contested vis-à-vis new challenges and obstacles in teaching, learning, curriculum, schools and learning institutions. The Master candidates will learn ethics of care by viewing

teaching and learning practices as a holistic system based on values, beliefs and theories.

CURR661 Smart Classrooms (3 CH)

This course aims to develop teachers' and administrators' technological knowledge and skills to enable them to effectively use and manage smart learning classes in line with the rapid development in the field of education worldwide. The course will include both theoretical and practical components. It will focus on the theories of international models which represent the theoretical bases for integrating technology in education. It aims to enable teachers and administrators to be aware of the right procedures to be used for achieving the target goals inside and outside the classroom. In relation to the practical component of the course, the focus will be directed towards the effective integration of technology in learning and teaching through the efficient use of smart learning, educational media and the Internet. It will also emphasize electronic and mobile learning to enable teachers to acquire the skills of designing and implementation as well as enabling administrators to acquire the skills of strategic planning, monitoring and evaluation. It will deal with modern educational technology and its diverse uses to enable both teachers and administrators to acquire the skills of electronic documentation. Teachers are expected to be able to document their work inside and outside the school, while administrators are expected to be able to use their documentation skills at a wider level to include all different school activities.

CURR662 Classroom Assessment & Program Evaluation (3 CH)

The aim of this course is to help candidates gain sophisticated knowledge and understanding of current issues and research topics in classroom assessment, develop skills in designing and implementing performance-based assessments, and explore the impact of those assessments on student learning in the classroom. The course emphasizes reflection on current research on assessment and evaluation and on how research can be incorporated into classroom practices. It also focuses on the use of assessment results in evaluating school programs and improving classroom instruction.

CURR663 Artificial Intelligence Applications in Education_AR (3 CH)

This course addresses the application of Artificial Intelligence (AI) in education. It focuses on the application of AI in different educational contexts that lead to a more effective teaching and learning environments. Students will learn to be introduced to a number of crucial topics in AI that will lead to the

acquisition of skills and knowledge related to this field. Participants will be introduced to the history of AI, theories behind this technology, applications of AI, and potential applications of AI in education.

CURR664 Teaching for Thinking_AR (3 CH)

This course focuses on the importance of implementing thinking intelligence in learning environments, and help program candidates to acquire knowledge, values and skills that would help them to deploy thinking strategies in classrooms. In addition, this course will offer candidates with opportunities to understand the nature of human brain, structure, and different thinking styles that our brain uses to interact with different variables around us.

CURR665 Professional Portfolio Development 1_AR (3 CH)

This course focuses on Electronic Portfolio (EP) and final creative project proposal development. This course will assist students in preparing their Electronic Portfolio and final project proposal which may include background study, project goal and objectives, and project development phases. The Electronic Portfolio should be a continuous work which involves synthesizing the preparatory work done in the framework of the previous courses and projects.

CURR666 Professional Portfolio Development 2_AR (3 CH)

The purpose of this course is to integrate, synthesize and apply knowledge from earlier relevant courses in the program and to tackle a specific research problem. This course will assist students to submit their final draft of the Electronic Portfolio demonstrating competence in their area of specialization through artifacts they submit as evidence in a portfolio, and through classroom and field assessments.

CURR701 Curriculum Theory and Practice (3 CH)

The purpose of this course is to provide candidates with understanding of the curriculum theories and practices underpinnings. More specifically, the course will highlight how curriculum is conceived, developed and implemented through the idea of praxis pertinent to candidates' background and interest. The course will explore the social, psychological, epistemological, philosophical theories and explored how these theories can be express into real practice in

developing, articulating and implementing the curriculum. The course will further explore postmodernisms, poststructuralists, aesthetical feminism, phenomenological, critical, autobiographical and theological theories in order to conceptualize the role of these theories in advancing curriculum inquiry and discourse.

CURR702 Theory and research on learning and teaching science (3 CH)

This course intends to explore past and current issues in research on learning and teaching. The course will focus on philosophical issues and theoretical frameworks used to understand how students learn. The course will also examine approaches to empirical work investigating students' learning and teaching in classrooms. Students will conduct a small study examining conceptual development that will help them relate the discussions about the applications of research to theory and practice in teaching and learning.

CURR705 Policy Analysis in Curriculum and Instruction (3 CH)

This course introduces students to the development, implementation, influence, and structures that shape curriculum and instruction policy. Description and analysis of major factors involved in curriculum and instruction policy-making at the local, national and international levels. The course includes information and practice on developing a practical approach to policy development in curriculum and instruction. Contemporary educational policy will be investigated as students put analysis into practice.

CURR707 Supervision of Curriculum and Instruction (3 CH)

This course introduces the nature of instructional supervision. It provides competencies in the appraisal of teaching, the measurement of teacher performance, and familiarity with techniques related to the evaluation of teaching. It includes systematic analysis and evaluation, and integrates the current concepts, planning, measurement instruments, and validity of appraisal systems

CURR710 Quantitative Research Methods in Education (3 CH)

Quantitative Research Method is an introductory graduate course in using quantitative methods for inquiry in education research. Students will learn

about the fundamental concepts and procedures of descriptive and inferential statistics. Students will have the opportunity to develop competence in reading and understanding statistics topics from sources such as texts, dissertations, journals, or technical reports. The course will also include an introduction to the use and interpretation of IBM SPSS.

Prerequisites

- CURR710 with a minimum grade D

CURR712 Advanced Data Analysis in Quantitative Research (3 CH)

This course is designed for graduate students in Education. It is assumed that students entering this course have taken previous graduate statistics courses (Quantitative Research Method I and Quantitative Research Method II), and have a basic understanding of statistics and statistical inference from basic concepts through to linear models such as ANOVA and multiple regression. The course will provide students with the more common multivariate procedures used in education, such as multiple regression (with interactions), multivariate analysis of variance, logistic regression, discriminant analysis, factor analysis/SEM models, and principal components analysis. In addition to surveying these methods, their application using IBM SPSS software will be demonstrated.

CURR713 Qualitative Research Methods in Education (3 CH)

This hand-on course aims at providing doctoral candidates with theoretical foundation and practices to understand qualitative research. Qualitative methods, such as phenomenology, ethnography, grounded theory, symbolic interactionism and case study will be explored. The Ph.D. candidates will critically examine the different epistemological stances of qualitative inquiry such as interpretivism, hermeneutics, and social constructivism. The course will focus on the identification and creation of research problems, the development of qualitative research designs, actual data collection, and analysis procedures to address these issues.

CURR715 Mixed Methods Research in Education (3 CH)

This course aims at providing Ph.D. students with an overview of mixed methods research. The history and philosophy of mixed methods research, the emerging literature on it, purposes and characteristics of mixed methods

research, types of research problems addressed the specification of mixed methods purpose statements and research questions, types of major mixed methods designs, data collection and analysis strategies within mixed methods designs, and reporting and evaluating mixed methods studies will be discussed. Students will have the opportunity to develop a mixed methods study design proposal on a special topic and critique published research articles in their field of study.

Prerequisites

- CURR710 with a minimum grade D
- CURR713 with a minimum grade D

CURR720 Philosophical and historical perspectives in science education (3 CH)

The course is intended to provide candidates with historical and philosophical basis of science teaching and learning. It examines the nature of scientific knowledge and how it develops, distinction between science, pseudoscience, and other branches of knowledge. Implications for science education policy and instruction will be discussed in this course. Candidates will have the opportunity to critique research articles and contexts that examine historical and philosophical aspects of science education and consider critically how might history and philosophy of science impact the development of scientific knowledge and thinking.

CURR721 Science teacher education: Theory and practice (3 CH)

The purpose of this course is to help candidates explore aspects of science teacher education through readings, discussion, and practice. The course is organized around three themes: (1) science teachers are learners that construct understandings of theory and practice, (2) science teacher education can affect teacher practice, and (3) standards and teacher education are inextricably linked, guiding how teachers teach and what students learn.

CURR722 Current issues in science education (3 CH)

The course examines current trends and issues in science education and how these trends and issues impact teaching and learning of science, Candidates will examine current trends of science teaching and develop conceptual

frameworks and personal instructional theories related to teaching and learning science.

CURR723 Advanced Seminar in Science Education (3 CH)

This course provides opportunity for candidates to intensively examine trends and issues in science education that have direct influence on student learning of science such as science literacy, assessment for and of learning, technology in science education, history of science education.

CURR724 Independent Study in Science Education (3 CH)

The course aims at helping candidates to understand how research is being conceived, designed, implemented and finally published. Candidates will engage in research activities that will lead to the development of research skills. Topics to be investigated will be agreed on individual basis.

CURR730 Advanced studies in science teaching methods (3 CH)

The course is intended to provide candidates with opportunity to explore issues related to how student learn science and strategies used by learners to learn science. Issues related to metacognition, multiple intelligence, individual differences and context for learning will constitute a particular focus.

CURR731 Learning and cognition in science education (3 CH)

The course is intended to provide candidates with opportunity to explore issues related to how student learn science and strategies used by learners to learn science. Issues related to metacognition, multiple intelligence, individual differences and context for learning will constitute a particular focus.

CURR732 Assessment in science education (3 CH)

The course will focus on issues of assessment of and for learning including assessment of specific learning concepts. Candidates will learn how to assess for understanding and profile student learning.

CURR733 Integrating Technology in learning and Teaching Science (3 CH)

This course provides doctoral students with a solid understanding of educational technology integration in the classroom. Students will have the chance to examine the best practices of educational technology in science through technology; including field visits, the use of the Internet, and virtual reality and simulation programs used in teaching science. They will have the skills to review and select appropriate software for use in science classrooms to enhance students' learning, in addition to the production of science-curriculum-specific projects demonstrating effective technology integration abilities.

CURR734 Special Topics in Science Education (3 CH)

Candidates will either focus on some special topics in science education to further their expertise or do clinical internship in K-12 schools of UAE.

CURR740 Theory and Research in Mathematical Thinking and Learning (3 CH)

The course aims to help the candidates understand the theories of learning offered in mathematics education that are deemed to be cornerstones in the history of mathematics education research. Critique and synthesis of learning theories in mathematics education dating back to 1900s will be the main focus of the course.

CURR741 Advanced Study of Students' Mathematical Understanding (3 CH)

The course will help candidates understand how K-12 students think and reason about core mathematical ideas as well as the conceptual analysis of those core ideas. The course will also highlight the equity issue in mathematics classrooms.

CURR742 Theory and Research in Mathematics Teacher Education (3 CH)

The course will help candidates understand a variety of theories that serve the mathematics education community in teaching of mathematics as well as what it means to help mathematics teachers grow in knowledge, research and practice.

CURR743 Integration of Technology into Mathematics Curriculum and Instruction (3 CH)

In this course candidates will have the opportunity to investigate what it means to teach mathematics within the presence of a variety of technological tools (software, calculators, etc.) and how students' thinking is promoted in technology-intensive classes. The course will also enable candidates to curriculum development for technologically-rich environments.

CURR744 Independent Study in Mathematics Education (3 CH)

In this course, the candidates will have the freedom to work on any area in mathematics education that would support their development. The topics to be covered will be decided by the candidate and the instructor supervising the course based on the needs of the candidate.

CURR750 Communication and Representation in Mathematics (3 CH)

Candidates will learn how to use communication and representations as effective tools in the teaching of mathematics and to improve the teaching-learning processes.

CURR751 Clinical Interviewing and Assessment in Mathematics Education (3 CH)

Candidates will learn about advance techniques in interviewing to assess students' understanding of mathematical ideas and mathematical reasoning. They will also have the opportunity to analyze certain assessment techniques and how those inform teaching and learning process that take place in mathematics classrooms.

CURR753 Mathematics Curriculum Development (3 CH)

Candidates will learn about key components of curriculum development and understand what is required in developing curriculum and curricular materials in mathematics education.

CURR754 Historical Development of Mathematical Ideas (3 CH)

Candidates will have the opportunity to trace the historical development of certain mathematical concepts relevant to K-12 and make analyses of how such developments impact school mathematics.

CURR755 Mathematical Problem Solving (3 CH)

Candidates will focus on the core of problem solving by keeping an eye on theories about problem solving. They will be able to promote problem solving as a way of learning, thinking, and practicing mathematics in mathematics classrooms. Students will examine the research and reasoning behind the movement to emphasize problem solving as a foundation of mathematics education

CURR756 Advanced Seminar in Mathematics Education (3 CH)

Candidates will focus on the core of problem solving by keeping an eye on theories about problem solving.

CURR760 Language, Literacy and Culture (3 CH)

The focus of this course is to establish good foundation for language and literacy education practitioners to achieve a comprehensive understanding of the inter-connectedness of language, literacy, and culture in learning and to apply this knowledge in the formulation and evaluation of effective literacy instruction. The vibrant interconnectedness of language, literacy and culture must be scrutinized, observed, described and analyzed in a variety of contexts for educators to fully appreciate the impact of language choice, bilingualism, multiliteracies, language as a medium of instruction, language policy making, language as communication and language as cognitive processes. The course is based on valuing the proficiency of literacy educators in meditating the complexities of students' whole literacy environment, individual learning needs

and processes, and instructional programs and materials necessary to maximize each student's literacy attainment.

CURR761 Language and Literacy Pedagogy (3 CH)

The course intends to develop conceptual understanding of the fundamental principles, strategies and methods for language and literacy education teaching and learning. The topics of this seminar are based on discursive practice in language teaching and learning by means of the construction and reflection of psycho-social realities through actions which invoke tact of teaching and learning, identity, ideology, beliefs, and power. The course reviews and critiques studies in the area of language and literacy education teaching and learning and provides students with a broad framework for writing on issues pertinent to the language teaching and learning.

CURR762 First and Second Language Development and Assessment (3 CH)

The focus of this course is on examining the stages of first and second language development that are suitable for elementary and secondary school students. Students will analyze the curricular, social, intellectual, and linguistic factors that affect these stages. Concepts from the study of first and second language acquisition will be incorporated into the course, and the role of learning and practicing language both inside and outside the classroom will be considered. The development of productive and receptive language skills will be analyzed in relation to various types of linguistic knowledge (e.g., syntactic and lexical). The emphasis placed on these forms of knowledge and skill by popular teaching methodologies will be assessed. Finally, the suitability of various kinds of formal and informal assessment and evolution activities will be discussed at each stage of language development. The potential role of various forms of alternative assessment will be discussed, especially as they relate to methodologies like task-based language teaching. The course will provide students with the foundational concepts needed to select and design first and second language assessment instruments and curricula.

CURR763 Social and Psychological Aspects of Learning Language (3 CH)

The fundamental and basic elements and principles important to understanding language learning, acquisition and communication process, especially in language and literacy education will be introduced. The focus will be on the

application of linguistics approaches in the teaching of language and literacy education. The participants will learn about the social and psychological and pragmatic aspects of language that affect the organization and processing of language. Topics include child language acquisition, bilingualism, deafness, language and the brain, multilingual speech communities, gender and language, animal language, language variation and change. Students will familiarize themselves with the various approaches to these issues and the relevant supporting evidence.

CURR764 Discourse Analysis and Language Learning (3 CH)

This course will focus on major theoretical frameworks and current issues in academic discourse, discourse analysis and critical literacy. The course will demonstrate the significance and usefulness of academic discourse to the field of language and literacy by providing practical application of the course instruction on language used in teaching and learning school subjects, especially the contrast between the structure of academic discourse register with informal communication. The academic discourse and literacy will be considered through an interdisciplinary lens and through traditions that range from interactional sociolinguistics, psycholinguistic, narrative analysis, conversation analysis, critical discourse analysis, multiple literacies, media and critical literacy by laying bare how language production and language understanding interact with content areas with ample opportunities to engage in critical thinking about the role of language in society as important analytical mediating tools in epistemological ground.

CURR765 Bilingualism, Biliteracy and Multiliteracy Education (3 CH)

This course will focus on introducing the concepts of bilingualism and multilingualism by exploring the ecological, social, psychological, emotional, political, pedagogical and cognitive dimensions of the continua of bilingualism, biliteracy and multiliteracy education through delving into a wide range of issues pertinent to educational policy, classroom practice in bilingual, bicultural and multicultural settings. The major focus will be in contextualizing a global perspective to scrutinize topics such as language ideology, assimilation, pluralism, social literacy, cultural and literacy identity as they related to teaching and learning within bilingual/multilingual populations.

CURR770 Research Methods & Analysis in Language and Literacy Education (3 CH)

The goal of this course is to develop practical understanding of the major research paradigms in language and literacy education. The course will give participants the opportunity to develop a critical understanding of key concepts in language and literacy education research and to make informed choices in planning, designing, implementing, interpreting and evaluating research on language and literacy education based on research projects of their own as a means of reflecting on and improving educational practice. The participants will be introduced to a range of curriculum inquires pertaining to qualitative and quantitative methods of research. They will also become conversant with ways of disseminating research findings in language and literacy education.

CURR771 Special Topics in Language Education Teaching (3 CH)

The focus of this course is to analyze and critique approaches and methods in language education teaching and it includes research and experiential perspectives on practice and theory. It surveys traditional and innovative approaches in language teaching, analyzes language classroom interaction, and sets language teaching in cultural and socio-cultural context. It focuses on theoretical perspectives, major issues, and current controversies. Particular attention will be paid to long-term development of language teachers as decision-makers and problem-solvers. Current issues in language education pedagogy is designed to provide students with an understanding of how to apply integrated approaches to the teaching of listening, speaking, reading, writing, viewing, visual representation and grammar in the language education classroom, making use of the full range of technological tools and preparing second language teachers to meet the needs of diverse students.

CURR772 Development & Evaluation of Language and Literacy Programs (3 CH)

This course has two foci the first focus will be on language and literacy education program development and the second part on language and literacy education program evaluation. The first part of the course will offer a sound knowledge base in: the history of curriculum design in language programs; the systems approach to language curriculum design, language needs analysis; goals and objectives for language programs. The second part focus will focus on program evaluation to explore the potentials and pitfalls of evaluation, with a primary focus on: language program improvement; developing basic knowledge and skills to design effective evaluations at the classroom,

curricular, institutional, and societal levels. The course will scrutinize issues such as: program evaluation in language education, program evaluation projects, the critical need for evaluation, useful evaluation models, standards of evaluation, and paradigms debate and pragmatic resolution in contemporary practice,.

CURR773 Seminar in Language and Literacy Education Teaching and learning (3 CH)

The course intends to develop conceptual understanding of the fundamental principles, strategies and methods for language and literacy education teaching and learning. The topics of this seminar are based on discursive practice in language teaching and learning by means of the construction and reflection of psycho-social realities through actions which invoke tact of teaching and learning, identity, ideology, beliefs, and power. The course reviews and critiques studies in the area of language and literacy education teaching and learning and provides students with a broad framework for writing on issues pertinent to the language teaching and learning.

CURR774 Integrating Technology into Language and Literacy Instructions (3 CH)

In this course candidates will transform knowledge about language and literacy into practice while focusing on the integration of technology. The course cultivates professional development as participants devise critical skills for teaching, learning, assessing, creating and integrating technology into language and literacy education practices. The course includes interactive and hypermedia technologies, computer-assisted language learning (CALL) and language literacy education, language testing and technology, distance learning, online discussions, software selection, and other related issues. Course materials include extensive readings, discussions, demonstrations and hands-on sessions with technologies. Candidates are also expected to construct their own computer-based materials as part of their electronic portfolio for teaching.

CURR800 Comprehensive Examination (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student’s knowledge of his or her discipline, as well as the student’s scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by

an examination committee from the student's concerned department. It must be taken before the start of the student's fifth semester in the program. Students taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end of the student's fifth semester. A second unsuccessful attempt leads to immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

CURR810 Research Proposal (0 CH)

Student prepares a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The Research Proposal course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Prerequisites

- CURR800

CURR900 Dissertation Research (30 CH)

Student conducts high quality academic research under the direction of his/her supervisor. Student and supervisor shall meet on regular basis and discuss progress and issues related to the student's dissertation research. Furthermore, the student writes an annual report based on a meeting with supervisor and Advisory Committee, in which a review is conducted to determine progress, identify problems, and project dates for completion of various tasks. The research shall represent original contribution to human knowledge in the particular academic field and is presented in a written research dissertation of a publishable standard. The document shall also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the College of Graduate Studies

CURR910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based on two main parts: (1) the Committee's evaluation of the dissertation document and (2) the Committee's evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal. The Dissertation Defense course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Prerequisites

- CURR900

Foundations of Education

FOED101 Learning Communities (3 CH)

This course aims at enabling students to acquire a broad knowledge of learning communities. The course emphasize school, family, community, and profession as learning communities. Furthermore, the course addresses the multiple roles of teachers and educational professionals, their ethical values and behavioral standards, and the creation of partnership for effective teaching and learning in schools. Emphasis is placed on the concept of learning communities and its utilization to improve learning outcomes.

FOED102 Professional Ethics in Education (3 CH)

Learners, teachers, and school leaders are faced daily with ethical choices and with views and decisions reflecting differing values. To function properly, they need to be clear about their own ethical standards and those of their institution and society. This course (a) introduces students to different approaches to ethics, and (b) examines ethical issues confronting learners, teachers and school leaders. The aim is to help students construct an ethics knowledge-base that will illuminate their professional ethical choices about teaching and

learning, curriculum, classroom management, and research. Students will be able to incorporate ethical standards and codes in their future work.

FOED350 Educational Research (3 CH)

This course is designed to introduce students to educational research skills that they will use in their future teaching practice. An overview of major approaches to educational research is provided initially, followed by an examination of the components of research, including planning a study, selecting a research method, gathering, analyzing and interpreting evidence, and the writing of a research report. Finally, an overview of action research will provide students with skills to undertake action research in their future roles as professional practitioners.

FOED615 International Perspective on Educational Leadership (3 CH)

This course will introduce candidates to a variety of contextualized international experiences on educational leadership. The aim of the course is threefold: a) to help candidates recognize that the local culture is vital to the understanding of educational leadership and administration, b) to assist them to think critically about international experience of educational leadership ,and c) to prepare them to apply their knowledge of appropriate international educational experiences to the UAE educational leadership context.

FOED616 Leading Schools and Communities (3 CH)

This course prepares candidates to lead schools using the learning community approach. It focuses on introducing candidates to the knowledge and skills that will help them transform and lead schools to function as communities that support the learning and development of students and teachers.

FOED619 Leadership of Change in Education Organizations (3 CH)

This course aims to help practitioner to know his/ her leadership style, in order to develop that style with needed knowledge and skills to become a leader in his/ her working organization. This course will help practitioner to become a leader of change toward excellence and pioneers of his/ her organization based on acquired leadership knowledge and skills.

FOED621 Personnel Administration and Staff Development (3 CH)

This course is designed to help candidates to acquire a deeper understanding of the issues involved in managing and leading school personnel in educational organizations. The course provides a comprehensive overview of personnel administration as it relates to recruitment, selection, orientation, induction, mentoring, staff development, staff appraisal, in-service education, motivation, and work incentives.

FOED622 School Finance and Resource Management (3 CH)

The purpose of this course is to help candidates acquire the knowledge and skills required to financially manage school organizations that promote effective learning environment. The course emphasizes both theoretical and practical applications of budgeting, as well as issues of accountability and efficiency in managing school fiscal and physical resources.

FOED623 Professional and Cultural Issues in Education (3 CH)

The course is designed to prepare culturally-sensitive leaders who are capable of understanding, responding to, and positively influencing the contexts of their workplaces as well as the larger society. The course will also examine the political, social, and cultural aspects of UAE K-12 education as they pertain to issues of professional integrity, fairness, and ethics.

FOED624 Educational Supervision (3 CH)

This course is designed to introduce candidates to essential aspects of the philosophies, theories, and practices of supervision that enhance the teaching and learning of those in educational institutions. The purpose is to assist candidates to construct an extensive knowledge-base and to develop skills to effectively supervise the professional development of education personnel. In addition to supervision theories and approaches, and interpersonal skills; technical skills (i.e. strategies and techniques) related to supervision will be studied and practiced.

FOED625 School Leadership (3 CH)

This course is designed to assist candidates to acquire the knowledge and skills needed to lead a school. Using contemporary leadership theory and

research, candidates will prepare to support and assist an educational community to develop and articulate a vision that supports effective teaching and learning, and then implement and maintain the vision.

FOED640 Thesis (6 CH)

The purpose of the thesis course is to integrate and apply knowledge from earlier relevant courses in the program and to tackle a specific research problem. Each student should select a specific topic within the area of their specific specialization and adopt appropriate procedures for data collection and analysis. The graduate student will work with an advisory committee of three faculty members from the same academic discipline. One of the committee members will assume the role of the major advisor and will guide the student throughout her/his entire work on the thesis. Upon completion, the student must defend his/her thesis in a special session and evaluated and approved by the examination committee which must include 3 members and one of the committee members should be an external examiner. The discussion session is made public for the academic community.

Prerequisites

- CURR612 with a minimum grade D

FOED650 Master Graduation Project (6 CH)

The aim of this course is to assist students in preparing their final project which will be a summative of what they have learned throughout their graduate program. Students are expected to complete this course within 6 credit hours. The Master's graduation project will completed as a creative project or an action research project. So, master students will have an opportunity to choose whether they are interested in preparing a creative project or action research. Creative projects are the tangible products of creative behavior and/or creative thinking. Creative projects are expected to benefit school. For instance, creative projects may include, but not limited to, activities, art, crafts, websites, games, applications and toys.

Prerequisites

- CURR612 with a minimum grade D

FOED652 Leading Schools & Communities_AR (3 CH)

This course aims at helping candidates to acquire the knowledge and skills needed to lead schools as learning communities. Emphasis is placed on the role of school administrators in the process of building learning communities in ways that improve student learning and teacher professional development. Candidates are introduced to the concepts, culture, conditions, procedures, and skills for leading a professional learning community. It is expected that candidates will develop and construct of their own leading schools as learning communities and test those patterns in actual school settings.

FOED655 International Perspectives on Educational Leadership (3 CH)

Globalization of education is occurring at an unprecedented rate. While this helps educational administrators around the world to share theory and practice, it can lead to the adoption of inappropriate perspectives and strategies of educational leadership. A knowledge-base of educational leadership in the global context is highly important for Master of Education students. Equally important is the adoption of the view that the cultural context is important for the success of educational leadership/administration practices. This course introduces Master of Education students to a variety of contextualized international experiences on educational leadership. The aim of the course is threefold: a) to help candidates recognize that the local culture is fundamental to the understanding of educational leadership and administration, b) to assist them to think critically about international experience of educational leadership and administration, and c) to prepare them to apply their knowledge of appropriate international educational experiences to the UAE education context. Course readings and activities will be divided into three broad sets. The first addresses the social and cultural context of educational leadership. The second cross-culturally examines the selection, mentoring, and evaluation of school leaders. The third section focuses on educational experiences in highly ranked systems of education.

FOED661 Management of Distinguished Institutions_AR (3 CH)

School principals have an important role in ensuring that schools are effectively educating students and preparing them for the future. In order to drive the school toward excellence, school principals should collaborate closely with and guide the efforts of teachers, administrators, support staff, students, parents, and other stakeholders who, together, form the school community. This necessitates that they have the knowledge, skills, and dispositions of effective school leadership. This course provides candidates of the Master’s degree with those aspects of school leadership. Scholars will discuss topics

and answer questions which will lead them not only to achieve excellence in their schools but also to create outstanding performance for their students.

FOED662 Leading School Change_AR (3 CH)

This course aims to help practitioner to know his/ her leadership style, in order to develop that style with needed knowledge and skills to become a leader in his/ her working organization. This course will help practitioner to become a leader of change toward excellence and pioneers of his/ her organization based on acquired leadership knowledge and skills.

FOED663 Managing Student Services (3 CH)

This course is intended to familiarize students with student services. This course focuses on the nature and purpose of student services, its functions, and how they can be effectively managed, coordinated, and integrated as part of the broad educational purposes of the institution. It also examines institutional strategies for organizing, staffing, and funding the extensive array of programs, services, and facilities designed to facilitate the learning and development of students. By actively participating in and successfully completing this course, students will become conversant with some of the literature and best practices associated with effective delivery of student services.

FOED664 Evaluation & Modern Supervision (3 CH)

This course is designed to provide students enrolled in the master understand some of the fundamental aspects of theories and modern supervision practices to enhance teaching and learning. The purpose is to help them construct a broad background knowledge and develop practical skills of supervision to assist in the development of teachers' professionalism. Practitioners enrolled will examine the technical skills related to modern supervision and practice them under the supervision of the course instructor. The course will also focus on the idea that the evaluation and modern supervision is integral part of the work of distinguished educational leaders, and essential to ensure the quality of teaching and learning process.

FOED665 Professional Portfolio Development 1_AR (3 CH)

This course focuses on Electronic Portfolio (EP) and final creative project proposal development. This course will assist students in preparing their Electronic Portfolio and final project proposal which may include background study, project goal and objectives, and project development phases. The Electronic Portfolio should be a continuous work which involves synthesizing the preparatory work done in the framework of the previous courses and projects.

FOED666 Professional Portfolio Development 2_AR (3 CH)

The purpose of this course is to integrate, synthesize and apply knowledge from earlier relevant courses in the program and to tackle a specific research problem. In this course, students are expected to conduct or execute their research project that has been developed and planned for in FOED 644 and to submit their final draft of the Electronic Portfolio demonstrating competence in their area of specialization through artifacts they submit as evidence in a portfolio, and through classroom and field assessments. Upon completion, the EP must be defended in a special session and evaluated and approved by the EP examination committee members

FOED701 Policy studies in Education (3 CH)

The purpose of this course is to develop students' policy analysis knowledge and skills by examining applicable policy, organizational, and leadership theories and by employing cutting edge policy analysis frameworks and methodologies. Although the similar principles and methodologies may apply for the analysis of school level educational issues, the focus of this course is rather on the national level policy issues. Therefore, “educational problem” and “policy issue” terms are interchangeably used in this class. The main course assignment will require students to apply contemporary policy analysis theories, frameworks, and methodologies in the analysis of a select national level policy issues. More specifically, students will adopt appropriate policy theory-ies (e.g., Copper, Fusarelli, & Randal 2004; Gaynor 1998; Hoy & Tarter, 2004) Alexander’s (2013) the 10-step policy analysis process for the analysis of their select national level educational policy issues. Analysis of educational problems and decision making to resolve them are always driven by both normative and affective considerations. While normative domain suggests the rational behaviour for the best choices and outcomes, affective domain of human nature (values, beliefs, feelings, and biases) prevents humans to avoid making rational decisions even this does not have to be the best interest of organizations. By adopting an integrative yet critical perspective, this class

connects both domains of social reality in addressing organizational and policy issues in educational settings. In the affective domain, course activities will incorporate the contextual attributes of organizations and their communities; the values, beliefs, and culture of stakeholders; the ethical and moral principles; and inclusion of diverse views will be incorporated with rational and practical views. Similarly, the course activities will adopt scientific policy analysis methodologies. These methodologies require the adoption of established theories and well-formulated empirical data gathering and analysis strategies. In this regard, the class will offer students the opportunities to be exposed to the established theories and formulate and engage in policy analyses projects by employing integrative methodologies. While the awareness and adoption of on the leading theories in carrying out the course activities will guide the incorporation of normative and affective domains of organizational and educational policies, the qualitative and quantitative analytical skills will help for making sense of policy analysis processes in educational contexts.

FOED702 Organizational theory in educational leadership (3 CH)

In this course, we will try to understand the complexity that characterizes organizations from theoretical and practical standpoints. The emphasis will be on how schools as organizations are produced or how they function and on the leadership choices made within organizations. Students will have an opportunity to develop their own views of how school organizations work and to use these views as grounds for their future research.

FOED703 Critical Issues in contemporary Educational Leadership (3 CH)

This course provides candidates with opportunities to use critical theory and postmodern perspectives to identify, review, and analyze major issues, trends and debates that influence the contemporary educational contexts. Candidates will evaluate the advantages and liabilities of these issues from the perspectives of prevailing educational leadership research, and the realities of educational environments.

FOED704 Philosophy of Education (3 CH)

This course is intended to provide candidates with an opportunity to discuss philosophical and ethical dimensions of education. The process of teaching and learning will be discussed based on the theories and philosophies of well

known thinkers. In this course, students are required to do some philosophical analyses of the rise and development of educational movements, trends, institutions, and policies in multicultural contexts.

FOED720 Comparative and International Education (3 CH)

This course is designed to enable candidates to examine educational issues from a comparative standpoint. The course is framed on the definition that Comparative and International Education is the application of theories and methods of the social sciences to the study of issues related to education locally and internationally. Through this course candidates will be provided with a framework that involves an inquiry into the relationship among educational institutions. Forces and factors that shape the systems of education are to be analyzed. Through analysis and comparison candidates will be equipped with tools for explaining social phenomena related to education.

FOED721 Sociology of Education (3 CH)

This course is designed to introduce PhD students to the concepts and theoretical approaches in the sociology of education and how they have changed over time. The aim is to help students develop an awareness of the role of schools in society and how society has impacted schools. Therefore, it will help graduate students improve their understandings of the intertwined and dynamic relationship between the school and society. Contemporary themes such as the purpose of schooling, social and cultural reproduction, and school reform are among the issues which will be discussed using different sociological perspectives. In addition, the methods of studying educational issues from a sociological perspective will be examined.

FOED722 Leading School Change (3 CH)

This course focuses on understanding the organizational change as well as emphasizing the nature, characteristics, responsibilities, and contextual factors that enable school leadership and the school community to contribute to the process of desired change.

FOED723 Leadership & Policy in Adult Education (3 CH)

Colleges and universities are unique institutions. Although they seem to increasingly resemble the complex organizations typically found in business

and public administration, their special missions of teaching, research and service put them in a singular category where collegiality and university traditions of academic freedom introduce powerful cross-currents of equality. This course explores the unique nature, processes, and practices of effective collegiate leadership, from the lofty heights of the presidency to the more mundane challenges faced by managers at all levels, be they in academic or administrative units. Effective leadership requires a deep understanding of the history, philosophy, sociology, and law pertaining to governance, administration, and leadership in higher education institutions and systems. The scope of the course covers the “leadership” of organizations toward desired improvement plans and change, “management” of people, and “administration” of resources to achieve the collective vision and mission. As the scope expands well beyond the limits of a one-semester course, the professor will identify timely and important select focus area-s for each year. Students will evaluate and apply best practices and contemporary organizational and leadership theories and models to create and lead effective higher education organizations. Students will comparatively examine the myths and realities of higher education leadership in the field and as presented in the literature, and, conduct their own leadership studies to unveil the complexities of leading higher education organizations.

FOED724 Ethics of Educational Leadership (3 CH)

Educational leaders are faced with difficult challenges every day. They are accountable to staff, students, parents, and the community. They must constantly ask themselves what they ultimately hope to achieve and what values they hope to promote. Therefore, leading ethically is an important component of contemporary education leadership. This course will review issues and perspectives relating to ethics in educational leadership and draw on the dispositions needed by school leaders who aim to be ethical. Students will be discussing different frameworks for the development of ethical leadership. They will have opportunities to examine their newly developed ethical standpoints and the ethical dimensions of educational leadership in schools and other educational organizations.

FOED730 Economics of Education (3 CH)

The course introduces candidates to the economic analysis of education. Among the topics to be covered: human capital theory, economic return analysis, and various issues in educational policy and finance.

FOED732 International Organizations and Education Development (3 CH)

This course reviews discourses and practices of key international organizations and actors in the field of international education and examines their impact on national educational policies and practices. International organizations, bilateral and multi-lateral aid agencies, and non-governmental organizations will be among the organizations and actors studied.

FOED733 Independent study (3 CH)

The course is designed to allow students to explore a topic of interest under the close supervision of a faculty member. It offers opportunities students for honing research skills. Students participating in an independent study will have individualized opportunities for working towards a scholarly research experience that clearly addresses a specific area of their interest to contribute to the knowledge of their specialization in the field. Students will explore a special topic, chosen by the student and a faculty supervisor, through library research or empirical research techniques (and, in some cases, applied experience). Regular meetings with the instructor will be held to discuss progress, and brainstorm ideas about revision and reorganization. Students will complete a set of agreed upon rigorous activities with the aid of the supervision of the professor who approves students' projects, directs the independent study, and evaluates students' products. Activity may include, but is not limited to, designing and conducting a small-scale research project, preparing a potentially publishable paper, or crafting a series of presentations on select and approved research topic. The course may include directed readings, applied work, assisting the faculty member with a research project, carrying out an independent research project, or other activities deemed appropriate by the supervising faculty. Regardless of the nature of the experience, the work must culminate in a formal scholarly paper. The experience in the course should lead to the improved research skills as well as the in-depth knowledge in the topic area of interest. Knowledge and skills gained in this class is expected to prepare students for the dissertation research process.

FOED800 Comprehensive Examination (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student's knowledge of his or her discipline, as well as the student's scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. It must be

taken before the start of the student's fifth semester in the program. Students taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end of the student's fifth semester. A second unsuccessful attempt leads to immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

FOED810 Research Proposal (0 CH)

Student prepares a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The Research Proposal course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Prerequisites

- FOED800

FOED900 Dissertation Research (30 CH)

Student conducts high quality academic research under the direction of his/her supervisor. Student and supervisor shall meet on regular basis and discuss progress and issues related to the student's dissertation research. Furthermore, the student writes an annual report based on a meeting with supervisor and Advisory Committee, in which a review is conducted to determine progress, identify problems, and project dates for completion of various tasks. The research shall represent original contribution to human knowledge in the particular academic field and is presented in a written research dissertation of a publishable standard. The document shall also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the College of Graduate Studies.

FOED910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based on two main parts: (1) the Committee's evaluation of the dissertation document and (2) the Committee's evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal. The Dissertation Defense course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Prerequisites

- FOED900

Physical Education

PHED200 Foundations of Health and Physical Education (3 CH)

This course is designed to provide HPE students with an overview of the field of health and physical education. Topics include, but not limited to, health promotion and behavioral changes, human wellness, careers in health and physical education, knowledge and skills essential to the development of health and physical education literacy, testing and evaluation of changes, and health promotion models. Emphasis is placed upon career opportunities in this multi-faceted profession as well.

PHED201 Physical Fitness and Wellness (3 CH)

This course aims at introducing students to the basic concepts of health and physical education. It covers topics such as health, physical fitness, nutrition, healthy lifestyle, diseases, and drug uses. It also enables students to apply those concepts of personal health in ways that are complementary to each other in various learning settings.

PHED202 Invasion Games (2 CH)

This course is designed to introduce HPE students to the fundamentals of selected invasion games that will help further develop their skills, knowledge, and attitudes needed for teaching purposes. Invasion will be used to enable students to develop a generic teaching approach. Invasion games are team games in which the purpose is to invade the opponents territory while scoring and keeping the opponents' points to a minimum, and all within a certain time period. Students are expected to achieve some degree of proficiency in the skills required by these invasion games. HPE Students are expected to model best teaching practices in invasion games. Skill development and content knowledge is emphasized. In-depth practice of skill progressions, offensive strategies, officiating and use of authentic assessment is required/emphasized/expected. HPE students will be exposed to specific aspects of sports and game skills for understanding which they will subsequently teach. Course content will be taught through a combination of lectures, micro-teaching, group discussions and activities, presentations, videos, and project-based approach.

PHED203 Swimming (2 CH)

This course is designed to introduce the basic fundamentals and techniques of swimming. Emphasis will be placed on development of basic strokes and rhythmic breathing. Water safety techniques and safe water habits will be emphasized.

PHED204 Human Anatomy and Physiology (4 CH)

This is a lecture/lab course. The lecture part of the course is designed to provide a fundamental understanding of the structure and functions of various systems of the human body relevant to physical education. Course contents will include the human skeleton, muscular system, respiratory system, circulatory system, digestive system, and nervous system. The lab part is hands-on where students examine and explore body systems.

PHED205 Adapted Physical Education (3 CH)

This course is design to provide an understanding of the methods and practices in teaching physical education to individuals with a variety of disabilities. Physical/physiological characteristics of individuals with physical and/or mental disabilities will also be covered.

PHED206 School and Community Health (3 CH)

This course is designed to introduce fundamental issues related to school and community health. Topics include, but not limited to, environmental influences, health policy, health care system, and students' unhealthy risk behaviors.

Prerequisites

- PHED200

PHED207 Exercise Physiology (3 CH)

This is a lecture/lab course designed to study the human body under the influence of exercise. The lecture part is developed to provide a comprehensive understanding of body's physiological responses and adaptations to various types of exercises and training conditions. The lab part is designed to allow students to examine the human body under the influence of exercise.

Prerequisites

- PHED204

PHED208 Motor Learning (3 CH)

This is an introductory course in motor learning and development. Emphasis is placed on utilizing basic knowledge of the human development and motor learning processes for more effective understanding as to why and how children and adults learn and perform motor skills.

PHED209 Track and Field (2 CH)

This course aims at introducing the skills and training concepts of track and field. Candidates will learn the mechanics of track and field events (sprints, relays, hurdles, distance, long jump, triple jump, high jump, pole vault, shot put, and discus). Candidates are expected to achieve an intermediate level of skill in the events. Conditioning and rules will also be covered.

PHED302 Physical Fitness Conditioning (3 CH)

This course is designed to help candidates increase their understanding of how to develop and assess overall physical fitness levels including cardiovascular endurance, muscular strength and muscular endurance through practical application of the training principles. Students will be required to develop, execute, and evaluate different workout plans. In this course, candidates will learn to plan, implement, motivate, and evaluate school-age- students' physical fitness levels. In addition, to help students develop a positive attitude towards physical exercise and healthy living, workout sessions, aerobic exercise, class lectures, and class discussion will be held.

Prerequisites

- PHED207

PHED305 Health and Physical Education Curriculum (3 CH)

This course is designed to provide an in-depth review of a variety of traditional and contemporary curricular models for health and physical education. Students will study topics related to philosophical perspectives in various types of programs. Additional emphasis will also be given to designing and producing an elementary, junior/middle, or secondary curricula for the future and the evaluation model which could be utilized to assess its effectiveness.

PHED306 Personal Health and Wellness (3 CH)

This course is designed to expose HPE students to various aspects of school students' personal health and wellness. Topics will include, but are not limited to: school students' eating habits, physical fitness, weight management, disease prevention, substance use and abuse. HPE Students will engage in hands-on activities that will enable them to teach school students how to adopt a healthy lifestyle. HPE students will develop health and physical exercise lesson and unit plans to school students, participate in teaching lesson plans through microteaching to classmates and critique lesson plans, apply lesson plans to school children in a school environment, assess school students' unhealthy living habits and apply techniques to modify unhealthy living habits, design physical exercise programs for school students to develop and maintain physical fitness, and prepare diet plans using weight management techniques.

Prerequisites

- PHED302

PHED308 CPR and First Aid (3 CH)

This is a lecture/lab course. The lecture part is developed to provide an understanding of the nature and cause of injuries related to the physical activities of children and athletes. Emphasis will be placed on common injury prevention, care, recognition, and management with focus on hands-on skills. The lab part is hands-on where students are expected to handle various injuries commonly found in physical activity settings.

Prerequisites

- PHED204

PHED309 Individual and Dual Sports (2 CH)

This course is designed to provide candidates with a wide-variety of individual and dual sports to further develop their skills, knowledge, and attitudes. Candidates are expected to achieve an intermediate level of skill in the selected individual and dual sports. Sports and lifetime activities may include: walking and running, weight-training, badminton, table tennis, and tennis. Practice outside of class time may be necessary for some candidates to achieve the expected performance level. The course will also implement physical fitness and candidates will be tested throughout the semester on muscular endurance, and cardio respiratory fitness. Candidates will be evaluated on a number of fitness tests to measure physical fitness and also evaluate improvement.

PHED310 Health and PE Teaching Methods for Elementary Education (3 CH)

This course aims at educating candidates with the methods of teaching health and physical education at the elementary education level including writing goals, objectives, lesson plans, self-evaluation of teaching, teaching and learning styles, skill analysis, and classroom management theories and

practices. It requires candidates to conduct both clinical observations and clinical teaching experiences.

Prerequisites

- PHED200

PHED311 Health & Movement (3 CH)

This course aims at introducing candidates to the concepts of gross-motor skills, fine-motor skills, manipulative skills and perceptual awareness skills in the early childhood stage, which are related to personal health and safety. It covers topics such as locomotive skills, stability skills and manipulative skills. Emphasis is placed on movement concepts of body parts and shapes, efforts of speed and force, space of levels and direction, and the relationships between objects and peers. It also enables candidates to apply those concepts of personal health and safety in ways that are complementary to each other in various learning settings.

PHED312 Evaluation and Assessment in Health and Physical Education (3 CH)

This course is designed to introduce candidates to the construction, administration, and analysis of skills tests, of performance rubrics and of health and fitness assessments. Students apply descriptive and inferential statistical procedures in health and exercise settings.

PHED314 Biomechanics (3 CH)

This is a lecture/lab course. The lecture part aims at introducing the investigation and application of mechanical principles to the study of human motion and the motion of sport objects. Health and Physical education students will learn systematic approaches for the qualitative and quantitative analysis of the human body as it engages in motor activities. The lab part is hands-on where students apply mechanical principles to study human movement.

Prerequisites

- PHED204

PHED315 Child and Health Development (3 CH)

This course aims at presenting scientific basis for sports nutrition with emphasis on basic nutritional concepts, energy expenditure during resistance and endurance exercise, diet during training, timing and composition of the pre- and post- competition meals, use of food supplements and ergogenic aids, and the special needs of various athletic groups

Prerequisites

- PHED207

PHED400 Sport Management (3 CH)

This course is designed to introduce the principles and foundations of sport management and application in sport industries. Issues discussed include core management principles, ethics, industry structure, growth trends, and contemporary problems and issues.

PHED401 Health and PE Teaching Methods for Secondary Education (3 CH)

This course aims at educating candidates with the methods of teaching health and physical education at the secondary school level including writing goals, objectives, lesson plans, self-evaluation of teaching, teaching and learning styles, skill analysis, and classroom management theories and practices. It requires candidates to conduct both clinical observations and clinical teaching experiences.

Prerequisites

- PHED310

PHED402 Exercise Psychology (3 CH)

This course is designed to provide a comprehensive understanding of the social and psychological factors related to exercise participation. Main topics include exercise and psychological well-being; personality; body image and

self-presentational concerns; theories of motivation; self-perceptions; motivational factors; stress management ; and psychological methods for enhancing personal development and physical performance. HPE Students will engage in hands-on activities that will enable them to teach school students various psychological theories and constructs that affect exercise participation and adherence that include developing lesson plans, teaching lesson plans through microteaching to classmates and critiquing lesson plans, and applying lesson plans to school children in a school environment. Course content will be taught through a combination of lectures, group discussions and activities, presentations, videos, and project-based projects.

PHED403 Sport Sociology (3 CH)

This course focuses on athletics and sport development and its role in society. Topics such as the role of sport in the context of health, leisure, social inclusion and exclusion, professionalization, marketing, culture, and media will be addressed.

PHED404 Techniques of Coaching (3 CH)

This course is designed to introduce the various coaching styles and techniques, influences of fitness, motivational factors, injuries, sports psychology and the role of the coach. The course will be of interest to physical education teachers and any sports man or woman interested in coaching styles and techniques.

PHED405 Martial Arts (3 CH)

This course is designed to develop techniques and movements associated with self-defense. It introduces the skills and methods of self- defense while emphasizing mental and physical discipline.

PHED406 Aerobic Fitness (3 CH)

This course is designed to develop cardiovascular fitness though activities intended to elevate and sustain heart rates appropriate to age and physical condition. In this course, candidates will learn to plan, implement, motivate, and evaluate their students' physical fitness levels.

PHED407 Health, Physical Activity, and Nutrition (3 CH)

This course is designed to provide HPE students with a comprehensive understanding of the connections between physical activity, nutrition, health and well-being. Topics covered include and not limited to: basic nutritional concepts, healthy diets, energy expenditure, weight management, fluid and electrolyte balance, nutrients and disease prevention, and use of food supplements and ergogenic aids during physical exercise. HPE students will be engaged in hands-on activities that enable them to teach school students the importance of nutrition to health and physical activity. HPE students will develop lesson and unit plans, participate in teaching lesson plans through microteaching to classmates and critiquing lesson plans, and teach lesson plans to school children in a school environment. Course content will be taught through a combination of lectures, micro-teaching, group discussions and activities, presentations, videos, and project-based approach.

PHED408 Capstone Experiences in Health and Physical Education (3 CH)

This course is a crowning experience coming at the end of the program with the specific objective of integrating knowledge, concepts, and skills associated with an entire sequence of study in the program. The course is designed to build on skills acquired in earlier courses. It emphasizes situations and challenges that exist in the "real world" and measures the student's achievement of the institution's general educational objective and the learning outcomes of the teacher education program. It is expected that students in the capstone experience will creatively analyse, synthesize, evaluate and reflect on learned knowledge in a project having a professional focus, while demonstrating capacity for being a teacher leader and fostering school change.

Prerequisites

- PHED310
- PHED401

Corequisites

- PHED409

PHED409 Student Teaching in Health and Physical Education (9 CH)

The aim of this course is to provide candidates with an opportunity to spend a full semester student teaching in one of the schools. During the course candidates are expected to demonstrate mastery of all standards for beginning teachers that have been adopted by the College of Education teacher programs. Planning and preparation, instruction, the classroom environment and professional responsibilities are the four domains in which candidates are evaluated. Candidates are expected to keep a student teaching portfolio to document work not demonstrated during a classroom observation visit. (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Prerequisites

- PHED310 with a minimum grade D
- PHED401 with a minimum grade D

Corequisites

- PHED408

Special Education

SPED101 Education of Exceptional Children (3 CH)

This course provides broad knowledge and skills in special education for candidates in all teacher education programs. It mainly covers: models, theories, etiology, and philosophies, legal provisions, ethical and professional commitment, assessment and identification procedures and instructional strategies for students with exceptional learning needs. It also provides knowledge of different characteristics of learners with special needs and their educational implications. This course will stress adapting teaching strategies and differentiating instructions to meet the needs of individuals with exceptional learning needs. School visits are recommended

SPED102 Diversity and Student Learning (3 CH)

This is an introductory course in the education of special needs students. The course provides an overview of the current and historical issues in the field of special education. The intellectual, social, emotional, developmental, and educational characteristics of special-needs students will be introduced. In this course, students will also be introduced to different teaching approaches that help create equal educational opportunities for students from diverse groups and across grades 6–12, and provide candidates with strategies to make teaching more effective in increasingly diverse settings. Appropriate educational opportunities and programming as well as current research in these areas will be reviewed.

SPED210 Assessment in Special Education (3 CH)

The primary focus of this course provides candidates with a practical approach for learning about the procedures of the assessment process of children and individuals with special needs. It introduces students to the basic concepts in assessment and types of assessment, including legal issues and ethical concerns of assessment. The course will proceed in a step-by step manner to address topics that are considered technical prerequisites of understanding assessment such as descriptive statistics, reliability and validity. Emphasis will be placed on the mechanics of both informal and formal assessment for assessing students as well as the interpretation of assessment for educational intervention

Prerequisites

- SPED101

SPED211 Technology Applications in Special Education (3 CH)

This course is designed to equip special education candidates with the knowledge and skills regarding assistive technology as means to help all students to succeed. Hardware and software, legislative rules and issues, and current professional readings are the focus of this class.

Prerequisites

- SPED101
- CURR101

SPED220 Classroom Behavior Management (3 CH)

This course aims at helping candidates understand classroom management by recognizing differences in teaching and learning styles and how they influence classroom management to meet the needs of all learners. It also addresses the difference between rules and procedures, the roles of both student and teacher in academic accountability, and getting the school year off to a positive start. Well-organized and managed classrooms set the stage for student learning and achievement. Students will explore a range of models and strategies that will serve as a foundation for developing a personal approach to classroom management. Classroom management will be defined by exploring theory and research in the field. In addition, rationale will be examined in considering it as a system, as instruction, and as discipline. Field experience in public school settings is required.

Prerequisites

- SPED101

SPED221 Collaboration (Home, School & Community) (3 CH)

This course provides candidates with knowledge of legal, social and educational aspects and their effects on children with disabilities and their families. Among topics covered are historical and current roles of parents, family characteristics, needs of parents of children with special needs, and the effect of disability on family functioning. The course emphasizes school visitation, family interview, and developing necessary skills that is responsive to the unique individual needs of parents and their children with special needs

Prerequisites

- SPED101

SPED222 Language & Communication Disorders (3 CH)

Some causes of speech and language disorders include hearing loss, neurological disorders, brain injury, mental retardation, drug abuse, physical impairments such as cleft lip or palate, and vocal abuse or misuse. However, sometimes the cause is unknown. For example, it is estimated that communication disorders affect 1 in every 10 people in the United States. This

course explores the etiology (cause), epidemiology, assessment, and educational implications of speech and language disorders. This course is part of the core program for the special education students. Speech and language disorders refer to problems in communication and related areas such as oral motor function. These delays and disorders range from simple sound substitution to the inability to understand or use language or use the oral-motor mechanism for functional speech. Some causes of speech and language disorders include hearing loss, neurological disorders, brain injury, mental retardation, physical impairments such as cleft lip or palate, and vocal abuse or misuse.

SPED312 Individuals with Mild/Moderate Disabilities (3 CH)

This course aims at introducing candidates to psychological, environmental, and cultural conditions that contribute to mild/moderate disabilities. It covers etiology, characteristics, development, prevention and intervention strategies, theories, and legal aspects. This course emphasizes development in academic, social, career, behavioral, medical, psychological, physical, and health conditions of individuals with mild/moderate disabilities.

SPED313 Early Intervention in Special Education (3 CH)

The purpose of this course is to provide a forum for discussing current issues in early intervention of children with special needs and to encourage scholarly discussion and presentation among the class participants. The course provides an overview of the field of early intervention in special education including discussions of historical and empirical support for providing early intervention services, screening, assessment, instructional programming, integration of children with and without disabilities, family involvement, and service delivery models. Emphasis is placed on assessing and promoting the attainment of cognitive, language, social, self-help, and motor skills.

Prerequisites

- SPED101

SPED314 Differentiated instruction (3 CH)

This course is designed to inspire educators to explore the many aspects of differentiated instruction and learning. Educators will experience the student-centered concepts of differentiated instruction through research, group work,

and manipulation of methods, discussion, field trips to gather data on how differentiated instruction is implemented in real educational contexts, application of technology, guest lectures and creative presentations. Educators will enhance their ability to successfully deliver instruction and evaluate outcomes to both heterogeneous and homogeneous groups of students.

Prerequisites

- SPED101

SPED315 Individuals with Sensory Impairments (3 CH)

This course aims at introducing candidates to psychological, environmental, and cultural conditions that contribute individuals with visual impairments and blindness and other sensory disabilities. It covers etiology, characteristics, development, prevention and intervention strategies, theories, and legal aspects. This course emphasizes development in academic, social, career, behavioral, medical, psychological, physical, and knowledge specific technologies and resources available to enhance and improve the ability of individuals with visual and other sensory impairments to succeed in school, daily living activities and employment.

Prerequisites

- SPED101 with a minimum grade D

SPED321 Gifted and Talented (3 CH)

This is an introductory course in the education of gifted, talented, and creative students. The course provides an overview of the current and historical issues in the field. The intellectual, social, emotional, developmental, and educational characteristics of gifted students are introduced. Appropriate educational opportunities and programming are discussed. Issues in identification of the gifted, special gifted populations, and current research are reviewed.

Prerequisites

- SPED101

SPED322 Teaching Students with Visual Impairments (3 CH)

This course provides broad knowledge and skills in the field of teaching students with visual impairments, mainly covering basic concepts and principles related to visual impairments, the role of inclusion teacher in teaching, assessment, sensory training and literacy skills. The course focuses on modifying the scientific material and teaching methods to meet the needs of people with visual impairments (with emphasis on field visits to schools).

Prerequisites

- SPED315 with a minimum grade D

SPED324 Functional Curriculum for Students with Sever Disabilities (3 CH)

In this course, candidates will develop their understanding of individuals with severe disabilities. The course will emphasize functional-skills curriculum and educational planning according to individual needs. An examination of modification of the state standards will be addressed. The topics addressed in this course will include curriculum modification for students with severe disabilities. Students will also demonstrate knowledge of the theoretical-research base and service delivery models and options related to the education of students with severe disabilities.

Prerequisites

- SPED413 with a minimum grade D

SPED326 Educating Gifted and Talented Students in the Regular Classroom (3 CH)

This course provides candidates with the strategies and techniques that they can use to meet the academic and emotional needs of the gifted and talented. Course content includes practical approaches for challenging the most able students in the regular classroom, pull-out, or full-time classes for gifted students. The course emphasized on the appropriate pedagogy to specifically enhance each student's giftedness.

Prerequisites

- SPED321 with a minimum grade D

SPED330 Individuals with Severe Disabilities (3 CH)

This course will develop candidates' skills for understanding characteristics of students with severe disabilities. Issues related to state regulations, issues and trends in the assessment (formal and informal), education, health care, motor development, self-help skills, school/home/employment partnerships and transition procedures, and instructional strategies for individuals with severe disabilities.

Prerequisites

- SPED413 with a minimum grade D

SPED331 Curriculum & Materials for the Gifted (3 CH)

The course provides theoretical basis and practical techniques for implementing defensible practices in classes for the gifted. Candidates will be expected to relate the characteristics and learning needs of the diverse population of gifted students to appropriate instructional methods and materials that are needed to implement effective educational programs for all gifted and talented students. Candidates will be expected to assess learners and develop and modify instructional content and methodology to meet the learning needs of gifted students and demonstrate this knowledge by creating and implementing an instructional unit of study in their content area.

Prerequisites

- SPED321

SPED332 Introduction to Rehabilitation (3 CH)

The overall goal of this course is to provide students with a comprehensive introduction to the field of disability rehabilitation and the related types of specialties within this field such as educational, social, physical, vocational

and community-based rehabilitation. Students in this course will achieve an appreciation and understanding of the history, philosophy, legislative influences, organizational structure, and various service-delivery models of rehabilitation. This foundation of study is intended to provide the groundwork for continued and progressive study in disability leading to the achievement of a degree in special education. Competencies will be developed through formal lectures, assigned readings, class activities and discussion, and at-home assignments.

Prerequisites

- SPED101

SPED346 Communication Disorders in School Age Children and Adolescents (3 CH)

This course introduces students to developmental speech and language disorders in school-aged children and adolescents, examining the phonological, syntactic, semantic and pragmatic aspects of these disorders, and highlighting the impact and issues that they present during primary and secondary education. It provides students with knowledge and skills required to assess and remediate language impairments in children from the pre-linguistic level through adolescence. Students are instructed in understanding language impairment, assessment, and intervention, collecting and analyzing language samples, and the skills required to address challenges specific to the school-aged and adolescent population.

Prerequisites

- SLP276 with a minimum grade D

SPED361 Teaching Children with Mild/Moderate Disabilities (3 CH)

This course aims at understanding mild/moderate disabilities. Topics include characteristics of children with mild/moderate disabilities, identification of specific problems within each disability category, cognitive, academic, and emotional skills of mild/moderate disability students, curriculum planning and implementation, alternative instructional strategies, class organization, maintenance and generalization of skills, and integration of services into instructional settings. This course emphasizes how the process by which

content is taught within various educational settings could fit the needs of students with mild/moderate disabilities.

Prerequisites

- SPED101 with a minimum grade D
- SPED210 with a minimum grade D

SPED412 Teaching Students with Hearing Impairments (3 CH)

This course provides broad knowledge and skills in the field of teaching students with hearing disabilities. It covers basic concepts and principles related to hearing impairment and the role of the teacher of hearing impaired students in education as well as in assessment, training of the senses and literacy skills. The course focuses on modifying the teaching materials and methods of to meet the needs of students with hearing disabilities (with emphasis on field visits to schools)

Prerequisites

- SPED315 with a minimum grade D

SPED413 Teaching Students with Sever Disabilities (3 CH)

This course is designed to train Special Education candidates in instructional planning, management and delivery of instruction for students with severe disabilities. This course covers a variety of issues including teaching strategies in teaching independent living skills, instructional program planning, classroom management and organizational practices designed to establish optimal learning environment for students with severe disabilities. The course also focuses on developing an IEP for students with severe disabilities. Field experiences are a critical component in this course.

Prerequisites

- SPED330 with a minimum grade D

SPED415 Education Diagnosis/ Remediation of Literacy/Math Disabilities (3 CH)

The purpose of this course is to provide a forum for discussing current issues in diagnosis and remediation of literacy and math problems. Students will be made aware of various assessment tools to diagnose reading, writing and mathematics difficulties of students in addition to select and implement appropriate classroom techniques to plan and conduct effective math and literacy instruction. The course also provides an overview of the types of math and literacy difficulties encountered in the classroom, identification and assessment techniques and effective intervention strategies to ameliorate math and literacy challenges.

Prerequisites

- SPED101 with a minimum grade D

SPED416 Research Seminar for Gifted & Talented (3 CH)

The purpose of this course is to provide a forum for discussing current issues in the education of gifted students and to encourage scholarly discussion and presentation among the class participants. This course provides students with the basics of gifted education beginning with its history to application of best practices. The class will examine the identification process and the characteristics of the gifted. They will focus on students? social and emotional needs and the conflicts experienced from the nature of giftedness and the environment in which they function. The special needs of underachievement, motivation, and twice exceptional students will also be addressed with a focus on intervention strategies and issues surrounding appropriate assessment.

Prerequisites

- SPED326

SPED500 Practical Experiences in Special Education_AR (3 CH)

This course aims at providing students with a wide range of exploratory educational experiences. It is a field-based experience where special education majors will directly work with children with special needs. In this course Special Education majors will have an opportunity to observe and work directly with students with special needs. This experience will assist students

in discovering, developing and refining necessary competencies and skills to teach students with special needs. This field-based experience will occur prior to student teaching.

Prerequisites

- SPED101 with a minimum grade D

SPED541 Capstone Experience in SPED/Mild/Mod Disabilities_AR (3 CH)

This course is a crowning experience coming at the end of the program with the specific objective of integrating knowledge, concepts, and skills associated with an entire sequence of study in the program. The course is team-taught and is designed to build on skills acquired in earlier courses. It emphasizes situations and challenges that exist in the real world" and measures the student's achievement of the institution's general educational objectives and the learning outcomes of the teacher education program. It is expected that students in the capstone experience will creatively analyze

SPED542 Capston Experience in SPED/Sensory Impairments_AR (3 CH)

This course is a crowning experience coming at the end of the program with the specific objective of integrating knowledge, concepts, and skills associated with an entire sequence of study in the program. The course is designed to build on skills acquired in earlier courses. It emphasizes situations and challenges that exist in the "real world" and measures the student's achievement of the institution's general educational objective and the learning outcomes of the teacher education program. It is expected that students in the capstone experience will creatively analyse, synthesize, evaluate and reflect on learned knowledge in a project having a professional focus, while demonstrating capacity for being a teacher leader and fostering school change.

SPED543 Capstone Experience in SPED/Sever Disabilities_AR (3 CH)

This course is a crowning experience coming at the end of the program with the specific objective of integrating knowledge, concepts, and skills associated with an entire sequence of study in the program. The course is designed to build on skills acquired in earlier courses. It emphasizes situations and

challenges that exist in the "real world" and measures the student's achievement of the institution's general educational objective and the learning outcomes of the teacher education program. It is expected that students in the capstone experience will creatively analyse, synthesize, evaluate and reflect on learned knowledge in a project having a professional focus, while demonstrating capacity for being a teacher leader and fostering school change.

SPED544 Capstone Experience in SPED/Gifted & Talented_AR (3 CH)

This course is a crowing experience coming at the end of the program with the specific objective of integrating knowledge concepts, and skills associated with an entire sequence of study in the program. The course is team-taught and is designed to build on skills acquired in earlier courses. It emphasizes situations and challenges that exist in the real world" and measures the student's achievement of the institution's general educational objectives and the learning outcomes of the teacher education program. It is expected that students in the capstone experience will creatively analyze

Prerequisites

- SPED500 with a minimum grade D
- SPED564 with a minimum grade D

SPED561 Student Teaching in SPED/Mild and Moderate Disabilities_AR (9 CH)

During this course, candidates must demonstrate mastery of all standards for beginning teachers that have been adopted by COE'S teacher education programs. Planning, instruction, the classroom environment, and interactions with students, parents, and colleagues should reflect knowledge gained through courses and field experiences. However, in addition to application of theory and strategies learned in university courses, mastery of the professional standards for beginning teachers will require new learning throughout student teaching. Students are expected to spend a full semester practice teaching in one of the training sites (schools, centers, hospitals). (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Corequisites

- SPED541 with a minimum grade D

SPED562 Student Teaching in SPED/Sensory Impairments_AR (9 CH)

Candidates must demonstrate mastery of all standards for beginning teachers that have been adopted by COE’s teacher education programs. Planning, instruction, the classroom environment, and interactions with students, parents, and colleagues should reflect knowledge gained through courses and field experiences. However, in addition to application of theory and strategies learned in university courses, mastery of the professional standards for beginning teachers will require new learning throughout student teaching. Students are expected to spend a full semester of practice teaching in one of the schools around the country.

SPED563 Student Teaching in Sever Disabilities_AR (9 CH)

Candidates must demonstrate mastery of all standards for beginning teachers that have been adopted by COE’s teacher education programs. Planning, instruction, the classroom environment, and interactions with students, parents, and colleagues should reflect knowledge gained through courses and field experiences. However, in addition to application of theory and strategies learned in university courses, mastery of the professional standards for beginning teachers will require new learning throughout student teaching. Students are expected to spend a full semester of practice teaching in one of the schools around the country.

SPED564 Student Teaching in SPED/Gifted & Talented_AR (9 CH)

During this course, candidates must demonstrate mastery of all standards for beginning teachers that have been adopted by COE's teacher education programs. Planning, instruction, the classroom environment, and interactions with students, parents, and colleagues should reflect knowledge gained through courses and field experiences. However, in addition to application of theory and strategies learned in university courses, mastery of the professional standards for beginning teachers will require new learning throughout student teaching. Students are expected to spend a full semester practice teaching in one of the training sites (schools, centers, hospitals). (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Prerequisites

- SPED500 with a minimum grade D

- SPED416 with a minimum grade D

Corequisites

- SPED544 with a minimum grade D

SPED618 Human Development and Individual Differences (3 CH)

This course is designed to teach students how people change develop and grow over time. It covers a wide range of ages and topics; from studies that focus on early language development, to the growth of social skills in preschool settings, the dramatic changes in cognitive skills in school, and studies of adolescent and adult development.

SPED621 Advanced Assessment in Special Education (3 CH)

This course is designed to cover a great deal of material and to be as functionally oriented as possible. Graduate students will exit this course with knowledge, skills, and dispositions they can employ in their positions in school districts. More specifically, this course is designed to teach students the skills necessary to perform educational evaluation of individuals with mild and moderate disabilities and to utilize diagnostic data to construct appropriate educational recommendations. The course will be focused on the use of various formal and informal assessment in real life situations.

Prerequisites

- SPED6322

SPED622 Characteristics and Teaching Techniques for Individuals with mild/moderate disabilities (3 CH)

The primary purpose of this course is to provide graduate students with a multiple path to knowledge and expertise related to students, special education, resources, and practice in applying effective instructional and behavioral techniques with students identified as having mild/moderate disabilities in the classroom. By providing in-depth examination of individuals with diverse cognitive, social-emotional, behavioral and physical characteristics and their educational needs, graduate students will be more

able to use this information to design effective and relevant instruction. This course explores accommodations related to teaching techniques and academics for students with mild/moderate disabilities in the regular education setting.

SPED623 Advanced Collaboration in Special Education (3 CH)

In this course graduate students learn effective practice in the processes of interpersonal, cross-disciplinary, and organizational collaboration and consultation. This course will focus on the skills necessary for working with trans-disciplinary teams in the inclusive school. Among topics covered are historical and current roles of parents, needs of parents of children with special needs, and the effect of disability on family functioning. The course emphasizes family interview and developing necessary skills that is responsive to the unique individual needs of parents and their children with special needs.

SPED624 Inclusive Learning Environment (3 CH)

This course provides graduate students with knowledge of legal, social and educational aspects and their effects on inclusive learning environment for students with disabilities. Among topics covered are introduction to inclusive teaching, teaching students with disabilities in inclusive school, effective differentiated instruction for all students, improving classroom behavior and social skills, promoting inclusion with classroom peers, teaching subjects for students with disabilities into inclusive school. The course emphasizes school visitation,, and developing necessary skills that is responsive to the unique individual needs of children with special needs.

SPED625 Curriculum Modifications for Exceptional Individuals (3 CH)

This course will focus on the concepts and skills necessary for teaching in special education classes including inclusive and collaborative settings. Modifications of instructional methods and materials for the teaching of reading, math, language arts, social studies and science for children with disabilities. The emphasis of the course is on setting up the physical environment of the classroom to foster literacy development, maximize learning productivity and prevent unnecessary behavior problems.

SPED640 Thesis (6 CH)

The purpose of the thesis course is to integrate and apply knowledge from earlier relevant courses in the program and to tackle a specific research problem. Each student should select a specific topic within the area of their specific specialization and adopt appropriate procedures for data collection and analysis. The graduate student will work with an advisory committee of three faculty members from the same academic discipline. One of the committee members will assume the role of the major advisor and will guide the student throughout her/his entire work on the thesis. Upon completion, the student must defend his/her thesis in a special session and evaluated and approved by the examination committee which must include 3 members and one of the committee members should be an external examiner. The discussion session is made public for the academic community.

Prerequisites

- CURR612 with a minimum grade D

SPED650 Master Graduation Project (6 CH)

The aim of this course is to assist students in preparing their final project which will be a summative of what they have learned throughout their graduate program. Students are expected to complete this course within 6 credit hours. The Master's graduation project could be completed as a creative project or an action research project. So, master students will have an opportunity to choose whether they are interested in preparing a creative project or action research. Creative projects are the tangible products of creative behavior and/or creative thinking. Creative projects are expected to benefit school. For instance, creative projects may include, but not limited to, activities, art, crafts, websites, games, applications and toys.

Prerequisites

- CURR612 with a minimum grade D

SPED653 Human Development & Individual Differences (3 CH)

This course provides broad knowledge and skills for teachers to explore the multiple dimensions of human development and growth. This course will familiarize teachers with major theories and concepts on human development.

A variety of theory-based and practice-based instructional methods consistent with child and adolescent learning will be also explored. One of the objectives of the course is for teachers to recognize human diversity and individual differences and realize how these might affect human development and growth in relation to multiple disciplines, i.e. Psychology, Sociology, Education, Linguistics, Biology, and Anthropology. This course covers a wide range of topics. Some studies focus on early language development, others on the growth of social skills in preschool settings, the dramatic changes in cognitive skills in school, and on studies of adolescent development. This course will enable teachers to develop their own theoretical and analytical framework for exploring the principles of human development and individual differences, but also to reflect upon their pedagogic role and current practices for promoting cognitive, emotional, and social development as part of the whole child approach.

SPED656 Inclusive Learning Environment_AR (3 CH)

This course provides candidates with knowledge of legal, social and educational aspects and their effects on inclusive learning environment for students with disabilities. Among topics covered are introduction to inclusive teaching, teaching students disabilities in inclusive school, effective differentiated instruction for all students, improving classroom behavior and social skills, promoting inclusion with classroom peers, teaching subjects for students with disabilities into inclusive school. The course emphasizes school visitation, and developing necessary skills that is responsive to the unique individual needs of children with special needs.

SPED701 Advance Application of Assistive Technology in Special Education (3 CH)

This course will provide students with in-depth information concerning the application of research to effective instructional practices to the development of advanced technology-based interventions for students with special needs. In this course students will learn how to apply research and best practices in the evaluation, acquisition, training, and use of assistive technologies for children with disabilities. Students are prepared to design and implement assistive technology strategies to support instruction within the context of team-based decision making and focus on core learning. Additionally, students will design projects that solve instructional dilemmas by skillfully applying assistive technology to improve access to learning.

SPED702 Cognitive Psychology in Special Education (3 CH)

This course is concerned with various issues and research associated with the way people think, process information, and utilizes various cognitive processes. The primary emphasis is on acquiring a basic knowledge and understanding of the research and theories that comprise modern-day cognitive psychology. These topics, however, will be related to various educational concerns. This course will also consider how people encode, organize, transform and output information. Emphasis will be placed on such topics as concept formulation, problem solving, and creative thinking.

SPED703 Special Education Leadership (3 CH)

This course will focus on the professional development of special educations in supporting quality education for exceptional learners in diverse settings. As future administrators and policy makers, the students will learn the theories and research-based practices in planning, implementing and assessing the effectiveness of special education programs for learners with special needs. The course will also include current policies on providing excellent education opportunities for learners with special needs in general education.

SPED704 Teaching Students from Culturally and Linguistically Divers Background (3 CH)

This course is designed to prepare graduate students for the wide diversity of students that they are certain to encounter in their classrooms, schools, and communities and to increase accomplished teachers' appreciation of cultural, social, and economic realities of the pluralistic societies in relation to the educational system. Graduate students will gain knowledge about the fundamentals of how diverse learners acquire and use knowledge. In depth exploration of strategies and instructional services for students with disabilities who are from culturally and linguistically diverse backgrounds will be included. This course will provide ways to design and deliver culturally responsive strategies to work with culturally and linguistically diverse learners and empower their families in the teaching and learning process. Issues covered will include assessment and intervention, curricula development and social/affective skills related to family, community, values and culture of students from different cultural groups. The class will also explore the macro historical and social forces that helped to establish relations of dominance and subordination between groups.

SPED720 Education and Development of Gifted Learners (3 CH)

This course includes in-depth surveys of the history of the field, basic terminology and definitions, major models and theories, and effective program prototypes for gifted students. Students review characteristics of the gifted and talented and overview identification and assessment procedures for gifted students. Attention is given to Curriculum adjustments, methods and techniques, as well as classroom organizations necessary for teaching students who are gifted.

SPED721 Language and Literacy Impairment (3 CH)

This course provides a clear introduction to research and ideas about how human brains process language in speaking, understanding, and reading. Within a unifying framework of the constant interplay of bottom up (sensory) and top-down (knowledge-based) processing across all language uses and modalities. Additionally, the course will examine current findings on brain structure and function, including the roles of newly delineated fiber tracts and language areas outside Broca's and Wernicke's areas. Five core topics will be addressed; language description; brain structure and function; pragmatic and semantic stages of speech production; syntactic, morphological, phonological, and phonetic stages of speech production; and experimental psycholinguistics. Additionally, students will examine how linguistics and psycholinguistics can and should inform classroom and clinical practice in test design and error analysis, while also explaining the care that must be taken in translating theoretically based deas into such real-world applications.

SPED722 Advanced Topics in Special Education (3 CH)

In this course, participants will have an opportunity to learn more about the history of special education and how it has evolved through the years; as well as the current trends, issues, and policies that are being implemented internationally – and from this information reflect on what the future of special education would be like – and how it would impact them as future educators and professionals serving diverse students with special needs and exceptionalities. Participants would also form a critical understanding and evaluation of the benefits and challenges of using inclusive practices in the classroom across various students with exceptionalities and how this may be compounded throughout their life span if they are coming from culturally and linguistically diverse and impoverished backgrounds. Participants will be prompted to reflect deeply on their own personal background and cultural influences and how these can potentially impact their professional practice –

as befits a reflective academic and practitioner. A critical analysis of evidence-based best practices and resources when it comes to identification and providing intervention, assessment and program placement for students with exceptionalities and special needs throughout their life span would likewise be explored. Students are expected to integrate the evidence-based knowledge they have gained from this course and form their own personal pedagogy that will serve as the foundations for their own ethical and professional practice in teaching those who are considered as “the others.” Participants will create and develop advocacy endeavours to convey the rights and needs of students with disabilities using relevant and timely evidence-based research materials, which have been made accessible by them for easy understanding by various stakeholders in the communities (parents, family members and policy makers), and contextualized given the UAE educational landscape.

SPED723 Independent Study in Special Education (3 CH)

The course is designed to allow students to explore a topic of interest under the close supervision of the student’s dissertation advisor. The purpose of the course is to develop research skills, and gain expertise in a topic area. The course may include directed readings, assisting the faculty member with a research project, carrying out an independent research project, or other research activities deemed appropriate by the supervising faculty. Regardless of the nature of the experience, the work must culminate in a formal scholarly paper.

SPED724 Developmental Disabilities (3 CH)

This course introduces students to developmental disabilities. Students will critically examine current definitions of intellectual disability autism, emotional and behavioral disorders and practices in assessment and intervention. This course in intended to increase students’ awareness of challenges presented to individuals with disabilities in everyday situations. Topics included are: the social role of the disabled person and his/her family, adaptation, stress, treatment, advocacy, and the unique issues faced by individuals who are mainstreamed into the community. Students will explore their own beliefs and biases regarding people with developmental disabilities and their role as agents of change in society.

SPED725 Internship in Special Education (3 CH)

The purpose of this internship is to provide intensive "hands-on" intervention experiences with and related to students with special needs or at risk for

disabilities. Interns will have the opportunity to try new skills and to perform competencies which were developed throughout the teacher preparation program. The internship is individualized for each graduate student to ensure that she/he benefits fully from the internship experience.

SPED732 Assessment and Instruction for Students with Mild/Moderate Disabilities (3 CH)

This course is focused on the multidisciplinary use of assessment techniques in the diagnosis, planning and evaluation of the special needs' learner and the development of individual education plans and instructional strategies. In specific, it covers methods and materials used in assessing students who may be eligible for special education. It includes understanding of standardized assessment and the rationale for using curriculum-based measurement (CBM). Students will develop competencies in utilizing norm referenced, criterion-referenced, curriculum-based, and teacher made tests for instructional and placement decisions. Current issues in assessment such as assessing students from diverse backgrounds and response to intervention will also be covered.

SPED739 Language and Brain (3 CH)

This course will examine how language is implemented in the human brain. It is a course in neurolinguistics. We will cover (i) the basics of brain anatomy; (ii) the network of brain areas that are responsible for, or at least involved in, language; (iii) the types of deficit that affect language (and other cognitive abilities) when these brain areas are damaged; (iv) the role of these areas in language processing and language acquisition; (v) the ways linguistic theory explain the various types of language breakdown; and finally, (vi) how linguistics can be utilized in the treatment of language breakdown.

SPED800 Comprehensive Examination (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student's knowledge of his or her discipline, as well as the student's scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. It must be taken before the start of the student's fifth semester in the program. Students taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end

of the student's fifth semester. A second unsuccessful attempt leads to immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

SPED810 Research Proposal (0 CH)

Student prepares a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The Research Proposal course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Prerequisites

- SPED800

SPED900 Dissertation Research (30 CH)

Student conducts high quality academic research under the direction of his/her supervisor. Student and supervisor shall meet on regular basis and discuss progress and issues related to the student's dissertation research. Furthermore, the student writes an annual report based on a meeting with supervisor and Advisory Committee, in which a review is conducted to determine progress, identify problems, and project dates for completion of various tasks. The research shall represent original contribution to human knowledge in the particular academic field and is presented in a written research dissertation of a publishable standard. The document shall also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the College of Graduate Studies.

SPED910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based on two main parts: (1) the Committee's evaluation of the dissertation document and (2) the Committee's evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal. The Dissertation Defense course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

College of Engineering

Architectural Engineering

ARCH302 Introduction to Architectural Engineering (3 CH)

This course introduces the architectural engineering professions, architectural engineering design process and building construction systems integration. The course presents related communication skills and digital tools. It provides students with basic design skills and formal visual principles through design exercises with emphasis on developing creativity and effective communication.

ARCH313 Analysis and Design Principles for Building Structures (3 CH)

The course presents the basic skills and techniques required for analysis and design of structural elements as members in a complete building structural system. The course discusses the preliminary sizing of members, calculation of design loads, and structural member forces calculation. In addition, the course covers equilibrium, reactions, member forces, and deflections for trusses, frames, and various structural elements of building system. It introduces students to design process of structural systems in buildings.

Prerequisites

- CIVL240

Corequisites

- MECH305

ARCH316 Building Construction Systems (3 CH)

This course provides an introduction to building construction processes, techniques and systems. The course addresses the basics of building structure systems and construction methods of roofs, floors and walls. Additionally, it covers construction methods and components of vertical circulation and openings. Emphasis is placed on the relevant building construction materials and processes of assembling and installation, utilizing building construction codes and standards within a scope of sustainability. .

Corequisites

- ARCH302

ARCH320 Introductory Building Design Studio (3 CH)

This course aims at introducing students to concepts related to fundamental architectural principles like form, function, order, rhythm and harmony. Students explore in small-scale projects, the formation and manipulation of spaces in relationship to building site, circulation needs, as well as the relationship between the architectural and structural elements of design. The studio introduces computation, geometric techniques, digital drafting and visualization.

Prerequisites

- Pre/Co ARCH316 with a minimum grade D
- ARCH302 with a minimum grade D

ARCH326 Building Construction Methods and Equipment (3 CH)

This course provides an integrated study of building construction methods, equipment and safety in construction site. Emphasis is placed on common

building construction equipment and their acquisition decisions; managing building site logistics and construction operations; sub-structure and super-structure activities, construction waste management; and health and safety in construction. The course also provides an introduction to principles of sustainable building construction and site surveying.

Prerequisites

- ARCH316

ARCH335 Intermediate Building Design Studio (3 CH)

This course aims at developing students' analytical skills and awareness of the building physical, social and cultural contexts. Students are introduced to the engineering design process, as well as assessment and application of alternative structural, mechanical and electrical systems. Studio activities include simulations of building environments, and advanced architectural presentation techniques.

Prerequisites

- ARCH316
- ARCH320 with a minimum grade D
- Pre/Co ARCH313 with a minimum grade D
- Pre/Co ARCH326 with a minimum grade D

ARCH341 Building Electrical Circuits (2 CH)

This course covers fundamentals for circuit design analysis; alternatives for circuit design, resonance and quality factors, mathematical and physical models and analysis techniques required for building applications. Estimating electrical loads for lighting and equipment, specification and selection of equipment and electric fixtures, distribution and developing wiring diagrams.

Prerequisites

- MATH1120

ARCH342 Building Acoustics and Illumination (3 CH)

This course aims at understanding the physical properties of sound and light and their impact on the design of building systems; introduction to illumination, Daylighting, lighting fixtures and lighting systems in buildings; building's design requirements of illumination; and Lighting calculation methods and measurement techniques. Acoustical design of building spaces and noise control; methods of treatment and selection of appropriate finishing materials to fulfill standard specifications of internal acoustical and lighting environments. Introduction of architectural acoustics calculations and measurement techniques.

Prerequisites

- Pre/Co PHYS110 with a minimum grade D

Corequisites

- ARCH341 with a minimum grade D
- PHYS140 with a minimum grade D

ARCH345 Building Engineering Systems (3 CH)

This course aims at introducing the knowledge necessary for the introduction of Engineering Systems into Buildings from their theoretical working knowledge to their integration into buildings. Topics covered include selection of appropriate HVAC system in building and climatic context, Determination of cooling capacity for the building, Sizing of the air handling unit system and air supply ducts. Introduction of Fire safety systems. Water supply, drainage, and waste disposal. Integrates alternative cooling and energy systems integrated into buildings deemed important for sustainable built environment. The course introduces building codes and sustainability codes in regional context.

Prerequisites

- GENG220 with a minimum grade D

Corequisites

- CIVL345 with a minimum grade D

ARCH366 History and Theories of Contemporary Architecture (3 CH)

This course aims to develop student abilities to interpret architectural styles, visual representations of architectural works and to understand the theoretical, cultural and technical contexts of architectural production. The course reviews the impact of regional forms and traditions on early modern architecture and examines the architectural theories from its roots in early twentieth century modernism in America and Europe and on through its global expansion into various regions of the world, including the Arab world. The course reviews regional and local examples of the 20th and 21st century architecture to analyze and critique these formulations in terms of contextual reactions and people needs.

ARCH422 Structural Design for Buildings (3 CH)

The course introduces the relationship of structural systems, building use and configuration and related serviceability issues. The course covers the design of concrete and steel building structural elements including beams, columns for shear, bending, and axial loadings. Structural design covers additional elements such as steel tension members, simple concrete slab systems, and truss sections.

Prerequisites

- ARCH313

ARCH425 Advanced Building Construction Systems (3 CH)

This course deals with advanced building construction systems including sustainable materials, building construction technology, long span structures and building envelop. It covers modular coordination in building design and construction as well as the basic knowledge of various building engineering systems including plumbing, electrical, HVAC and fire protection, with integration of building engineering systems.

Prerequisites

- ARCH316

Corequisites

- CIVL358

ARCH430 Integrated Building Design Studio (3 CH)

This course develops a comprehensive design process with focus on systems design and integration of a mixed-use building, issues of technology, ecology and energy. Exercises focus on the design of building systems and components, building structural design, building codes, design for safety in buildings, architectural expression, integration strategies and applications involving the mechanical, electrical, energy, and building management systems.

Prerequisites

- ARCH313 with a minimum grade D
- ARCH326 with a minimum grade D
- ARCH335 with a minimum grade D

Corequisites

- ARCH345 with a minimum grade D

ARCH433 Environmental Systems & Control (3 CH)

Introduction to environmental control systems in architecture. The human thermal comfort in the internal environment. Heat stresses and the behavior of building envelope. Ventilation and air movement requirements and patterns. Natural cooling techniques in buildings (passive and active) and their impact on human comfort. Approach to energy conservation. Observations and measurements equipment.

Prerequisites

- ARCH316 with a minimum grade D
- GENG220 with a minimum grade D

ARCH440 Construction Project Management (3 CH)

This course aims introducing students to principles of Construction Project Management and Organization. Topics includes: Strategic Management and Project Selection; Project Organization and Structures; Project Delivery Methods; Cost Estimating; Risk and Value Management. Students will also acquire knowledge in: Managing Project Teams; Information and Communication Management; Construction Sustainability; and BIM application in construction. Introduction to famous CM tools.

Prerequisites

- Pre/Co ARCH425 with a minimum grade D

ARCH450 Construction Project Planning and Control (3 CH)

This course aims at providing students with the knowledge and skills required to plan, schedule, and control construction projects. Topics include: arrow and precedence networks; time calculations using critical path method (CPM), program evaluation and review technique (PERT); resource allocation and leveling; integration of risk and safety plan; advanced scheduling techniques, progress monitoring and earned value analysis; budget allocation and cash flow; project crashing and control; labor and equipment productivity and determination of activity duration. Applications and exercises using specialized planning, scheduling and BIM software.

Prerequisites

- ARCH440

ARCH495 Professional Practical Training (15 CH)

This course aims at offering career exploration opportunities for students as well as opportunities to correlate their academic preparation to the reality of conducting professional practice, to interact effectively with others in practice, to develop professional skills and the ability to communicate effectively in the workplace, to deal with the challenges of engineering businesses environment and to gain true practical experience that is necessary for their future practice as architectural engineers after graduation. Such practical experience strengthen students competency in handling architectural design, building construction and construction management of real projects. Students training

will further improve their ability to work in teams, to supervise buildings under construction, conduct field investigations and quantity surveying, to develop execution and shop drawings, to write appropriate specifications, contract documents and run cost analysis and estimation, and legal issues in construction. (This course is conducted over a full semester (before the last study year). No courses are allowed to be registered during the internship).

Prerequisites

- ARCH425 with a minimum grade D
- STAT210 with a minimum grade D
- GENG215 with a minimum grade D
- GENG220 with a minimum grade D
- GENG315 with a minimum grade D
- MATH1110 with a minimum grade D
- MATH1120 with a minimum grade D
- MATH2210 with a minimum grade D
- MATH2220 with a minimum grade D
- PHYS105 with a minimum grade D
- PHYS110 with a minimum grade D
- PHYS135 with a minimum grade D
- PHYS140 with a minimum grade D
- CHEM111 with a minimum grade D
- CHEM175 with a minimum grade D

ARCH501 Advanced Building Design Studio (3 CH)

This course aims at introducing students to theory of building systems integration, and systems-based approach to the design process. Students are engaged in an integrated engineering design process of a small-scale project with a real-life design problem. Students use building simulation tools to analyze and propose for integrated performance of building systems. Through design projects, students explore emerging directions in engineering design, along with emerging directions and tools for engineering design.

Prerequisites

- ARCH430 with a minimum grade D

ARCH503 Building Construction Detailing (3 CH)

Study of different construction methods of architectural spaces and the selection of suitable finishing materials related to function; evaluation of technical and aesthetic aspects of interior and exterior finishing materials; technical criteria for selection and evaluation of finishing materials; architectural working details and workshop drawings.

Prerequisites

- ARCH425 with a minimum grade D

ARCH509 Modeling and Simulation (3 CH)

This course focuses on advanced levels of experimentation, analysis, synthesis and application of existing and emerging digital applications for simulating urban & building form and performance at an integrated level. Areas of emphasis include 3D modeling tools, modeling of urban, building, environmental, acoustical and visual performance, as well as energy consumption and production. Projects focus on resolving complex and integrated urban and engineering design solutions through digital simulations.

Prerequisites

- ARCH335 with a minimum grade D

ARCH526 Specification and Quantity Surveying (3 CH)

This course aims at introducing the principles and theories of preparing Specification and Bill of Quantities documents for construction projects involving building components such as site work, concrete, masonry, steel, glass, finishes, and carpentry. Bidding requirements, construction contracts, methods of specifying, substitutions, and warranties with emphasis on building codes as applied to construction projects. Use of relevant application software packages.

Prerequisites

- GENG315 with a minimum grade D

ARCH530 Selected Topics In Architecture Engineering (3 CH)

This course aims at offering an opportunity to study selected architectural topics of interest. Topics are related to one area of architecture education. Application varies depending on selected topics and conducted under the supervision of a faculty member.

Prerequisites

- GENG315 with a minimum grade D

ARCH532 Sustainable Architecture & Urban Environments in Hot Climate (3 CH)

Characteristics of hot climates and analysis of comfort conditions. Employing natural resources to improve harsh desert conditions. Studying the adverse impact on energy costs, greenhouse gas emissions, and environmental problems. Learning sustainable design and urbanism from vernacular architecture and settlements and new innovative constructions. Integrative design with performance analysis using simulation tools. Detailing design and technologies to shape the built environment: cool microclimates and greenery, advanced building skins, building materials, passive cooling and integration with energy efficient active systems.

Prerequisites

- ARCH433 with a minimum grade D

ARCH542 Housing and Urban Design (3 CH)

This course aims at introducing housing and urban design theories. Topics include housing typologies, organizations and processes, housing management and development, characteristics of urban spaces, strategic management, public policy analysis, housing research and innovations in housing and urban spaces.

Prerequisites

- ARCH335 with a minimum grade D

ARCH551 Urban Planning & Infrastructure (3 CH)

This course aims at introducing city planning theories and processes, including topics such as city forms, neighborhoods, urban systems; land use planning. Basic principles of infrastructure planning, operation and design of physical infrastructure system including roads, services, public transportation, public open spaces and facilities

Prerequisites

- ARCH335

ARCH562 Construction Contracts (3 CH)

This course aims at studying basic concepts and fundamentals of contraction bidding and contract documents. It introduces students to the deployment of FIDC conditions of contracts for construction. Topics covered include: project delivery methods and contract types; general and supplemental conditions; pre qualification of contractors; invitation to bid; construction contract agreement; subcontracts agreements, liquidated damages, time extensions, insurance, construction bonds, change orders; claims, disputes and arbitration.

Prerequisites

- GENG315 with a minimum grade D

ARCH585 Design and Critical Thinking in Architectural Engineering (3 CH)

This course develops a capstone design project related to the real needs of society. An engineering design process is initiated through research, and then developed though literature review, data gathering, analysis, initial design development, assessment of alternatives and project documentation. This course emphasizes research, analysis, identification of applicable codes and standards, conceptual design development, evaluation of alternative concepts, and the production of a preliminary technical report and visual presentation

materials. The course provides overall preparation for the Graduation Project II course.

Prerequisites

- ARCH342 with a minimum grade D
- ARCH422 with a minimum grade D
- ARCH425 with a minimum grade D
- ARCH430 with a minimum grade D
- STAT210 with a minimum grade D
- GENG215 with a minimum grade D
- GENG220 with a minimum grade D
- GENG315 with a minimum grade D
- MATH1110 with a minimum grade D
- MATH1120 with a minimum grade D
- MATH2210 with a minimum grade D
- MATH2220 with a minimum grade D
- PHYS105 with a minimum grade D
- PHYS110 with a minimum grade D
- PHYS135 with a minimum grade D
- PHYS140 with a minimum grade D
- CHEM111 with a minimum grade D
- CHEM175 with a minimum grade D

ARCH590 Capstone Engineering Design Project (3 CH)

This course develops a final capstone design based on initial development previously prepared during the Graduation Project I course. Further project research is conducted, detailed engineering design solutions are prepared, design alternatives are evaluated in compliance with local and international building codes and standards, and performance verification is conducted. Submissions include a final technical report and supporting visual materials.

Prerequisites

- ARCH585 with a minimum grade D

ARCH600 Research Methods (3 CH)

The course constructs on critical thinking to advance research design and methods approaches. It provides students' guidance and recognition to identify

a research problem, form a research question, and select a relevant method to test a particular hypothesis. It deals with qualitative, quantitative, and mixed research methods. In particular, students learn multiple research tools, analyzing evidence, drawing conclusions, and presenting results. The course also deals with academic skills such as research presentation, writing of literature review, research proposal, time management, and ethical issues in research.

ARCH601 Graduate Research Seminar (0 CH)

Students present and debate advanced architectural research topics within the graduate program field under the facilitation and steering of a faculty. Guest speakers including faculty may be invited as appropriate to address current research issues pertaining to architectural engineering

Corequisites

- ARCH600 with a minimum grade C

ARCH602 Sustainable Urbanism (3 CH)

This course focuses on the concepts and practices of sustainable urbanism associated with high performance buildings. The course examines the processes that shape the form and function of the built environment in its full complexity that collectively make up planning and design of contemporary cities, neighborhoods and settlements. The course provides students with experiential learning in the application of the current theories, models and methods used in science, engineering, architecture and urban planning to specific, real-world issues of sustainable urbanism globally and locally in the UAE region.

ARCH603 High Performance Buildings (3 CH)

The course integrates all major high-performance building attributes including energy efficiency, durability, life-cycle performance, occupant wellbeing, and productivity, and emerging sustainable technologies. The course specifically addresses buildings sustainability issues existing in the UAE desert environment such as the excessive heat in the indoors/outdoors, the shortage of water and the excessive dust/air pollution. The course strengthens knowledge on sustainable sites and integrates passive and low energy strategies/renewable energy systems for conserving energy, water and other

natural resources. The course emphasizes on mitigating potential negative impacts on the human health/comfort and the environment considering local and international sustainable building codes, standards and rating certification systems.

ARCH608 Design Management for the Built Environment (3 CH)

This course focuses on current and developing approaches to design management, with special focus on high performance built environment which optimizes life-cycle performance. The course considers: client engagement and control, briefing processes and approaches, and the organization of integrated multi-disciplinary design processes, tasks, and teams. While different levels of the built environment from buildings to cities are considered, the interface of design with policy and business, and with construction and operation is also explored.

ARCH614 Sustainable Community Develop (3 CH)

Concepts and techniques, spatial aesthetics, social, cultural, technical and marketing issues, integration into existing urban system morphology of today?s urban development in the Gulf, common patterns and forms of urban development within the Gulf urban environments, investigation of magnets and forces that induce the interest in the development of urban spaces. Topics include: impact on suburb cities, urban master plans, spatial composition and infrastructures, real estate development, urban growth control and management, role of critical analysis, assessment, valuing through community participation feedback in creating appropriate development, case studies

Prerequisites

- ARCH602 with a minimum grade C

ARCH616 Impact Assessment for the Built Environment (3 CH)

This course introduces a systematic process for predicting, and evaluating the significant environmental consequences of a proposed action or undertaking in the built environment. It provides the students with an understanding of the guidelines for EIA; ecologically sustainable built environment; impact evaluation in terms of environmental criteria; procedures, techniques and future directions. Mitigation measures identified to avoid, minimize or remedy adverse impacts on the environment.

Prerequisites

- ARCH602 with a minimum grade C

ARCH617 Selected Topics in Architectural Engineering (3 CH)

Variable content course addressing in depth analysis of selected topics pertaining to the architectural engineering graduate research with a specific theme indicated by course title listed in program semester course offering Schedule. Course can be taken only once.

ARCH623 Integrated Construction Tools and Processes (3 CH)

This course provides the students with the knowledge and skills for the use of information management and technology tools and processes for the development of high-performance built environment. This includes information management and visualization tools and technologies for integrated multi-disciplinary work and teams across the whole life-cycle of the built environment. The course provides the students with hands-on experience of digital modelling and simulation tools to coordinate and manage digital information for an enhanced delivery of high performing buildings and urban infrastructure.

Prerequisites

- ARCH608 with a minimum grade C

ARCH631 Advanced Illumination and Daylighting (3 CH)

The course provides in-depth understanding of advanced topics on lighting issues and systems design and integration in high performance buildings. The covered topics include energy efficiency, visual quality and comfort, integration of lighting/daylighting, energy benefits and integration with other passive/active systems, innovative illumination concepts and design, advanced topics of photometry, colorimetry, measurement and control of light, daylight autonomy and analysis, climate-based daylight models, design skies, modeling and simulation techniques of daylight, advanced systems of fenestration design, skylights and atria daylight design, impact of daylight on building indoor lively quality.

Prerequisites

- ARCH602 with a minimum grade C
- ARCH603 with a minimum grade C

ARCH632 Climate Research in Build Energy Efficiency (3 CH)

The interrelationship between thermal and architectural design of buildings with respect to planning, design, operation and energy management. estimating building energy demands and predicting energy performance. Effect of climate on human comfort. Overall energy performance and climate-responsiveness as a design strategy for energy conservation, building envelope components' design for minimal energy consumption, Operation dynamics, and impact of building sub-systems integration on building's overall thermal efficiency. Energy operation, auditing and management, new directions in building energy conservation.

Prerequisites

- ARCH602 with a minimum grade C
- ARCH603 with a minimum grade C

ARCH633 Water Efficiency in the Built Environment (3 CH)

The course advances students’ knowledge and skills on current and emerging issues of water management, water efficiency and water and energy nexus in the built environment. The course covers water resources and challenges, water quality, water and health, integrated site and building water management, innovative water collection and regeneration, advanced water conservation practices and applications indoors and outdoors, water treatment and recycling systems and desert landscaping and irrigation. The course involves substantial literature research on developing topics through assignments.

Prerequisites

- ARCH602 with a minimum grade C
- ARCH603 with a minimum grade C

ARCH634 Building Science Experiment Research Lab (3 CH)

Building science experimental exercises pertaining to testing, analyzing and assessing building materials and components, topics cover thermal, acoustical, and luminous characteristics of building materials and building interiors. Exercises on instrumentation, measurement and logging techniques for environmental data gathering inside labs and outside in the field. Typical exercises introduce students to the measurement of temperature, air flow and humidity as well as lighting flux, intensity, distribution, acoustical measurements, heat flux meters, flow meters, energy meters, infrared thermo-graphic camera.

Prerequisites

- ARCH603 with a minimum grade C

ARCH635 Fenestration Analysis & Design (3 CH)

Fenestration thermal, acoustical and optical properties, monolithic, laminated, insulating glazing, thermal resistance and U-factor, daylight utilization potential and visual performance, fenestration components and systems, single and multi-pane window systems, window frames, glass types, low-E, and tinted low-E glazing. Windows, glass doors, curtain wall, and skylights design. Performance analysis of transparent thermal envelope design, thermal and optical simulations of fenestration systems and effect of overhangs. Analysis of the annual energy usage and peak demand as a function of glazing type, size, and control strategy, measurements of the net heat flow through glazing, infrared thermograph, fenestration energy ratings, electrochromic, gas filled, vacuum glazing and fenestration recent advances.

Prerequisites

- ARCH603 with a minimum grade C

ARCH636 Building Ventilation (3 CH)

Natural, mechanical and hybrid ventilation, climatic influences, uncontrolled air infiltration and exfiltration, building air tightness, airflow behavior around buildings, occupancy patterns and pollutant emission characteristics as determinants of ventilation requirements and demands, ventilation strategies,

design, analysis and performance of ventilation systems for comfort and cooling, optimal ventilation utilization and air energy recovery for achieving energy-efficient building design, analytical methods, Ventilation Performance Indicators, Standards and Regulations and key selected topics in building ventilation, relevant to all building types computing tools.

Prerequisites

- ARCH603 with a minimum grade C

ARCH698 Research Based Design Project (3 CH)

Design of built form with emphasis on research based issues related to architectural design and planning. This includes theoretical issues, in urban planning, urban design, project management, building technology, and architectural issues such as meaning, principles of order; alternative means of enclosing architectural space; synthesis of space, light, structure, materials, and environmental control systems. Design as a form of inquiry integrating all knowledge gained by student inside and outside the design disciplines.

Prerequisites

- ARCH600 with a minimum grade C
- ARCH601 with a minimum grade P
- ARCH602 with a minimum grade C
- ARCH603 with a minimum grade C
- ARCH605 with a minimum grade C
- ARCH608 with a minimum grade C

ARCH699 Thesis (9 CH)

The course includes the stages of defining, articulating and applying multiple research methods customized to solve real world challenges in a selected topic of the Built Environment. It includes formulating a problem statement, selecting and reviewing relevant literature, designing an empirical study as well as performing it, including data collection analyzing the empirical data, make theoretical conclusions and finally write a thesis that contributes to knowledge in the identified field. Students are responsible for developing independently a satisfactory thesis proposal, which provides an in-depth examination of the research area.

Prerequisites

- ARCH601 with a minimum grade C
- ARCH600 with a minimum grade C

ARCH710 Advanced Qualitative Research Methods (3 CH)

An advanced introduction to qualitative research, focusing on the philosophical underpinnings of qualitative inquiry, the principles of qualitative research practice, and the use and effectiveness of specific research paradigms. Narrative, phenomenological, ethnographic and case study approaches will be discussed. Qualitative techniques including participant observation, field notation, reflective narrative, interview method and document/image analysis will be discussed. Relationships between broad qualitative approaches and specific techniques will be examined. Research design, data collection, analysis and representation, ethical issues and evaluation standards will be covered. The course will emphasize application of advanced qualitative methods to student research problems

ARCH711 Behavior and Building Performance (3 CH)

The focus of this course is upon the ever-increasing professional and research interest in the sector which is the interrelationships between people and the built environment. It equips professionals with the skills, knowledge and networks needed to drive sustainable innovation for health and wellbeing in the design, retrofit and operation of buildings. During the course students will examine the built environment's impacts on health and wellbeing, within the context of sustainability; key design, engineering and health principles; use tools applicable in professional practice, including standards, benchmarking, modelling and monitoring methods; consider factors affecting for healthy and sustainable built environment.

ARCH712 Advanced Critical Thinking in the Built Environment (3 CH)

Advanced Critical Thinking in the Built Environment introduces the students to the importance of criticality in design of built environment. Introducing design as a medium of critical inquiry, the course familiarizes the students with key critical design thinking theories of appearance, reality, form, function, place creativity and meaning. Appreciating the underlying principles and foundational skills of scholarly research, the students will learn the different critical design

thinking practices based on contemporary movements, ideas and protagonists. This includes rational critical thinking practices using laboratory experimentation, human centered experimentation and logical argumentation reasoning - processes, methods, techniques and types of studies used. Extending the role of science for the society, the students develop capacities in understanding and challenging prevailing practices in architecture. By opening up questions of objectivity and judgment, the students are impelled to communicate their ideas using graphic or written means of expression.

ARCH713 Planning for Urban Resilience (3 CH)

The course introduces students to the theory and practice of building urban resilience. The course is in two parts: part one (theory) reviews the concepts, approaches and methodological understandings that underpin the resilience approach, as well as the application of resilience by different urban actors across the world. The course will critically examine the main features that help build resilient urban societies. Enabling cities to integrate individual and community capacities into broader urban resilience assessments. The second part of the course (practice) concerns undertaking a resilience assessment, using a case study. Students will work in teams using participatory assessment tools. The assessment involves identifying the main hazards, threats, vulnerabilities, capacities and actors (from government, civil society and emergency services), followed by the development of resilience action plans for presentation to key actors

ARCH714 Housing and Urbanization (3 CH)

The course examines housing policy and planning in urban societies around the world and especially in the Global South. The first part of the course is devoted to history and theory. We examine the historical emergence of the twin problems of slums and housing in Europe during its era of intense urbanization; the export of Western housing and anti-slum policies to the developing world; the furious debate over the nature of informal settlements in the Global South; and the fundamental concepts of land use and housing policy. In the second part of the course, we take up the practical application of housing policies in different national environments around the globe. Students will work in teams to evaluate specific housing programs in some defined cities to propose a planning strategy to improve particular sites

ARCH715 Energy Optimization in Built Environment Design (3 CH)

This course is oriented towards the practical solution of optimization problems arising when designing an energy system or component applicable to the built environment. The general methodologies are provided, useful for a wide range of problem scales, with a focus on multi-variable mono-objective and multi-objective problems. These may include Optimum energy use strategies for buildings / cities, hourly energy simulation methods, building envelope and HVAC system energy optimization by computer simulation techniques; life-cycle cost analysis of building energy systems; case studies in building and urban applications

ARCH716 Advanced Intelligent Built Environment Systems (3 CH)

This course focusses on smart solutions in the built environment, and on principles for successful implementation of these solutions with emphasis on design, operation and evaluation of these intelligent systems and the factors affecting integrated building design in relation to sustainable operation. The course will involve mechanism self-sensing, electrically switching and mechanical actuation for enhanced building response to climatic and operation demands. The students will learn the skills involved to evaluate performance and integration aspects of several intelligent systems applicable to the built environment and gain knowledge of advanced building simulation and integrated design tools.

ARCH734 Directed Studies in Architectural Engineering (3 CH)

This will require students to discuss and critique original and recent journal articles, describing a major scientific advancement in a research area, which will be chosen in consultation with the student’s supervisor. Students are required to make presentations, submit reports and participate in discussions.

ARCH735 Advanced Topics in Architectural Engineering I (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Architectural Engineering

ARCH736 Advanced Topics in Architectural Engineering II (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Architectural Engineering

ARCH800 Comprehensive Exam (0 CH)

Passing the comprehensive exam is required to enter into PhD candidacy. The exam evaluates the research ability of potential PhD candidates.

ARCH810 Prospectus Exam (0 CH)

PhD student submits and defends a Research Proposal in front of a prospectus examination committee as stipulated in the COE prospectus examination guidelines.

Prerequisites

- ARCH800 with a minimum grade D

ARCH900 Dissertation Doctoral Research (30 CH)

Open to students who have successfully completed the comprehensive exam. PhD student conducts original research under the direction of a supervisory committee. Credits are determined in consultation with the dissertation supervisor. Prerequisite: Student must pass ARCH 810

Prerequisites

- ARCH810 with a minimum grade P

ARCH910 Dissertation Defense (0 CH)

Two part exam, open and close, to defend the results of PhD research work

Prerequisites

- ARCH810 with a minimum grade D

Chemical & Petroleum Engineering

CHME300 Introduction to Chemical Engineering (3 CH)

This course introduces the students to the chemical engineering profession and basic calculations in mass and energy balance; phase equilibria; and process flow sheeting. It includes applications on reactive and non-reactive chemical processes. Computer programs are used to implement these topics.

Prerequisites

- CHEM111 with a minimum grade D

CHME310 Computer Applications in Chemical Engineering (2 CH)

This course will focus on computer applications in chemical engineering including available software packages. Students will be introduced to the applications of software packages such as such as Hysys, Aspen Plus or PRO/II for simulating main unit operations related to chemical engineering processes.

Corequisites

- CHME300 with a minimum grade D

CHME322 Chemical Engineering Thermodynamics (3 CH)

Review of the basic laws in thermodynamics. Theory and applications of solution thermodynamics, vapor-liquid and liquid-liquid equilibrium for ideal and non-ideal systems, and chemical reaction equilibrium.

Prerequisites

- GENG220 with a minimum grade D

CHME330 Chemical Engineering Fluid Mechanics (3 CH)

Principles of fluid mechanics and physical separation processes are introduced. Topics include flow and pressure measurement for Newtonian and non-Newtonian fluids, dimensional analysis and pressure drop, and flow through porous media and packed beds. Applications to filtration, fluidization, sedimentation, and biosystems.

Prerequisites

- PHYS105 with a minimum grade D

  PHYS135 with a minimum grade D)

CHME357 Fundamentals of Biochemical Engineering (3 CH)

The course covers basic aspects of biochemical engineering and bioprocesses. Topics covered include: Microbial structure, growth kinetics and product formation in cell cultures. Applied enzyme catalysis and kinetics of enzymatic reactions, continuous fermentation, agitation, mass transfer, and design and analysis of bioreactors

Prerequisites

- Pre/Co CHEM282 with a minimum grade D

CHME390 Engineering and Strength of Materials (3 CH)

This course introduces the students to the concepts and fundamentals of engineering and strength of materials. Topics covered include structure and imperfection of solid material, types of materials, mechanical properties and deformation, failures, corrosion, vector force and moment, objects in equilibrium, centroids and center of mass, moments of inertia, and internal forces and moments, and torsion

Prerequisites

- CHEM111 with a minimum grade D

CHME411 Reactor Design (3 CH)

This course covers kinetics of homogeneous and heterogeneous reactions, design of isothermal reactors such as Batch, CSTR and PFR, introduction to bioreactors, catalysis and catalytic reactions; non-isothermal reactor design; multiple reactions.

Corequisites

- CHEM351 with a minimum grade D

CHME413 Heat Transfer (3 CH)

This course covers the three modes of heat transfer: conduction, convection, radiation, and their applications in steady- and unsteady-state heat transfer. Integrated analogy between fluid and heat transfer operations. Condensation, boiling, and evaporation. Energy applications in biosystems. Heat exchangers: types, design, and rating.

Prerequisites

- CHME330 with a minimum grade D

CHME415 Fluid Mechanics and Heat Transfer lab (1 CH)

This is an experimentation course introducing concepts of experimentation data analysis to emphasize the relationship between predictive theories and actual experimental results and to enhance oral and written communication skills. A number of experiments are selected to cover topics related to fluid mechanics and heat transfer, such as fluid friction, filtration, fixed and fluidized bed, centrifugal pump, concentric tube heat exchanger, radiation etc.

Corequisites

- CHME413 with a minimum grade D

CHME417 Mass Transfer and Reactor Design Lab (1 CH)

This is an experimentation course introducing concepts of experimentation data analysis to emphasize the relationship between predictive theories and actual experimental results and to enhance oral and written communication skills. A number of experiments are selected to cover topics related to mass transfer and reactor design, such as molecular diffusion, mass transfer in wetted wall column, batch reactor, CSTR, plug flow reactor, etc.

Corequisites

- CHME411 with a minimum grade D

CHME421 Mass Transfer (3 CH)

This course covers molecular and convective steady-state and unsteady-state mass transfer. Integrated analogy between fluid, heat, and mass transfer operations. Interfacial mass transfer, continuous and stage-wise contact operations, with applications in absorption and distillation.

Prerequisites

- CHME330 with a minimum grade D

CHME422 Unit Operation (3 CH)

The course addresses fundamentals of fluid-particle mechanics, such as the notion of drag, and builds on those fundamentals to develop design concepts for various industrial processes like packed bed operation, fluidized operations, sedimentation, filtration, separation of solids and fluids, etc. Industrial applications are discussed. The course is concluded with an introduction to colloidal systems, soft materials and nanoparticles. Applications of these novel systems are discussed.

Prerequisites

- CHME421 with a minimum grade D

CHME433 Water Desalination (3 CH)

This course aims at studying industrial desalination processes. Topics covered include global and local water resources, water quality and analysis, technical and economic analysis of major desalination processes such as multi-stage flash, reverse osmosis, multiple-effect distillation and electrodialysis.

Prerequisites

- CHME413 with a minimum grade D

CHME441 Industrial & Wastewater Treatment (3 CH)

Definitions, characteristics, survey and monitoring of industrial wastewater. Legislation, guidelines, and standards. Treatment processes: volume and strength reduction, neutralization and equalization, removal of suspended and colloidal solids, removal of dissolved organics. Combined treatment of industrial and domestic wastewaters. Treatment economics. New trends in treatment processes.

Prerequisites

- CHME421 with a minimum grade D

CHME442 Corrosion (3 CH)

This course introduces electrochemical principles and their application to corrosion. Topics covered include different corrosion mechanisms, corrosion inhibition and different methods for electrochemical metal protection. Case studies from oil and petroleum refining industries are also included.

Prerequisites

- CHME390 with a minimum grade D

CHME444 Renewable Energy Sources (3 CH)

The objective of this course is to assess current and potential future energy systems, including resources, extraction, conversion, and end-use, with

emphasis on meeting regional and global energy needs. Different renewable and conventional energy technologies will be presented, including bio-fuels, fuel cells, solar energy, wind energy and nuclear energy. Topics include basic principles of reactor design and operation at commercial nuclear electrical generating facilities, including an examination of nuclear waste issues. The photovoltaic solar energy systems will be presented, focusing on the behavior and design of "stand-alone" photovoltaic systems.

Prerequisites

- CHME413 with a minimum grade D

CHME452 Biochemical Treatment (3 CH)

The course emphasizes on the biological treatment of wastes. Topics covered include: constituents in wastewater, biological treatment fundamentals, aerobic and anaerobic systems, attached and suspended treatment processes, process selection, and advanced wastewater treatment.

CHME453 Biofuels Technology (3 CH)

Overview of the technologies available for bio-fuels production. The topics covered include (a) Biodiesel: advantages of biodiesel over petroleum diesel, conventional biodiesel production technologies, enzymatic biodiesel production, and new feedstock, and (b) Bio ethanol: advantages of bio-ethanol, fermentation processes, and production of bio ethanol from cellulose.

Prerequisites

- CHME421 with a minimum grade D

CHME454 Biochemical Separation (3 CH)

The course presents main techniques of Bioseparation used in the purification of a wide range of valuable molecules. Topics covered include: fundamentals of downstream separation and purification processes, membrane separation, chromatography, centrifugation, cell disruption, extraction, protein separation and purification, and process design.

Prerequisites

- CHME421 with a minimum grade D

CHME457 Fundamentals of Biochemical Engineering (3 CH)

This course covers the basic aspects of bioreactors design. Topics covered include: applied enzyme catalysis, immobilized enzyme technology, kinetics of enzymatic reactions, product formation and biomass production in cell culture, batch and continuous culture, and design and analysis of bioreactors.

Prerequisites

- CHME300 with a minimum grade D

CHME461 Natural Gas Processing (3 CH)

This course introduces different techniques for processing natural gas. Topics include properties and behavior of natural gas using equations of state, hydrate formation, field treatment including dehydration, sour gas sweetening, sulfur recovery, and liquefaction. Design of main processing equipment will be studied.

Prerequisites

- CHME322 with a minimum grade D

Corequisites

- CHME421 with a minimum grade D

CHME462 Petroleum Refining Engineering (3 CH)

This course aims at introducing different techniques for petroleum refining. Topics include refinery feed stocks and products, field processes, crude distillation, coking and thermal processes, catalytic reforming and cracking,

hydro-processing, and solvent treating processes. Students will do a case study of a typical refinery.

Prerequisites

- CHME300 with a minimum grade D
- CHEM282 with a minimum grade D

CHME463 Petrochemical Technology (3 CH)

Overview. Petrochemical feed stock. Growth of global and UAE petrochemical industry. Technologies for the manufacture of bulk petrochemicals: Steam Reforming, Synthesis gas manufacture, Steam Cracking, Olefin Separation, Upgradation of C2, C3, C4, and C5 cuts. Manufacture of major downstream products and their uses and properties, e.g., Methanol, Formaldehyde, Ethylene oxide, Ethylene glycol, PVC, LDPE and HDPE, Propylene oxide, Isopropyl Alcohol, Butadiene, Isobutylene, Acetic acid, Maleic anhydride, Nylons, Polyethylene terepthalate, Formaldehyde resins, Styrene Butadiene Rubber, etc.

Prerequisites

- CHEM282 with a minimum grade D
- CHME322 with a minimum grade D

CHME464 Polymer Engineering (3 CH)

Introduction to polymer science and synthesis: condensation polymerization, addition polymerization, bulk polymerization, solution polymerization, suspension polymerization, and emulsion polymerization. Industrial polymer processing: extrusion, injection molding, blow molding, calendaring, sheet forming and fiber spinning. Review of the design and manufacture of polymer products, with particular emphasis on material selection and processing technology. Engineering properties of elastomers, thermoplastics, blends and specialty polymers in terms of processing characteristics and end-use performance.

Prerequisites

- CHME330 with a minimum grade D

CHME495 Industrial Training (15 CH)

Students spend one semester on a full-time basis in engineering or consulting office in the UAE or abroad to earn practical skills. (This course is conducted over a full semester (before the last study year). No courses are allowed to be registered during the internship).

CHME506 Process Modeling & Simulation (3 CH)

This course aims at introducing principles of process modeling using general-purpose software packages to solve model equations of various unit operations. Topics covered include multi-component phase equilibria, fluid flow reaction kinetics and separation processes. Applications are performed using MATLAB/SIMULINK and polymath in solving model equations.

Prerequisites

- MATH2210 with a minimum grade D

CHME508 Process Control (3 CH)

This course aims at introducing process dynamics and principles of control for chemical processes. Topics covered include block diagrams, Laplace transforms, transient response of feed-back systems, stability analysis, gain and phase margins.

Prerequisites

- MATH2210 with a minimum grade D

CHME510 Process and Plant Design (3 CH)

This course exposes the student to design strategies and interrelationships between process and design variables. There is an emphasis on cost analysis, environment, and rational use of energy and raw materials. Design of processes related to the petroleum and petrochemical industries.

Prerequisites

- GENG315 with a minimum grade D
- CHME390 with a minimum grade D
- CHME421 with a minimum grade D

CHME517 Mass Transfer Operations (3 CH)

This course starts with a review of phase equilibria, and then covers binary and multi-component distillation, leaching, and liquid-liquid extraction, with applications in design of a multi-column distillation process.

Prerequisites

- CHME421 with a minimum grade D

CHME528 Unit Operation and Process Control Lab (1 CH)

This is an experimentation course introducing concepts of experimentation data analysis to emphasize the relationship between predictive theories and actual experimental results and to enhance oral and written communication skills. A number of experiments are selected to cover topics related to unit operations, separation processes and process control, such as drying, cooling tower, gas absorption, distillation, liquid-liquid extraction, level control, dynamics of step input to CSTR in Series, etc.

Corequisites

- CHME517 with a minimum grade D

CHME570 Special Topics in Chemical Engineering (3 CH)

A specific topic in chemical engineering that is not covered in other program courses is presented in a course format. The selected topic is to be approved by the departmental board and the prerequisite to be specified according to the topic.

Prerequisites

- CHME411 with a minimum grade D

CHME575 Independent Studies in Chemical Engineering (3 CH)

An independent investigation by each student of a certain problem in the core areas of chemical engineering. The investigation may require theoretical, numerical, and experimental work. Grades are based on solving the assigned problem and giving an oral and a written report. There are no formal lectures. The topic choice requires arrangement with a faculty member and the approval of the department.

Prerequisites

- CHME495 with a minimum grade D

CHME585 Design and Critical Thinking in Chemical Engineering (3 CH)

This course concentrates on the rigors of communication, design, and critical thinking in an engineering context including problem identification, feasibility study of alternative solutions, preliminary design, technical writing, teamwork, and formal presentations. A team of students will apply the knowledge gained throughout their study and from industrial training to an engineering design project, emphasizing critical thinking, creativity, and originality. The selected alternatives will be the foundation of the capstone design project. A final report is required.

Prerequisites

- PHYS105 with a minimum grade D
- PHYS135 with a minimum grade D
- PHYS110 with a minimum grade D
- PHYS140 with a minimum grade D
- MATH2210 with a minimum grade D
- MATH2220 with a minimum grade D
- GENG215 with a minimum grade D
- GENG230 with a minimum grade D

- GENG220 with a minimum grade D
- GENG315 with a minimum grade D
- STAT210 with a minimum grade D

CHME590 Capstone Engineering Design Project (3 CH)

This course builds on the outcomes of CHME 585 course to perform detailed design and cost estimate of the selected alternative solutions to a well-defined engineering problem. Student teams are expected to apply knowledge gained throughout their studies to an engineering design project, emphasizing creativity and originality. A final report is required.

Prerequisites

- CHME585 with a minimum grade D

CHME611 Transport Phenomena (3 CH)

Prediction of velocity, temperature, and concentration profiles for flowing fluids; unifying concepts and analogies in momentum, heat, and mass transport; streamline flow and turbulence, molecular and eddy conduction and diffusion, boundary layers, smooth and rough conduits and other boundaries.

CHME612 Advanced Reaction Engineering (3 CH)

Kinetics of fluid-solid reactions in single particles, Mechanisms and kinetics of catalytic reactions; Reactor design: Fixed, fluidized and transport bed reactors for homo/heterogeneous systems; Novel reactors; Applications in petroleum and chemical industries.

CHME621 Advanced Mass Transfer (3 CH)

A study of fundamental mass transfer; theories of interphase mass transfer; gas-liquid and liquid-liquid systems; characterization; selection and design of equilibrium and rate-governed separation processes; capacity and efficiency of mass transfer equipment.

CHME622 Biochemical Engineering (3 CH)

An integrated approach to the application of engineering principles to biochemical processes. Topics include: cellular biology, polymeric cell compounds, enzyme and microbial kinetics, design and scale-up of bioreactors, sterilization, and bioseparation processes.

CHME623 Advanced Polymer Engineering (3 CH)

Polymer reaction engineering, characterization and processing for chemical engineers; polymerization mechanisms, kinetics and industrial equipment; thermodynamics of polymer solutions, morphology; crystallization and mechanical properties; polymer processing equipment and technology.

CHME624 Advanced Process Dynamics & Controls (3 CH)

Open-loop system dynamics, closed-loop systems, systems with difficult dynamics, non-linear systems, discrete-time systems, model-based control, adaptive systems and artificial intelligence. application to the chemical industry.

CHME625 Selected Topics in Chemical Engineering (3 CH)

Different selected topics in chemical engineering selected to complement the student's program and approved by the Program Committee.

CHME626 Waste Management (2 CH)

This course aims at presenting the characteristics of different types of solid waste, their generation rate, and associated regulations and legislation. Several waste management issues are covered including collection, transfer and transport, processing techniques, resource recovery, incineration, and landfilling. Control measures, reduction strategies, recycling and reuse industries are explored and their relevance to UAE and the region are discussed.

CHME640 Directed Studies in Chemical Engineering (3 CH)

This will require students to discuss and critique original and recent journal articles, describing a major scientific advancement in a research area, which will be chosen in consultation with the student's supervisor. Students are required to make presentations, submit reports and participate in discussions.

CHME710 Advanced Modeling and Mathematics for Chemical and Petroleum Engineering (3 CH)

Formulation of mathematical modeling in chemical/petroleum engineering; Vectors and Matrices; Solution of algebraic sets of equations. Solution of Ordinary Differential Equations: Analytical and Approximate Methods, Qualitative Analysis, Numerical Methods; Initial Value Problems, Boundary Value Problems; Numerical Methods and Parameter Estimation. Solution of Partial Differential Equation: Analytical Methods, Numerical Methods, Finite Difference Methods, Finite Element Methods. Applications in chemical/petroleum engineering including problem assignments, term projects and course exams.

CHME720 Rheology and Rheometry (3 CH)

A systematic development of the principles and applications of the science of rheology. Reviews vector and tensor mathematics and Newtonian fluid dynamics. Develops the physical and mathematical nature of stress and deformations in materials. Covers the use of theory and application of rheological equations of state. Describes and predicts non-linear viscous behavior as well as linear viscoelasticity. Covers the use of rheometry to determine rheological parameters in shear and extensional flow, and the rheology of interfaces

CHME731 Nanoscience and Nanotechnology (3 CH)

This course will cover range of fundamental topics in the fields of nanoscience and nanotechnology, including properties of nanomaterials (role of size; mechanical, optical, thermal, etc. properties(, classification of nanomaterials, structure-property relationship, synthesis of nanomaterials (Chemical vapor deposition, Arc discharge, RF-plasma, Ion sputtering, Laser ablation, Laser pyrolysis, Electro-deposition, etc.), characterization of nanomaterials (XRD, SEM, TEM, Optical, AFM, etc.), applications of nanomaterials (solar cells, nanocomposites, drug delivery, etc.), and the major challenges in

nanotechnology in terms of nanomaterials dispersion, purity and mass production.

CHME735 Advanced Topics in Chemical Engineering I (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Chemical Engineering

CHME736 Advanced Topics in Chemical Engineering II (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Chemical Engineering

CHME742 Advanced Catalysis (3 CH)

The course introduces catalysis and fundamental catalytic phenomena. These phenomena are discussed in light of different catalyst properties and catalyst preparation techniques. Physical and chemical properties of the catalyst are used to demonstrate the principles of the catalyst selection process. Reactors and reactor design for activity testing are described as well as catalyst deactivation mechanism and treatment. Industrial catalytic processes are discussed such as synthesis gas reactions (ammonia synthesis and Fischer-Tropsch synthesis), petroleum refining and processing, and environmental catalysis

CHME750 Enzyme Technology (3 CH)

This course provides information on enzyme technology, with emphasise on kinetics of enzymatic reactions. Immobilization processes, kinetics of immobilized enzymes and the design of packed bed enzymatic bioreactors are also discussed. The course starts with a general introduction to enzymes, their role and advantages over chemical catalysts, and genetics and protein synthesis. The course also covers enzyme production and purification techniques

CHME755 Graduate PhD Seminar (1 CH)

Presentations on research conducted by Faculty, industry, and students to be coordinated by the respective specializations.

CHME760 Advanced Membrane Technology (3 CH)

The course goal is to introduce students to a comprehensive understanding of membrane technology with reference to the transport mechanisms through different types of membranes. The course will cover various topics such as transport through polymeric, inorganic and hybrid membranes; the influence of sorption, diffusion, adsorption, pore size and pore size distribution to the membrane separation. Separation in various systems at varying conditions. The importance of the materials chemical structure, the physical properties of the gases and liquids, interaction between gases/liquids and membrane material, and possible degradation. This course will enable students to understand the design of membrane-based separation/reaction processes by acquiring in-depth knowledge in the area of membrane separation mechanisms, transport models, membrane permeability computations, membrane types and modules, membrane reactors

CHME800 Comprehensive Exam (0 CH)

Passing the comprehensive exam is required to enter into PhD candidacy. The exam evaluates the research ability of potential PhD candidates.

CHME810 Prospectus Exam (0 CH)

PhD student submits and defends a Research Proposal in front of a prospectus examination committee as stipulated in the COE prospectus examination guidelines.

CHME900 Dissertation Doctoral Research (30 CH)

Open to students who have successfully completed the comprehensive exam. PhD student conducts original research under the direction of a supervisory committee. Credits are determined in consultation with the dissertation supervisor. Prerequisite: Student must pass

CHME910 Dissertation Defense (0 CH)

Two part exam, open and close, to defend the results of PhD research work

Prerequisites

- CHME810 with a minimum grade D

CPSE600 Graduate Seminar (0 CH)

Research preparation

CPSE610 Fluid Phase Equilibria (3 CH)

Review of energy and reversibility concepts; single-phase systems of pure materials and mixtures; equilibrium and stability of PVT systems; phase behavior of multicomponent, multiphase systems; applications using equations of state.

CPSE624 Well Stimulation (3 CH)

In-situ stress determinations, effects of stress and strain gradients, time-dependent effects, Griffith's theory, crack phenomena, fracture toughness of rocks, pore-elasticity concepts. Hydraulic proppant fracturing. Formation damage and modeling damage. Acid treatment of carbonates. Geochemistry of acid-rock interactions. Matrix acidizing of sandstone and carbonates. Sand Control.

CPSE695 Technical Project (3 CH)

This course involves independent work on a design, simulation, modeling, development or experiments-related research project. All projects must be supervised by a faculty member and the student is responsible for finding his/her supervisor. Project topics may be faculty initiated, student initiated, or suggested by industrial contacts. The student is expected to submit a brief description of the work plan by the end of the second week of the semester and a comprehensive final report by the last week of lectures of the semester. The student is also required to give an oral presentation during that week.

CPSE699 Thesis Research (9 CH)

A directed research study on a specialized topic under the supervision of faculty advisor(s). The research is carried out during two or more terms. A written report is submitted at the end of the study and defended in front of a panel.

PETE290 Introduction to Petroleum Engineering (1 CH)

This course introduces the general activities of the upstream sector of the petroleum industry including origin of petroleum, petroleum traps, exploration for oil and gas, drilling and completion practices, and production operations, corrosion, pollution, oil storage, transportation, refining, and marketing.

PETE305 Reservoir Rock & Fluid Properties (3 CH)

This course introduces fundamental properties of reservoir rocks and fluids (oil, natural gas, formation water). Rock properties include porosity, fluid saturation, rock compressibility, permeability, capillary pressure, and effective and relative permeability. Fluid properties include composition of hydrocarbons, phase behavior of hydrocarbon systems, types of reservoir fluids, properties of oil-phase, gas-phase, and water-phase at reservoir pressures and temperatures, gas-liquid equilibrium (flash and differential vaporization), and gas-liquid equilibrium calculations using K values.

PETE308 Drilling Engineering I (3 CH)

This course introduces basic drilling techniques and drilling fluid properties. Topics include components of rotary drilling rig: rig, power transmission, hoisting, rotary table, bottom hole assembly, drilling bits; prediction of formation pressure, fracture pressure, and casing setting depths; mud properties and mud weight calculations; drilling hydraulics and nozzle sizing; factors affecting rate of penetration; cementing operations; and lab measurements of mud properties.

Corequisites

- CHME330 with a minimum grade D
- CHME390 with a minimum grade D

PETE315 Reservoir Rock & Fluid Properties lab (2 CH)

This course deals with the measurement of fundamental properties of reservoir rocks and fluids. Rock properties include porosity, irreducible water saturation, residual oil saturation, absolute permeability. Fluid properties include oil distillation, oil composition of one of oil fractions, oil density at room conditions and at high pressure and temperature conditions, oil viscosity at high pressure and temperature, surface and interfacial tensions, flash liberation process, estimation of bubble-point pressure at reservoir temperature, and oil-formation-volume factor and solution gas/oil ratio at pressures below the bubble-point pressure.

Prerequisites

- PETE305 with a minimum grade D

PETE320 Reservoir Mechanics (3 CH)

This course deals with material balance (MB) techniques to estimate oil and gas reserves. Topics include generalized MB equations for oil and gas reservoirs, fluid drive mechanisms, selection of PVT data, water influx, analysis of production history data and performance prediction of oil and gas reservoirs.

Prerequisites

- PETE305 with a minimum grade D

PETE362 Data Analysis in Petroleum Engineering (1 CH)

This course concentrates on the application of probability theory to analyze data in petroleum engineering processes. This includes data analysis of heterogeneous reservoir rock properties to estimate the most probable values of porosity, water saturation, permeability, and volumetric hydrocarbon reserves; use of permeability distribution as a descriptor of reservoir heterogeneity; probabilistic analysis of new hydrocarbon discoveries; and estimation of reservoir performance using probabilistic procedures and regression analysis.

Prerequisites

- STAT210 with a minimum grade D
- PETE305 with a minimum grade D

PETE403 Well Logging (3 CH)

This course covers analysis of various well measurements of reservoir properties. Topics include effect of the bore hole environment on logging operations interpretation of self potential, resistivity induction, neutron, sonic, density gamma ray, and dipmeter logs to determine hydrocarbon saturation, porosity, permeability, and facies. Also this course covers fundamental geophysical concepts including wellbore seismic and stratigraphic information from dipmeter.

Prerequisites

- PETE305 with a minimum grade D
- GEOL372 with a minimum grade D

PETE407 Drilling Engineering II (2 CH)

This course deals with additional topics in drilling engineering, namely design of directional and horizontal wells, survey analysis methods, tie point and collision, casing specifications and strengths, casing sizing, prediction of casing loads and resistances, and design of different casing strings.

Prerequisites

- PETE308 with a minimum grade D

PETE409 Natural Gas Engineering (3 CH)

This course covers reservoir and flow-line analysis and design for gas field development. Topics include material balance equation, gas condensate reservoirs, deliverability, pressure testing, separation, rate measurements, flow in pipes, and gas storage.

Prerequisites

- PETE320 with a minimum grade D

PETE410 Independent Studies (3 CH)

An independent investigation by each student of a certain problem in the core areas of Petroleum Engineering. The investigation may require theoretical, numerical, and/or experimental work. Grades are based on solving the assigned problem, giving oral presentation, and a written report. There are no formal lectures. The choice of problem requires arrangement with a faculty member and the approval of the department.

PETE413 Applied Reservoir Geology (3 CH)

Oil distribution in the world and in the United Arab Emirates; geology of reservoirs, which includes the formation of reservoir rocks, cap rocks, source rocks and the environments of deposition; petrophysical parameters of reservoir rocks, porosity and permeability; reservoir fluids: oil field waters, crude oil and natural gas; reservoir conditions: pressure, temperature and their effects on oil maturation, migration and accumulation; oil generation; oil migration; types of oil traps; and methods of exploration.

Prerequisites

- GEOL100 with a minimum grade D

PETE419 Well Performance (3 CH)

This course covers basic well performance calculations necessary for the design and analysis of naturally flowing and artificially lifted wells. Topics include Inflow Performance Relationship (IPR), Tubing Performance Relationship (TPR), Flowline Performance Relationship (FPR), Choke Performance Relationship (CPR), Gas-Lift, Electric Submersible Pumps (ESP), and production forecasting.

Prerequisites

- CHME330 with a minimum grade D
- PETE320 with a minimum grade D

PETE422 Reservoir Simulation (3 CH)

This course covers fundamental concepts of reservoir simulation to model single-phase flow in petroleum reservoirs. Topics include reservoir engineering concepts, mathematical concepts, derivation of reservoir flow equations, finite difference equations and their solutions, and applications to predict reservoir performance.

Prerequisites

- PETE320 with a minimum grade D

Corequisites

- MATH2220 with a minimum grade D

PETE424 Safety & Environment Impact (3 CH)

This course introduces students to safety and environmental issues in petroleum operations. Topics include sources of pollutants and hazards, management of safety and loss prevention, safety programs and safety rules, and environmental protection, rules and regulations.

Prerequisites

- CHEM111 with a minimum grade D
- CHEM175 with a minimum grade D
- MATH1120 with a minimum grade D

PETE443 Transport & Storage of Petroleum (3 CH)

This course deals with analysis and design of surface piping and storage facilities of crude oil and natural gas. Topics include fluid flow and pressure losses in pipes, pipeline design, selection and sizing of liquid pumps and gas compressors, corrosion in pipes, other transportation methods, and storage of petroleum and its products.

Prerequisites

- PETE419 with a minimum grade D

PETE495 Industrial Training (15 CH)

Students spend one semester on a full-time basis in engineering or consulting office in the UAE or abroad to earn practical skills. (This course is conducted over a full semester (before the last study year). No courses are allowed to be registered during the internship).

PETE507 Well Testing (3 CH)

This course covers reservoir characterization by pressure test analysis. Topics include fluid flow equations in porous media under transient and pseudo-steady state flow conditions, pressure buildup and pressure drawdown tests, average reservoir pressure, type curve matching, well testing of heterogeneous reservoirs, pressure derivatives analysis technique, multiple well testing, and test design and instrumentation

Prerequisites

- MATH2210 with a minimum grade D
- PETE320 with a minimum grade D

PETE512 Petroleum Production Operations (3 CH)

Well completions, perforations, Chemical and mechanical properties of reservoir rocks/fluids and treatment fluids, formation damage sources, detection, and modeling. Hydraulic fracturing, and fracturing fluids. Acid/rock interactions and acid treatment of oil reservoirs. Sand control methods. Evaluation of various skin factors.

Corequisites

- PETE419 with a minimum grade D

PETE519 Secondary Recovery Methods (3 CH)

This course covers analysis and design of the secondary (water and gas injection) recovery technique to recover oil. Topics include flood patterns, mobility ratio, sweep efficiency, displacement mechanisms, injection rates and pressures, reservoir heterogeneity, performance prediction, and sources and treatment of water for water flooding.

Prerequisites

- PETE320 with a minimum grade D

PETE520 Fluid Flow in Porous Media Lab (1 CH)

This course deals with the design aspects of oil displacement by another fluid in rock samples. It builds on the experiences of students obtained in lab measurements of individual reservoir rock and fluid properties in PETE 315 to create an integrated lab measurement of all properties needed to analyze oil displacement by a displacing fluid. The displacing fluid can be chosen to study the relative permeability, capillary pressures, and displacement efficiency of water flooding, gas flooding, or any enhanced oil recovery fluids (acidic water, microbial water, polymer solution, or steam) using cores, fractured cores (sand packs and glass beads may be considered as alternatives) in one-dimensional geometry or packed layers in two-dimensional geometry.

Prerequisites

- PETE315 with a minimum grade D

Corequisites

- PETE519 with a minimum grade D

PETE526 Separation & Treatment Petrol Fluid (3 CH)

This course deals with design of separation and treatment facilities for crude oil. Topics covered include phase behavior of water-hydrocarbon systems, flash calculations, 2 and 3- phase oil and gas separators sizing and design, oil-water emulsions and heater-treater design, treatment of oil field waters, and oil skimmers selection and design.

PETE542 Petroleum Property Evaluation (3 CH)

This course deals with economic evaluation of exploration and producing properties. It combines reservoir-engineering techniques such as reserve calculations and decline curve analysis with rate of return calculations for assured and risky ventures to project economic values for petroleum properties.

Prerequisites

- GENG315 with a minimum grade D

Corequisites

- PETE419 with a minimum grade D

PETE547 Applied Reservoir Simulation (3 CH)

This course covers advanced topics in reservoir simulation. These include reservoir fluid flow equations in multiphase, multidimensional flow, up-scaling of rock properties, pseudo functions, vertical equilibrium, analysis of data for for consistency, history matching, and applications to field cases.

Prerequisites

- PETE422 with a minimum grade D

PETE557 Enhanced Oil Recovery (3 CH)

This course covers chemical and thermal methods of EOR. Specific topics include interfacial tension, entrapment and mobilization of oil in porous media, residual oil, miscibility, adsorption at solid/liquid interfaces, surfactants and micro-emulsions, miscible gas flooding, polymer flooding, thermal methods, and effect of reservoir heterogeneity.

Prerequisites

- PETE519 with a minimum grade D

PETE570 Special Topics in Petroleum Engineering (3 CH)

This course may cover any area of petroleum engineering that is not covered by other courses of the program. A topic, approved by the Department, is selected for an in-depth study in the form of a semester course.

PETE585 Design and Critical Thinking in Petroleum Engineering (3 CH)

This course concentrates on the rigors of communication, design, and critical thinking in an engineering context including problem identification, feasibility study of alternative solutions, preliminary design, technical writing, teamwork, and formal presentations. A team of students will apply the knowledge gained throughout their study and from industrial training to an engineering design project, emphasizing critical thinking, creativity, and originality. The selected alternatives will be the foundation of the capstone design project. A final report is required.

Prerequisites

- PHYS110 with a minimum grade D
- PHYS140 with a minimum grade D
- MATH2210 with a minimum grade D
- MATH2220 with a minimum grade D
- GENG215 with a minimum grade D
- GENG220 with a minimum grade D
- GENG230 with a minimum grade D
- GENG315 with a minimum grade D
- STAT210 with a minimum grade D

PETE590 Capstone Engineering Design Project (3 CH)

This course builds on the outcomes of PETE 585 course to perform detailed design and cost estimate of the selected alternative solutions to a well-defined engineering problem. Student teams are expected to apply knowledge gained throughout their studies to an engineering design project, emphasizing creativity and originality. A final report is required.

Prerequisites

- PETE585 with a minimum grade D

PETE608 Advanced Drilling Engineering (3 CH)

This course covers advanced drilling topics which is essential in drilling technology environment. These topics were carefully selected to add to the skill of advanced drilling engineer. It is an introduction to advanced drilling topics such as High Pressure High Temperature (HPHT) drilling, modern drilling technologies, special well design, advanced wellbore stability analysis, pore pressure and fracture gradient estimation strategies before and during drilling are highly critical topics for anyone involved in the drilling process, problems and their solutions.

Prerequisites

- PETE308 with a minimum grade C
- PETE407 with a minimum grade C

PETE612 Advanced Natural Gas Engineering (3 CH)

Reserve estimates for gas and gas-condensate reservoirs; gas well performance; gas-well testing, gas flow in transmission lines; gas storage fields; liquefied natural gas.

PETE615 Advanced Reservoir Engineering (3 CH)

This course covers advanced topics in reservoir flow and the use of its initial production data for optimum development and management leading to a forecast of its future production capacity. Topics include fluid and petrophysical properties and measurements; horizontal, radial, and vertical flow, multiphase flow, heterogeneous, multilayered, and inclined reservoirs; up-scaling and averaging properties; diffusivity equation and solutions, aquifer influx reserve estimation; reserve estimates from decline curve analysis; productivity index for vertical, horizontal and multilateral wells, gas and water coning, production forecasting; field development alternatives: infill drilling, secondary recovery using water and gas injection patterns, drainage volumes for various schemes, streamlines, tracer methods; introduction to enhanced oil recovery.

PETE619 Advanced Petroleum Production Engineering (3 CH)

In this course the function of the production engineering is envisioned in the context of well design, multi-stage separation, and recent advances in hydraulic fracturing. Advanced study of production operations, artificial lift methods, well problems and optimization well deliverability from vertical, horizontal and multilateral wells; multiphase flow modeling in wellbores and pipes.

Prerequisites

- PETE419 with a minimum grade D

PETE621 Non-Thermal EOR Methods (3 CH)

New principles of recovery of oil and gas fields including use of polymer, gas-miscible, surfactant, and microbial processes with emphasis on the miscible flooding process. Phase behavior, first contact miscibility, multiple contact miscibility processes, predictive models and economic analysis, selection of candidate reservoirs; design and performance prediction of improved recovery floods.

PETE625 Selected Topics in Petroleum Engineering (3 CH)

Different selected topics in petroleum engineering selected to complement the student's program and approved by the Program Committee.

PETE626 Advanced formation evaluation (3 CH)

This course provides the student with a working knowledge of the current methodologies used in Geological description/analysis, Formation evaluation (the analysis/interpretation of well log data), and the analysis of well performance data (the design/analysis/interpretation of well test and production data).

Prerequisites

- PETE507 with a minimum grade C
- PETE403 with a minimum grade C

PETE627 Advanced Reservoir Simulation (3 CH)

This course provides advance numerical simulation of multiphase flow in heterogeneous porous media, with emphasis on advanced techniques based on numerical methods to develop flow equations, finite difference approximations their solution and applications to predict reservoir performance. Formulate discretization of partial differential equations combined with state-of-the-art linear and nonlinear solvers and well modeling and enhance students ability for self-learning through solving practical problems using a compositional oil reservoir simulator

Prerequisites

- (PETE422 with a minimum grade C and ELEC600 with a minimum grade C)

PETE640 Directed Studies in Petroleum Engineering (3 CH)

This will require students to discuss and critique original and recent journal articles, describing a major scientific advancement in a research area, which will be chosen in consultation with the student's supervisor. Students are required to make presentations, submit reports and participate in discussions.

PETE735 Advanced Topics in Petroleum Engineering I (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Petroleum Engineering

PETE736 Advanced Topics in Petroleum Engineering II (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Petroleum Engineering

PETE800 Comprehensive Exam (0 CH)

Passing the comprehensive exam is required to enter into PhD candidacy. The exam evaluates the research ability of potential PhD candidates.

PETE810 Prospectus Exam (0 CH)

PhD student submits and defends a Research Proposal in front of a prospectus examination committee as stipulated in the COE prospectus examination guidelines.

PETE900 Dissertation Doctoral Research (30 CH)

Open to students who have successfully completed the comprehensive exam. PhD student conducts original research under the direction of a supervisory committee. Credits are determined in consultation with the dissertation supervisor.

PETE910 Dissertation Defense (0 CH)

Two part exam, open and close, to defend the results of PhD research work

Prerequisites

- PETE810 with a minimum grade D

Civil & Environmental Engineering

CIVL220 Computer Aided Drawing (CIVL) (2 CH)

This course gives an introduction to computer graphics, geometric construction and line convention. It includes orthographic projections, isometric, dimensioning, sectional views, and preparation of drawings for different civil engineering projects including concrete and steel structures.

CIVL240 Statics (3 CH)

This course aims at introducing the students to the mechanics of rigid, non-accelerating bodies with applications to machinery and structures. Topics covered include scalar and vector quantities; two-dimensional force systems: forces, moments, couples and resultants; free body diagrams; equilibrium conditions; three-dimensional force systems; analysis of structures: method of joints, method of sections; distributed forces: introduction to shear forces and bending moments in beams; center of mass and centroid; properties of areas; and friction.

Prerequisites

- PHYS105 with a minimum grade D
- PHYS135 with a minimum grade D

CIVL270 Introduction to Environmental Engineering (2 CH)

This course aims at introducing the different topics related to the field of environmental engineering. It includes the role of environmental engineers; fundamentals of environmental chemistry; fundamentals of environmental microbiology; mass balance; mathematics of growth; risk assessment; water pollution; water quality control; solid waste management; and air pollution.

Prerequisites

- CHEM111
- CHEM175

CIVL310 Structural Analysis (3 CH)

This course aims at providing students with the skills and techniques required for the analysis of statically determinate structures. It includes the discussion and review of basic statics; stability and determinacy; analysis of determinant structures (trusses, beams, and frames); cables and arches; influence lines of moving loads; deflection analysis (geometric and energy approach); introduction to indeterminate structures (slope deflection method and moment distribution method).

Corequisites

- MECH305 with a minimum grade D

CIVL330 Transportation Engineering (3 CH)

This course aims at introducing the notions of transportation systems, organizations, and management. The course covers in details the elements of the transportation planning process; namely trip generation, trip attraction, trip distribution, modal split and trip assignment models. The course also covers aspects of forecasting travel demand and evaluating transportation alternatives using both economical and effectiveness approaches.

Prerequisites

- STAT210

CIVL335 Surveying (3 CH)

This course aims at studying fundamentals of plain surveying for civil engineers. It includes fundamentals of surveying measurements, including using classical and electronic measuring devices. Topics cover vertical distance measurements, topography representation, and horizontal distance measurements. Computation and determination of point coordinates are covered including measurements of angles and directions, and establishing of the horizontal control by Traverses, including field procedures and computations. Computation of earthwork volumes is also included in the course.

Prerequisites

- Pre/Co CIVL315

CIVL340 Soil Mechanics (3 CH)

This course aims at introducing the engineering properties of soils to the students. Topics cover soil formation and classification; soil water interaction; soil plasticity; permeability of soils; stress distribution in soils; soil compaction; shear strength of soils; the principle of effective stress.

Prerequisites

- Pre/Co MECH305 with a minimum grade D

CIVL345 Fluid Mechanics for Civil and Architectural Engineering (3 CH)

This course aims at presenting basic principles of fluid mechanics. It includes definitions and fundamental concepts, dimensions and units, properties of fluids, flow regimes, pressure and force calculations under hydrostatic conditions, manometers, buoyancy and stability of floating and submerged bodies, elementary fluid dynamics, conservation equations: mass, energy and momentum, continuity and Bernoulli equations, hydraulic gradient line and total energy line, linear momentum equation, Angular momentum equation, applications on conservation equations, Navier-Stockes equation, dimensional analysis, Rayleigh Method, Pi theorem, Geometric, kinematic and dynamic hydraulic similarities, undistorted and distorted hydraulic models, and Lab experiments on the above topics.

Prerequisites

- CIVL240 with a minimum grade D

CIVL358 Surveying for Architectural Engineering (2 CH)

This course aims at learning fundamentals of measurements of horizontal and vertical distances, measuring angles, using classical and electronic measuring equipment, computing areas and volumes of earthwork, staking-out of buildings and sewers, staking-out of hardscapes, setting out verticality of columns and buildings, and measuring settlement of buildings.

Prerequisites

- STAT210 with a minimum grade D

CIVL360 Concrete Technology (3 CH)

This course aims at introducing concrete and its constituents to the students. Topics include properties and specification of different types of cements; properties of aggregates; properties of fresh concrete; mixing, placing, and compaction of concrete; strength and durability of hardened concrete; concrete mix design; types of admixtures for concrete; special concretes and their applications; introduction to hot weather concreting; introduction to masonry materials.

Prerequisites

- Pre/Co CHEM2706

CIVL365 Reinforced Concrete Design I (3 CH)

The course aims at developing the design process for reinforced concrete structural members. It includes; load determination, vertical and lateral load distribution, and lateral load resisting systems: frames and shear walls, design methods and structural safety. Applications of the design process to singly and doubly reinforced beams and T-beams, shear and diagonal tension in beams, design of short columns.

Prerequisites

- CIVL310
- Pre/Co CIVL360

CIVL375 Water & Wastewater Technology (3 CH)

This course aims at presenting the analysis and design aspects of main technologies employed in water and wastewater treatment. It includes physical treatment processes like screening, grit removal, aeration, sedimentation, and filtration, chemical treatment processes like coagulation, flocculation,

softening, iron and manganese removal, disinfection, ion exchange and adsorption, and biological treatment processes like activated sludge and anaerobic treatment units. The course addresses the reuse of wastewater and the treatment and disposal techniques of generated sludge. It also includes a number of laboratory experiments illustrating selected water and wastewater treatment technologies.

Prerequisites

- CIVL270 with a minimum grade D
- BIOL250 with a minimum grade D

CIVL400 Water Resources (3 CH)

This course aims at presenting the different aspects of water resources and hydraulic applications. It includes introduction to, and significance of, water resources, rainfall, evaporation, infiltration, and surface runoff, mass curves, steady flow in closed conduit, friction losses in pipelines, pipe networks, types, selection and operation of pumps, open channel flow, normal and critical depths, specific energy concept, rapidly and gradually varied flow, water surface profile analysis and computation, introduction to groundwater hydraulics, and flow calculation in 2-D and 3-D wells. It also includes a number of laboratory experiments.

Prerequisites

- CIVL345

CIVL412 Reinforced Concrete Design II (3 CH)

The course aims at the design of complex reinforced concrete structural systems. It includes the analysis and design of continuous beams; two-way slabs; design of reinforced concrete slender columns; and shear walls. It also includes an introduction to the seismic design of reinforced concrete structures and application of computer software for analysis and design of reinforced concrete elements.

Prerequisites

- CIVL365 with a minimum grade D

CIVL417 Structural Steel Design (3 CH)

This course aims at studying the properties of structural steel, steel sections and design concepts. In addition, the course discusses in details the design of main structural elements such as tension and compression members, as well as the design of beams. The course also covers the design of bolted and welded connections for tension members, and sheds the light on the design of simple beam connections.

Prerequisites

- CIVL310 with a minimum grade D

Corequisites

- CIVL365 with a minimum grade D

CIVL433 Highway Engineering (3 CH)

The course aims at covering aspects of geometric and structural design of highways. Aspects of geometric design include capacity calculations, sight distance, horizontal and vertical alignment, design of at-grade and grade-separated intersections. Aspects of structural design include loading analysis, design of asphalt layers, and design of hot asphalt mixes.

Corequisites

- CIVL335 with a minimum grade D

CIVL442 Foundation Engineering (3 CH)

This course aims at developing an understanding of the application of soil mechanics to design of foundations. It includes subsurface exploration; bearing capacity and settlement calculations for shallow foundations, structural design of shallow foundations; capacity and settlement calculations for deep foundations; lateral earth pressure and retaining walls.

Prerequisites

- CIVL340 with a minimum grade D

Corequisites

- CIVL365 with a minimum grade D

CIVL445 Construction Management (3 CH)

This course aims at introducing students to the different types and functions of management, project delivery methods, and types of contracts. It also includes the critical path method (CPM) and its application and the program evaluation and review technique (PERT) method of scheduling. In this course, students will also learn resource leveling and allocation, cost estimation and bidding, and overall project management using CPM. The course also includes several computer applications.

Corequisites

- GENG315 with a minimum grade D

CIVL495 Industrial Training (15 CH)

Students spend one semester on a full-time basis in an engineering or consulting office in the UAE or abroad to earn practical skills.

Prerequisites

- CHEM2706 with a minimum grade D
- MATH2210 with a minimum grade D
- MATH2220 with a minimum grade D
- PHYS110 with a minimum grade D
- PHYS140 with a minimum grade D
- GENG230 with a minimum grade D
- GENG215 with a minimum grade D
- GENG315 with a minimum grade D
- GENG220 with a minimum grade D
- CIVL310 with a minimum grade D
- CIVL330 with a minimum grade D
- CIVL335 with a minimum grade D
- CIVL340 with a minimum grade D

- CIVL345 with a minimum grade D
- CIVL360 with a minimum grade D
- CIVL365 with a minimum grade D
- CIVL375 with a minimum grade D

CIVL510 Special Topics in Structural Engineering (3 CH)

This course aims at introducing topics based on the recent developments and advances in structural engineering. It includes topics that are selected by the department based on the needs of students. The choice of the topics will be limited to the academic and financial resources of the department.

Prerequisites

- CIVL365 with a minimum grade D

CIVL515 Advanced Concrete Technology (3 CH)

This course aims at teaching students advanced topics in Concrete Technology. Emphasis on hot weather concreting is the primary topic of this course. Topics include concrete durability matters such as pore structure, permeability, corrosion of the reinforcement and repair. Properties of high performance concrete shall also be addressed.

Prerequisites

- CIVL360 with a minimum grade D

CIVL517 Matrix Structural Analysis (3 CH)

The course aims at the analysis of structural systems. It includes the review of structural mechanics and matrix algebra, formulation of stiffness matrices of linear elements, displacement method and introduction to finite element analysis. It sheds light on the use of software packages for structural analysis.

Prerequisites

- CIVL310 with a minimum grade D

CIVL520 Special Topics in Water Resources & Environmental Engineering (3 CH)

Topics will be decided by the department based on the recent developments in water resources and the environmental engineering field, and the needs of students. The choice of the topics will be limited to the academic and financial resources of the department.

Prerequisites

- CIVL270
- CIVL400

CIVL522 Advanced Environmental Engineering (3 CH)

Basic concepts of EIA, environmental policies, framework of EIA, EIA methodologies, preparation of impact statements, types of air pollutants, sources, effects of air pollution on health and welfare, modeling atmospheric pollutants, and control of emissions.

Prerequisites

- CIVL270

CIVL524 Geo-environmental Engineering (3 CH)

The course aims at presenting different aspects related to the field of geo-environmental engineering, emphasizing the influence/interaction of pollutants with the subsurface environment. The course includes topics in the area of geo-environmental practices; environmental land use; land environment sensitivity and tolerance; land disposal regulation; waste characterization; soil mineralogy; clay water system; soil-pollutant interaction; influence of pollutants on soil hydraulic properties.

Prerequisites

- CIVL270 with a minimum grade D
- CIVL340 with a minimum grade D

CIVL525 Hydrology (3 CH)

The course aims at introducing basic concepts of hydrology. It includes introduction to hydrology, hydrologic budget, hydrologic measurements and data, statistical methods in hydrology, point and areal precipitation, evaporation, infiltration, characteristics of drainage basins, stream flow measurements: stage, velocity, discharge, stream flow hydrograph, surface water runoff, base flow separation, estimation of surface runoff volume, unit hydrograph, types of aquifers and wells, physical properties of aquifers, hydraulic gradient, specific yield and specific storage, Darcy's law, groundwater flow nets, governing equations for flow in confined and phreatic aquifers, pumping and recovery tests, groundwater recharge, groundwater exploration and well construction.

Prerequisites

- CIVL400

CIVL530 Special Topics in Transportation Engineering (3 CH)

Topics will be decided by the department based on the recent developments in transportation engineering and the needs of students. The choice of the topics will be limited to the academic and financial resources of the department.

Prerequisites

- CIVL330

CIVL531 Topographic Surveying (3 CH)

This course aims at studying essential topics in topographic surveying. It includes establishment and calculations of circular compound and reverse curves, spirals, and vertical curves. Topics also cover precise leveling, establishment of horizontal control in the form of triangulation networks, and methods for monitoring stability of structures. An introduction to photogrammetry will be included. In addition, the course sheds light on the GPS satellite based measurements and positioning.

Prerequisites

- CIVL335 with a minimum grade D or CIVL358

CIVL534 Computer Aided Mapping (3 CH)

This course aims at studying the up-to-date techniques used in map generation aided by computer usage. Topics include Digital mapping and applications, and Digital terrain modeling. The course discusses different types of coordinate systems and their transformation. It introduces use of satellite positioning techniques in mapping and land information systems. The course also includes map projections methods and their applications.

Prerequisites

- CIVL335

CIVL538 Advanced Highway Engineering (3 CH)

The course aims at introducing the methods for pavement evaluation, repair and management of pavement maintenance. It covers aspects of preparation of sub-grades, soil stabilization, construction machinery, performance upgrading of roads, pavement structural evaluation and repair, environmental impact.

Prerequisites

- CIVL433

CIVL539 Traffic Engineering (3 CH)

The course aims at studying the basics of traffic engineering and modeling of highway networks. Topics to cover include traffic capacity analysis, levels of service, delay calculations, fundamentals of signal design and timing, analysis and design of pre-timed signalized intersections, and actuated signals and detection. It also introduces traffic network simulation models for traffic modeling, evaluation, and assessment of effectiveness of design alternatives.

Prerequisites

- CIVL330

CIVL540 Special Topics in Construction Management (3 CH)

This course aims at studying topics that are decided by the department based on the recent developments in construction management and the needs of students. The choice of the topics will be limited to the academic and financial resources of the department.

Prerequisites

- CIVL445

CIVL541 Special Topics in Soil Mechanics & Foundation Engineering (3 CH)

Topics will be decided by the department based on the recent developments in soil mechanics and foundation engineering, and the needs of students. The choice of the topics will be limited to the academic and financial resources of the departments.

Prerequisites

- CIVL340 with a minimum grade D

CIVL547 Advanced Construction Management (3 CH)

This course aims at studying the advanced techniques used for the scheduling of construction project operations. This includes scheduling of repetitive and linear projects using the line of balance technique. It also includes project financing and progress control, time-cost tradeoff analysis, and optimum markup estimation. This course also includes application of computer project management packages to construction and case studies.

Prerequisites

- CIVL445

CIVL548 Advanced Geotechnical Engineering (3 CH)

Topics include soil structures; primary and secondary clay minerals; diffuse double layer; soil water potential (soil suction); saturated and unsaturated water flow; heat flow in soils; soil stabilization; and slope stability analysis.

Prerequisites

- CIVL340 with a minimum grade D

CIVL552 Advanced Steel Design (3 CH)

This course aims at studying the design of built-up beams and plate girders. It also includes details of the design of composite beams. In addition, the course discusses the design and detailing of common building connections, rigid frames, roof trusses and structural steel building systems.

Prerequisites

- CIVL417

CIVL585 Design and Critical Thinking in Civil Engineering (3 CH)

This course concentrates on the rigors of communication, design, and critical thinking in an engineering context including problem identification, feasibility study of alternative solutions, preliminary design, technical writing, teamwork, and formal presentations. A team of students will apply the knowledge gained throughout their study to an engineering design project, emphasizing critical thinking, creativity, and originality. The selected alternatives will be the foundation of the capstone design project. A final report is required.

Prerequisites

- GENG215 with a minimum grade D
- CIVL310 with a minimum grade D
- CIVL330 with a minimum grade D
- GENG315 with a minimum grade D
- CIVL335 with a minimum grade D
- CHEM2706 with a minimum grade D
- CIVL340 with a minimum grade D

- PHYS110 with a minimum grade D
- CIVL345 with a minimum grade D
- PHYS140 with a minimum grade D
- CIVL360 with a minimum grade D
- MATH2220 with a minimum grade D
- MATH2210 with a minimum grade D
- CIVL365 with a minimum grade D
- GENG230 with a minimum grade D
- GENG220 with a minimum grade D
- Pre/Co CIVL375 with a minimum grade D

CIVL590 Capstone Engineering Design Project (3 CH)

This course builds on the outcomes of CIVL 585 course to perform detailed design and cost estimate of the selected alternative solutions to a well-defined engineering problem. Student teams are expected to apply knowledge gained throughout their studies to an engineering design project, emphasizing creativity and originality. A final report is required.

Prerequisites

- CIVL585 with a minimum grade D

CIVL600 Graduate Seminar (0 CH)

Current research topics in Civil Engineering will be presented and discussed. Seminars will be delivered by faculty, staff and industry experts and professionals in the field. This is a pass or fail core course. Plan A students should present a research proposal to pass the course while Plan B students (non-thesis option) should present a summary report of the presented talks.

CIVL602 Environmental Impact Assessment Principles & Applications (3 CH)

Basic concepts; environmental policies; framework of environmental assessment; impact assessment methodologies; preparation of impact statements; air, water and soil qualities; noise; energy; vegetation; wildlife, marine life, and socioeconomic factors. Case studies.

CIVL605 Experimental Methods in Civil Engineering (3 CH)

Introduction to experimental methods, instrumentation, data acquisition, data processing, static and dynamic testing, overview of laboratory work with several hands-on applications in the laboratory, physical models in Structural Engineering, Physical models in Water Resources, Physical models in Geotechnical Engineering, Physical models in Highway Engineering, experimental project.

CIVL610 Advanced Mechanics of Materials (3 CH)

Analysis and design of load-carrying members, shear center, unsymmetrical bending, curved beams, beams on elastic foundations, energy methods, theories of failure, thick-walled cylinders, stress concentrations, design to prevent failure by excessive elastic deformation, plastic deformation and fracture, buckling of bars.

CIVL611 Structural Dynamics (3 CH)

Damped and undamped natural vibration, response of single- and multiple-degrees-of-freedom systems to steady-state and transient excitations, modal analysis, nonproportional damping and complex modes, variation formulation of equations of motion, discretization of structural systems for vibrational analysis, applications for earthquake and machinery loadings.

CIVL612 Prestressed Concrete Structures (3 CH)

Basic concepts of prestressing, materials and systems for prestressing, partial losses of prestressing, behavior and design of simple span and continuous span prestressed concrete members in flexure and shear, application of prestressed concrete to columns, composite sections, and circular storage tanks.

CIVL614 Advanced Steel Design (3 CH)

Review of the design of tension and compression members. Compression plates: stability, analysis, and design. Lateral torsional buckling of Beams. Design for torsion. Plate girders: stability, strength, and stiffener design. Design of different types of connections. Continuous beams and rigid frames:

failure mechanisms and elastic/plastic design criteria. Braced and unbraced frames: stability and bracing requirements.

CIVL615 Bridge Engineering (3 CH)

History and development of bridges. Construction materials for Bridges. Bridge components. Bridge design philosophies. Loads on bridges. Slab-on-steel beam bridges (composite and non-composite construction). Plate-girder bridges. Box-girder bridges (straight and curved). General overview of special bridge types (arch and truss bridges, cable-supported bridges). Substructure design (piers and abutments). Bridge evaluation procedures - bridge rating.

CIVL616 Rehabilitation of Structures (3 CH)

Damage mechanisms, instrumentation and non-destructive test methods, conventional repair techniques, innovative repair and strengthening techniques with composites, case studies.

CIVL618 Construction Equipment & Methods (3 CH)

Major construction equipment and operations. Selection of construction equipment including scrapers, dozers, cranes, etc., based on applications, methods, and production requirements. Power generation, transmission, and output capacity of equipment. Calculation of transport cycle times. Concreting methods including mixing, delivery, and placement. Design of forms for concrete walls and supported slabs.

CIVL620 Construction Cost Estimating (3 CH)

Conceptual and detailed cost estimating. Cost of different construction operations including handling and transporting materials, excavation, concrete structures, floor finishes, floor systems, masonry, carpentry, interior finishes, roofing and flashing, plumbing, steel structures. Estimation of profit and project budgeting.

CIVL621 Advanced Foundation Design (3 CH)

Design of shallow foundations, bearing capacity and settlement, combined footings and rafts; eccentric and inclined loads, footings in slopes, machine

foundations. Deep foundations; caissons and piers, piles, pile groups, tension piles. Tunnels and tunnel linings, flexible culverts. Earth pressures, retaining walls, sheeting and bracing, cofferdams. Case records of foundation performance including failures.

CIVL622 Stability of Earth Supported Structures (3 CH)

Introduction, lateral earth pressure, gravity and cantilever walls, mechanically stabilized retaining walls, sheet pile walls, braced cuts, drilled shafts, caissons.

CIVL623 Foundation Dynamics (3 CH)

Design of foundations subjected to vibratory and impulsive loadings, evaluation of dynamic soil properties, lumped mass analogies, earthquake effects in slope stability and earthwork structures.

CIVL624 Theory & Design of Pavement Structures (3 CH)

Theories of pavement behavior and concepts of pavement design, Pavement design considerations, Calculations of ESAL, Design reliability concept, AASHTO method for flexible pavement design, PCI method for flexible pavement design, AASHTO method for rigid pavement design, Economic Considerations.

CIVL625 Pavement Management Systems (3 CH)

Stresses in flexible pavements, Stresses in rigid pavements, Pavement materials, distress survey and rating procedures, Non-destructive testing, Roughness measurements, Skid resistance measurements, Pavement serviceability index calculation, Pavement condition index calculations, Pavement condition prediction models, Network-level management, Project-level management, Computer applications in PMS.

CIVL626 Advanced Traffic Engineering & Management (3 CH)

Introduction to traffic flow theory, Traffic capacity analysis concepts, Highway capacity analysis of multilane uninterrupted flow facilities, Calibrating relationships for freeway analysis, Traffic control devices, Principles of intersection signalization, Signal design and timing, Analysis of signalized

intersections, Actuated signals and detection, Signal coordination, Computer traffic control systems, Arterial design and management, Traffic simulation tools.

CIVL627 Design of Transportation Systems (3 CH)

Characteristics of Urban travel and transportation systems, Transportation planning and decision making, Data management and diagnosis, Analysis and evaluation of transportation systems, Demand analysis, Supply analysis, Transportation systems evaluation, Program and project implementation, Intelligent transportation systems: introduction.

CIVL628 Map Projections and Geometric Geodesy (3 CH)

Coordinate frames used in geodesy, Photogrammetry, Surveying and mapping, Cartesian, spherical, and ellipsoidal coordinates, Earth-fixed geocentric and topocentric frames, Fundamentals of mapping, Curvilinear coordinate systems, Mapping projections, Projection aspects, Distortion, Conformal mapping, State plane coordinate systems, Applications, Datums: global and local, horizontal and vertical, and three-dimensional, Geodetic reference systems.

CIVL629 Digital Terrain Modeling & Applications (3 CH)

Global and local modelling strategies for topography, Elements of spatial topology and geomorphology, Breaklines, trends, periodicities and related features, Sampling techniques and accuracy considerations, Triangulation, tessellations and other partitions, Contouring shading and other graphical representations, Network modeling approaches of Werner and Warntz, Graph theoretic approach of Pfaltz, Contour trees and generalizations, Surface patchwork intelligent approach, Fractals and applications, Overview of data structures.

CIVL630 Special Topics in Civil Engineering (3 CH)

Different selected topics in Civil Engineering to complement the student's program. The executive committee of the program should decide the topics to be offered each semester based on the needs.

CIVL631 Directed Studies in Civil Engineering (3 CH)

This will require students to discuss and critique original and recent journal articles, describing a major scientific advancement in a research area, which will be chosen in consultation with the student's supervisor. Students are required to make presentations, submit reports and participate in discussions.

CIVL650 Research Thesis (9 CH)

A directed research study on a topic relevant to the main specialization under the supervision of faculty advisor(s). The research should be conducted during two or more terms. A research thesis will be submitted upon advisor(s) approval at the end of the study and defended orally to a committee as stipulated by the University's Graduate Studies regulations.

CIVL732 Sustainable Civil Infrastructure Engineering (3 CH)

This course provides the background required for modelling the interconnected nature of infrastructure systems and understanding the different types of interdependencies that exist between them. It also introduces the application of the three dimensions of sustainability, economic, environmental and social, towards the planning, design and operation of sustainable infrastructure systems. The course provides also the background necessary for performance-based design and durability analysis of civil engineering infrastructure. It provides an advanced knowledge on the use of recycled waste materials in sustainable civil engineering infrastructures. It introduces the concept of civil engineering infrastructure life cycle cost analysis and assessment

CIVL734 Earthquake Engineering (3 CH)

This course aims at introducing the central concepts in structural earthquake engineering. The topics covered include causes and measuring of earthquakes; lessons learned from previous earthquakes; structural response characteristics; key aspects of seismic design; structural configurations and systems for earthquake resistance; principles of seismic hazard assessment; earthquake input motion; and seismic response evaluation.

CIVL735 Advanced Topics in Civil Engineering I (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Civil Engineering

CIVL736 Advanced Topics in Civil Engineering II (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Civil Engineering

CIVL737 Design of Concrete Structures with Fiber Reinforced Polymers (3 CH)

This course aims at developing an in-depth understanding of the performance and design of concrete structures internally-reinforced with fiber reinforced polymers (FRP) bars. The course introduces the students to the strut-and-tie modeling approach used for the design of FRP-reinforced concrete structures with discontinuity/disturbed regions (D-regions). Students will use modern software to simulate the behavior of complex FRP-reinforced concrete members. The course introduces the students to the Arrhenius concept used for service life prediction of FRP composites in harsh environments.

CIVL738 Tunneling and Deep Excavation (3 CH)

History of tunneling; functions, types of tunnels; Geotechnical aspects in tunneling; Excavation methods and construction techniques; Prediction of ground deformation due to tunneling; Effect of ground deformation on existing structures; Types of tunnel lining; Design methods for tunnel lining; Instrumentation and monitoring. Braced excavations; straining actions in support elements of deep excavations

CIVL739 Contaminant Subsurface Hydrology (3 CH)

Description and quantification of solute transport processes (diffusion, dispersion, advection, sorption, transformations, etc.) in porous media. Physical-chemical-biological concepts of retention and transport of water and solutes in unsaturated and saturated media. Formulation and solution of solute transport equations, modeling of water flow and solute transport equations. Applications: Groundwater contamination and site remediation

CIVL742 Sustainable Water Treatment Systems (3 CH)

This course covers sustainability issues as they apply to water treatment systems. Topics will cover two broad issues related to sustainable water treatment technologies and management of water treatment systems. Sustainable water treatment technologies will focus on wastewater reclamation, grey water utilization, and use of nanomaterial and green technologies for water treatment. Management of water treatment systems will include risk assessment, economic assessment and asset management. Throughout the course, case studies, application examples and numerical problems will be presented

CIVL743 Urban Traffic Control Systems (3 CH)

This course introduces the students to various topics of relevance to the design, operation, and management of traffic flow over complex urban traffic networks. It covers mainly the traffic flow modeling and traffic flow operations. Sub-topics include dynamic traffic assignment, network optimization techniques, advanced queuing theory, transit systems preemption, incident management, and integrated control systems

CIVL746 Transport Economics and Transit Systems Operation Management (3 CH)

This course is aimed at covering relevant topics related to applied transport economics, including transport demand, supply, and costs, as well as applications of cost-benefit analyses in the transportation context. The course is also aimed at exposing students to transport pricing practices and transport financing alternatives. This course also entails introducing data needs for evaluating and managing transit systems and developing the skills of using various analytical methods. Methods entail the use of Simulators, Data Envelopment Analysis (DEA), and Technique of Order Preference by Similarity to Ideal Solution (TOPSIS). Several issues concerning the efficiency and effectiveness of transit systems as well as accessibility are discussed through real-life examples and data.

CIVL751 Engineering Risk Assessment and Management (3 CH)

This course will provide students with a thorough understanding of effective planning for risk management. Students will learn how to identify project risks, prioritize identified risks, analyze and evaluate these risks, and develop

responses for high priority risks. The course will also introduce students to risk response planning, risk monitoring, and risk control. The course will focus on the PMI Project Management Body of Knowledge (PMBOK) process of risk management. Students will also learn how to identify and analyze risks related to a project's scope, schedule, and resources. The course will introduce students to advanced tools and techniques used for risk management. Applications to case studies will be covered

CIVL800 Comprehensive Exam (0 CH)

Passing the comprehensive exam is required to enter into PhD candidacy. The exam evaluates the research ability of potential PhD candidates.

CIVL810 Prospectus Exam (0 CH)

PhD student submits and defends a Research Proposal in front of a prospectus examination committee as stipulated in the COE prospectus examination guidelines.

Prerequisites

- CIVL810 with a minimum grade D

CIVL900 Dissertation Doctoral Research (30 CH)

Open to students who have successfully completed the comprehensive exam. PhD student conducts original research under the direction of a supervisory committee. Credits are determined in consultation with the dissertation supervisor.

CIVL910 Dissertation Defense (0 CH)

Two part exam, open and close, to defend the results of PhD research work

Prerequisites

- CIVL810 with a minimum grade D

WATR601 Fluid Mechanics for Non Eng. (3 CH)

Definitions, Dimensions and units, dimensional homogeneity, characteristics of fluids, Fluid Statics: Hydrostatic Pressure and manometers, Types of Flow, Forces and Motion, Basic Laws: Continuity equation, momentum equation, and energy equation, Applications to the basic laws, Uniform, Rapid and Gradually Varied flow in Open Channels, dimensional analysis, physical models.

WATR602 Water Resources Management (3 CH)

Availability of water resources, demands, supplies, reservoirs operation, planning and development, Reuse and disposal of reused water, Human resources development, social aspects of water resources development. Significance of developing standards and specifications, water regulations, laws and legislations. Framework of water resources management. Review of basic microeconomics applied to water resources. Economical and financial evaluation techniques and impact analysis. Water and agriculture. Uncertainty and risk in supply and demand of water resources.

WATR603 Surface Water Hydrology (3 CH)

Hydrologic measurements and data, Statistical methods in hydrology, Precipitation, Evaporation and Transpiration, Water Budget, Infiltration, stream flow measurements, Watersheds and drainage basins, Rainfall-runoff, Hydrographs, an introduction to hydrological modeling.

Prerequisites

- WATR601 with a minimum grade C or CIVL345 with a minimum grade D

WATR605 Introduction to Water Science and Technology (3 CH)

This course introduces the students to surface and ground water resources, non-conventional water resources, types of desalination, new technologies in water reuse and recycling in different sectors. It examines current and future plight of water shortages and water quality issues. It also introduces aspects of water and wastewater quality assessment and treatment.

WATR606 Water Quality (3 CH)

Sources and uses of water. Water characteristics. Water pollution, physical, chemical, biological and radiological pollutants. Risk and hazard index. Water quality standards. Sampling, measurement and analysis of water. Pollution control.

WATR608 Graduate Seminar (0 CH)

Presentations by faculty and professionals on different topics related to Water Resources, Presentations by students on their research interest, Thesis Proposal (Thesis option).

WATR611 Hydraulics of Closed Conduits (3 CH)

Pipe transmission design. Flow control and measurement. Selection of pumps. Forces in pipelines. Hydraulics of valves, transients and cavitation. Computer applications in water supply systems, extended period simulation in pipe networks.

Prerequisites

- WATR601 with a minimum grade C or CIVL345 with a minimum grade D

WATR615 Groundwater Hydrology (3 CH)

Types of Aquifers, Darcy equation, Aquifer characterization. Types of Models, Governing equations, initial and boundary conditions, closed form solutions, numerical techniques, development of a conceptual model, Flow and transport models, data requirement, verification, calibration and validation of numerical models, MODFLOW, Applications and study cases. Groundwater contamination and transport processes.

Prerequisites

- WATR601 with a minimum grade C or CIVL345 with a minimum grade D

WATR616 Advanced Hydrochemistry (3 CH)

Groundwater origin and quality, types and causes of contamination, contaminant transport in porous media, Basic concepts in hydrogeochemistry, Chemical equilibrium and kinetics, Acid-base reaction and carbonate system, Mineral weathering, Mineral surface processes, Redox reaction processes, Sorption reactions, Applications of isotopes in hydrogeology and hydrogeochemistry, Alternative approaches in hydrogeochemisty. Groundwater remediation.

Prerequisites

- WATR605 with a minimum grade C

WATR617 Water and Wastewater Treatment (3 CH)

Wastewater sources and characteristics. Wastewater treatment methods: pretreatment, primary (physical), secondary (biological), and tertiary (advanced) treatment. Primary treatment: (screening, coagulation, flocculation, sedimentation, filtration, aeration), Biological systems of treatment (activated sludge processes, biological filtration, sludge handling). Tertiary treatment (adsorption, ion exchange, disinfection).

WATR618 Introduction to Water Desalination (3 CH)

Chemistry of saline water. Mathematical analysis and design of single effect evaporation processes (SEE) combined with mechanical vapor compression (SEE-MVC) and thermal vapor compression (SEE-TVC), multiple effect desalination (MED), single and multistage desalination processes (MSF). Reverse Osmosis; scale formation, bio-fouling and scale control. Pre- and Post- treatment operations. Reject brine management. Cogeneration and economic consideration of various desalination processes.

Prerequisites

- WATR601 with a minimum grade C or CIVL345 with a minimum grade D

WATR620 Membrane Desalination (3 CH)

Linear, non-linear and dynamic programming and applications to water resources. Uncertainty and reliability analysis in systems of water resources.

Techniques of water demand forecasting. Selected applications in water resources.

Prerequisites

- WATR618

WATR622 Coastal Hydrodynamics (3 CH)

Basics of coastal hydraulics and physical oceanography. Linear wave theory and determination of significant wave heights. Hydraulics of tides and harmonic analysis. Coastal and oceanographic currents and circulation. Ekman currents and Geostrophic flow. Transport modes. Heat and turbulence transfer. Physical measurements and field observations. Introduction to hydrodynamic modeling.

Prerequisites

- WATR603 with a minimum grade C

WATR631 Special Topics in Water Resources (3 CH)

Different courses will be offered based on the needs and Theses requirements. Examples of the courses to be offered include: Coastal hydraulics, Groundwater contamination, Mathematical methods in Water Resources, Water recycle and wastewater minimization, Industrial Wastewater Treatment, Small-scale Desalination Techniques, and others.

WATR632 Directed Studies in Water Resources (1 CH)

The student can select a topic under the guidance of his supervisor and approval of the executive committee. Selected topics should not be part of Theses. The student should submit a report about the studied topic.

WATR640 Research Thesis (9 CH)

Supervision of research work is made towards the completion of M.Sc. requirements for Thesis option students.

WATR695 Technical Project (3 CH)

This course involves independent work on a design, simulation, modeling, development or experiments-related research project. All projects must be supervised by a faculty member and the student is responsible for finding his/her supervisor. Project topics may be faculty initiated, student initiated, or suggested by industrial contacts. The student is expected to submit a brief description of the work plan by the end of the second week of the semester and a comprehensive final report by the last week of lectures of the semester. The student is also required to give an oral presentation during that week.

WATR735 Advanced Topics in Water Resources I (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Water Resources

WATR736 Advanced Topics in Water Resources II (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Water Resources

WATR800 Comprehensive Exam (0 CH)

Passing the comprehensive exam is required to enter into PhD candidacy. The exam evaluates the research ability of potential PhD candidates.

WATR810 Prospectus Exam (0 CH)

PhD student submits and defends a Research Proposal in front of a prospectus examination committee as stipulated in the COE prospectus examination guidelines.

Prerequisites

- WATR800 with a minimum grade D

WATR900 Dissertation Doctoral Research (30 CH)

Open to students who have successfully completed the comprehensive exam. PhD student conducts original research under the direction of a supervisory committee. Credits are determined in consultation with the dissertation supervisor.

Prerequisites

- WATR800

WATR910 Dissertation Defense (0 CH)

Two part exam, open and close, to defend the results of PhD research work

Prerequisites

- WATR810 with a minimum grade D

Electrical Engineering

ECOM320 Probability and Random Processes (3 CH)

An overview of sets, events, single random variables and probability theory; Multiple Random variables, joined density and distribution functions, operations on multiple random variables, moments and characteristic functions, dependence and correlation; multi-variant Gaussian distribution; Random processes, stationarity, ergodicity, correlation functions, temporal and spectral characteristics.

Prerequisites

- MATH1120 with a minimum grade D
- STAT210 with a minimum grade D

ECOM360 Fundamentals of Communication Systems (3 CH)

Background and overview of communication systems. Analysis and transmission of signals. Analog modulation techniques: amplitude modulation/demodulation, DSB, DSB-SC, SSB, and Phase and frequency Modulation/Demodulation. Analog communication Systems: Super heterodyne receiver, Multiplexing systems, Phase-locked loops, and Television and broadcast systems. Sampling theory and Pulse Modulation: PAM, PPM and PWM.

Prerequisites

- ELEC360 with a minimum grade D

ECOM402 Communication Systems Lab (1 CH)

Filter design and characteristics. ,AM Modulation/Demodulation Circuits, FM Modulation/Demodulation Circuits.PCM, Delta Modulation, and Delta-Sigma Modulation Circuits. Bandpass digital Modulation/Demodulation techniques ASK ,FSK BPSK QPSK. Spread Spectrum –DSSS mod/dem.,Fiber Optics – basics .

Prerequisites

- Pre/Co ECOM422 with a minimum grade D

ECOM412 Electromagnetic Waves (3 CH)

Time varying fields and Maxwell's equations. Plane wave propagation in perfect dielectric, lossy dielectric and good conducting materials. Power flow and power losses. Standing wave ratio and skin effect. Reflection and refraction of plane waves for normal and oblique wave incidence. Transmission lines (TL), power flow on lossless lines, transient signal analysis on TL. Smith chart, input impedance and matching with single stubs. Rectangular waveguides and resonators.

Prerequisites

- ELEC325 with a minimum grade D

ECOM422 Digital Communication Systems (3 CH)

Introduction: sampling theorem, quantizing & PCM, the maximum-likelihood (ML) receiver, error probability in ML receivers. Digital modulations: phase-shift keying (PSK), amplitude-shift keying (ASK), & frequency-shift keying (FSK). Pulse shaped modulations. Some advanced topics: differential PSK & offset PSK schemes. Generation of coherent references: phase-locked loops, linear & nonlinear models of PLL in the presence of additive noise.

Prerequisites

- ECOM320 with a minimum grade D
- ECOM360 with a minimum grade D

ECOM432 Data Communications & Networks (3 CH)

Principles of data communications; information transfer, computer networks and their applications. Open systems and the OSI reference model. Physical layer, transmission media, multiplexing, analog and digital transmissions. Data Link Layer: media access control, error detection and correction, multiple access, circuit switching: PSTN, packet switching: and Ethernet and gigabit networking. Local Area Networks (LANS), and Wide area Networks, (WANs), Network layer addressing and TCP/IP protocol stack.

Prerequisites

- Pre/Co ECOM360 with a minimum grade D

ECOM442 Data Communications & Networks Lab (1 CH)

Network Cabling and Testing, Building a Network, Testing and Troubleshooting a Network, Switching Basics and Intermediate Routing, Routing and Routing Basics, WAN Technologies, Network Monitoring and security, and Wireless LAN.

Prerequisites

- Pre/Co ECOM432 with a minimum grade D

ECOM451 Digital Signal Processing (3 CH)

Overview of discrete-time signals and systems, representation of discrete-time systems by means of difference equations. Analysis of discrete-time signals and systems using Fourier and z-transforms. The sampling theory of continuous-time signals, digital processing of continuous-time signals using A/D and D/A conversion. Transform-based analysis of linear time-invariant (LTI) FIR and IIR systems and their structures. Discrete Fourier transform (DFT) and fast algorithms for its computation. FIR and IIR digital filter design.

Prerequisites

- ECOM360 with a minimum grade D

ECOM461 Digital Signal Processing Lab (1 CH)

Fundamentals of applied digital signal processing (DSP) by implementing a wide range of DSP applications on general-purpose DSP development kits. Experiments cover fundamental concepts of digital signal processing like sampling and aliasing, quantization in A/D conversion, digital filter design and implementation, signal generation, spectrum estimation and fast transforms, sampling-rate conversion and multi-rate processing. Application experiments address a selection of multi-media and digital communications problems.

Prerequisites

- Pre/Co ECOM451 with a minimum grade D

ECOM532 Antenna Engineering (3 CH)

Fields and power radiation of different thin linear antennas (e.g. ideal dipole, electrically short dipole, half wave dipole and dipole over perfect ground plane). Antenna parameters in the far zone: radiation pattern, beam width, side lobe level, radiation resistance, power loss, efficiency, directivity, gain and polarization. Antennas in communication links and radar (Friis formula, radar cross-section, effective aperture). Antenna arrays: array factor, radiation pattern, beam width and directivity of isotropic arrays and short dipole arrays, case of uniformly excited, equally spaced linear arrays. Descriptive study of wire antennas (e.g. Yagi-Uda) and broadband antennas (e.g. helical, biconical).

Prerequisites

- ECOM412 with a minimum grade D

ECOM542 Wireless Communications (3 CH)

Introduction to wireless communication systems. The cellular concept and system design fundamentals: frequency reuse, interference and system capacity. Radio propagation and large-scale path loss. Small-scale fading and multipath propagation: Doppler shift, mobile multipath channel parameters such as coherence bandwidth and coherence time. Diversity techniques and diversity combining. Spread spectrum communication techniques. Multiple access techniques: TDMA, FDMA, CDMA, SDMA. Current and future wireless systems and standards.

Prerequisites

- ECOM360 with a minimum grade D
- ECOM412 with a minimum grade D

ECOM561 Information Theory & Coding (3 CH)

The concept of amount of information; average information; entropy and information rate; Shannon's theorem; channel capacity. Coding: mathematics of coding, groups, rings, fields and Galois fields. Block codes: parity and generator matrix, syndrome, and minimum distance. Cyclic and BCH codes; Convolutional codes and Viterbi decoding algorithm.

Prerequisites

- ECOM360 with a minimum grade D

ECOM562 Satellite Communications Systems (3 CH)

Introduction to Satellite Communication Systems. Link Analysis. Satellite Communication Techniques. Multiple Access Techniques. Multibeam Satellite Systems. Regenerative Satellite Systems. Broadcasting by Satellites. Inter

Satellite Links. Satellite Communication Payload, Earth Station Technology, Project Work

Prerequisites

- ECOM412 with a minimum grade D

ECOM571 Communication Circuits (3 CH)

RF signals in analog and digital modulations. RF circuits including linear amplifiers, mixers, oscillators, detectors, limiters, and power amplifiers; Transmitter and receiver structures; Phase locked loops; Design of RF integrated circuits; Circuit concepts like stability, noise, distortion, intermodulation, and dynamic range. Design problems of RF communication circuits or subsystems based on component, circuit, and system data and specifications.

Prerequisites

- ELEC370 with a minimum grade D
- ECOM360 with a minimum grade D

ECOM580 Special Topics in Communications (3 CH)

Topics in communications engineering are chosen by the course instructor at the beginning of the term and approved by the department council.

Prerequisites

- ECOM360 with a minimum grade D
- ECOM412 with a minimum grade D

ELEC305 Electric Circuits I (3 CH)

Circuit Analysis Techniques: Nodal Analysis, Mesh Analysis, Source Transformation, Superposition, Thevenin?s and Norton Theorems. Transient Response: First Order RC & RL Circuits, Step Response & Time Constants, Second Order RLC Circuits, Resonance & Quality Factor. Sinusoids and Phasors: Phasor Representation of Sinusoids, Impedance & Admittance,

Circuit Analysis using Phasors. Average Power and RMS values. Operational Amplifiers (Op Amp): Ideal Op Amp Operation, Circuit Analysis of Op Amp Inverting Configuration, Applications of Inverting Configuration, Circuit Analysis of Op Amp Non-Inverting Configuration.

Prerequisites

- MATH1120 with a minimum grade D

ELEC310 Electric Circuits I lab (1 CH)

Introduction to Circuit Simulators. Circuit Analysis Techniques I (Nodal & Mesh Analysis). Circuit Analysis Techniques II (Thevenin?s & Norton & Superposition). Transient Analysis of RC & RL circuits. Resonance & Quality Factor of RLC Circuits. Circuit Analysis using Phasors. Networks DC & Transient Analysis. Op Amp Circuits I (Configurations & Circuit Analysis). Op Amp Circuits II (Op Amp Applications). Op Amp Limitations.

Prerequisites

- Pre/Co ELEC305 with a minimum grade D

ELEC315 Fundamentals of Microelec Devices (3 CH)

Semiconductors: energy bands, carrier concentration, carrier transport phenomena: drift, diffusion. P-N Junction: current-voltage characteristics. Diode models. Diode circuit applications: Rectifiers, Clippers, Clamper, Zener diode (Regulators). Metal-Semiconductor Contacts: equilibrium, idealized metal semiconductor junctions, non-rectifying (Ohmic) contacts, Schottky diodes. Metal Oxide Semiconductor (MOS) capacitance. MOS Field-Effect Transistor: structure, current-voltage characteristics, DC biasing., the MOSFET as an amplifier and as a switch. Bipolar junction transistor (BJT): structure, current-voltage characteristics, DC biasing, charge control switching model, Ebers-Moll model.

Prerequisites

- ELEC305 with a minimum grade D

ELEC320 Electric Circuits II (3 CH)

Review of Instantaneous Power, Average power and RMS values, Active and Reactive Power. Three Phase Circuits and Power Distribution systems: Configuration of Different Three phase Systems, Three phase Power, Power factor Correction. Magnetically Coupled Circuits: Mutual Inductance, Dot Convention, Energy stored, Ideal Transformers, Three Phase Transformers. Frequency Response: Network Functions, Bode Plot, Resonance Circuits. Two port networks: Admittance Parameters, Impedance Parameters and Hybrid Parameters.

Prerequisites

- ELEC305 with a minimum grade D
- GENG220 with a minimum grade D

ELEC325 Engineering Electromagnetics (3 CH)

The course covers field theory topics related to stationary and moving charges. Coulomb's law, Electric flux and Gauss's law, Divergence theorem and capacitance. Electric boundary conditions. Magnetostatics: steady magnetic field, Biot-Savart Law, Ampere's Law, Stokes' theorem and magnetic flux. Magnetic force and inductance. Magnetic boundary conditions. Faraday's law and Maxwell's equations. Introduction to transmission line theory.

Prerequisites

- MATH1120 with a minimum grade D
- PHYS110 with a minimum grade D
- PHYS140 with a minimum grade D

ELEC335 Digital Logic Design (3 CH)

Data representation, number systems, codes, arithmetic operations, Boolean algebra, logic gate, combinational logic circuits, minimization techniques, MSI modules: adder, decoders, multiplexers, programmable logic arrays. Flip Flops, sequential circuits, registers, counters, and memory. Design of synchronous and asynchronous sequential circuits, state diagrams, state minimization and assignment. Memories.

ELEC345 Digital Logic Design Lab (1 CH)

Hands-on experimentation with primitive logic gates, decoders, multiplexers, adders, flip-flops, counters, registers, LEDs, and seven-segment displays.

Prerequisites

- Pre/Co ELEC335 with a minimum grade D

ELEC360 Signals & Systems (3 CH)

Continuous-time and discrete-time signals and systems. Linear time-invariant (LTI) systems: system properties, convolution sum and the convolution integral representation, system properties, LTI systems described by differential and difference equations. Fourier series: properties and applications, Fourier transform: properties and applications. Laplace Transform: properties and applications.

Prerequisites

- MATH2210 with a minimum grade D

ELEC370 Electronic Circuits (3 CH)

Low and high frequency models for transistors. Small-signal analysis and design of single-stage MOSFET amplifiers. Small-signal analysis and design of single-stage BJT amplifiers. Frequency response characteristics of amplifiers. Multistage amplifiers: Small signal analysis and Frequency response characteristics of multistage amplifiers. Negative feedback: Properties and the four basic feedback topologies. Wave shaping: Basic principles of Sinusoidal Oscillators, Op Amp-RC Oscillator circuits, LC and crystal Oscillators, Multi-vibrators, and Voltage controlled oscillators (VCO). Output stages and power amplifiers: Classification.

Prerequisites

- ELEC315 with a minimum grade D or MECH350 with a minimum grade D

ELEC372 Electro-Mechanical Devices (2 CH)

AC circuit analysis: phasors steady state power analysis, polyphase circuits; basics of electrical machines construction, theory of operation, equivalent circuit and its governing equations of DC machines, 3-phase synchronous generations, single phase transformers, and 3-phase induction motors, semiconductor devices and transducers.

Prerequisites

- PHYS110 with a minimum grade D
- PHYS140 with a minimum grade D
- GENG230 with a minimum grade D

ELEC375 Electronic Circuits Lab (1 CH)

Diode Characteristics & Circuit Applications, Zener Diode Characteristics & Circuit Applications. FET Characteristics, FET Amplifiers and frequency response characteristics. BJT DC Characteristics, BJT Amplifiers and frequency response characteristics. RC Coupled Amplifier characteristics and frequency response, Feedback amplifier operation and characteristics, Hartley and Colpitts oscillators and multivibrators, Complementary Power Amplifier DC Operation, AC Voltage and Power Gain.

Prerequisites

- Pre/Co ELEC370 with a minimum grade D

ELEC380 Analytical Methods for Electrical Engineering (3 CH)

Complex analysis including complex numbers, complex functions, complex integration, and series representations of complex functions. Laplace transform, properties and applications. Fourier analysis and orthogonal expansions. Introduction to partial differential equations. Applications include but not limited to circuit theory, control, wave propagation and digital signal processing.

Prerequisites

- MATH2210 with a minimum grade D

ELEC411 Electric Energy Conversion (3 CH)

Faraday's Law and applications, Magnetic circuits and introduction to the machinery principles. Single phase transformer, Ideal and Real Transformers theory of operation, Modeling and derivation of equivalent circuit parameters, experimental determination of equivalent circuit parameters. Theory of operation of AC Machines. 3-phase synchronous Generators, theory of operation, Machine modeling, experimental determination of the equivalent circuit parameters and parallel operation. Induction motors, theory of operation, Equivalent circuit development, experimental determination of equivalent circuit parameters, torque speed curve characteristics.

Prerequisites

- ELEC320 with a minimum grade D
- ELEC325 with a minimum grade D

ELEC431 Control Systems (3 CH)

Control Systems in the Real World, Feedback Concept, Modeling of Dynamic Systems, Block Diagrams, Sensitivity and Disturbance Analysis, Steady State Error Analysis, Stability Analysis, Time Domain Analysis of Control Systems, Frequency Domain Analysis of Control Systems, Control system design in frequency domain (Nyquist and Nichols Charts), Control System Design in time domain (Proportional-Integral-Derivative Control and lead-lag compensator).

Prerequisites

- ELEC360 with a minimum grade D
- MATH2220 with a minimum grade D

ELEC433 Instrument & Control Lab (1 CH)

Practical analysis and design of feedback control systems and components: control design of second-order systems, PID control design, Programmable Logic Controllers.

Prerequisites

- Pre/Co ELEC431 with a minimum grade D

ELEC451 Microprocessors (3 CH)

Architecture of a Microcomputer System, Evolution of the Microprocessors, Software Architecture of the 8088/8086 Microprocessors, Software Development Tools, Instruction Set, Assembly Language Programming Techniques, Interfacing and Applications, Interrupts.

Prerequisites

- ELEC335 with a minimum grade D
- ELEC330 with a minimum grade D

ELEC461 Microprocessors Lab (1 CH)

Software debugging and development tools, Instruction set, Assembly language programming techniques with applications.

Prerequisites

- ELEC451 with a minimum grade D

ELEC462 Computer Architecture & Organization (3 CH)

Basic structure of computers, machine programs sequencing, addressing modes, micro-programmed control, CISC & RISC CPUs, instruction architecture, data path and control, computer arithmetic, input-output organizations, I/O channels computer communications, memory organizations.

Prerequisites

- ELEC451 with a minimum grade D

ELEC472 Power Systems (3 CH)

Power Systems Concept and Components, The UAE Power Network, Review of Phasors and Complex Power, Balanced Three-phase Circuits, Per Unit Notation, Transmission Line Parameters, Modeling of Transmission Lines in the Steady State Mode, Introduction to Power Flow, Fundamentals of Symmetrical faults calculation, Computer applications.

Prerequisites

- ELEC320 with a minimum grade D
- ELEC325 with a minimum grade D

ELEC481 Electric Energy Conversion Lab (1 CH)

Transformer basics including turns ratio test, open-circuit test and short circuit test to determine the equivalent circuit parameters, in addition to exploring the concept of the voltage regulation and efficiency. DC machines (motors and generators) operation and basic characteristics. Basic tests and modeling of 3-phase synchronous generator in addition to the load characteristics. Torque-speed, efficiency, starting and other main characteristics of the Induction Motors.

Prerequisites

- Pre/Co ELEC411 with a minimum grade D

ELEC495 Industrial Training (15 CH)

Students spend one semester on full-time basis in in engineering or consulting company in the UAE or abroad to earn practical skills. (This course is conducted over a full semester (before the last study year). No courses are allowed to be registered during the internship).

Prerequisites

- GENG315 with a minimum grade D
- CHEM2706 with a minimum grade D
- ECOM320 with a minimum grade D
- ECOM360 with a minimum grade D
- GENG230 with a minimum grade D
- ELEC325 with a minimum grade D

- ELEC335 with a minimum grade D
- ELEC345 with a minimum grade D
- ELEC370 with a minimum grade D
- ELEC375 with a minimum grade D
- ELEC451 with a minimum grade D
- (PHYS235 with a minimum grade D or PHYS330 with a minimum grade D or MATH245 with a minimum grade D or MATH470 with a minimum grade D)

ELEC512 Digital Electronics (3 CH)

MOS Digital Circuits: Digital Circuit Design Overview, the MOSFET as a Digital Circuit Element Design and performance Analysis of the CMOS Inverter, CMOS Logic Circuits Pseudo-NMOS Circuits, Pass-Transistor Logic Circuits, Dynamic Logic Circuits, Latches and Flip-Flops, Multivibrators, Semiconductor Memories: Types and Architectures, Random-Access Memory (RAM) Cells, Read-Only Memory (ROM). Bipolar Digital Circuits: The BJT as a Digital Circuit Element, Transistor-Transistor Logic (TTL or T?L) 3. Characteristics of Standard TTL; TTL Families with Improved Performance; Emitter-Coupled Logic (ECL), Timing Circuits (Astable, Bistable, Monostable). Advanced Technology Digital Circuits: BiCMOS Digital Circuits, Overview of Silicon Germanium (SiGe) and Gallium-Arsenid.

Prerequisites

- ELEC370 with a minimum grade D

ELEC521 Advanced Control Systems (3 CH)

Controllability and Observability, State and Output Feedback Controller Design, Observer Design, Linear Quadratic Regulator, Introduction to Robust Control Design, Fundamentals of Nonlinear Control.

Prerequisites

- ELEC431 with a minimum grade D

ELEC522 Industrial Automation (3 CH)

Graphical symbols in Control Systems, Data acquisition, Implementation of digital PID controllers, Cascade Control, Feedforward control, Smith predictor controller, Programmable Logic Controller (PLC), Ladder diagrams, SCADA systems.

Prerequisites

- ELEC431 with a minimum grade D

ELEC530 Special Topics in Power & Control Engineering (3 CH)

Topics in power and control engineering are chosen by the course instructor at the beginning of the term and approved by the department council.

Prerequisites

- ELEC431 with a minimum grade D or ELEC472 with a minimum grade D

ELEC531 Power Systems Analysis (3 CH)

Power Systems in the Real World, Sources of Faults in Power Systems, Symmetrical Components, Sequence Networks, Unsymmetrical Short Circuits, Advanced load flow analysis, Power System Stability, Power System Protection.

Prerequisites

- ELEC472 with a minimum grade D

ELEC533 Very Large Scale Integrated Circuits (VLSI) (3 CH)

Historical perspective and future trend of CMOS technology; Basics of CMOS process; Design methodologies: custom, semicustom, automatic. The focus is on CMOS technology, using custom and standard cell-based design flows. Issues covered at the introductory level include deep sub-micron design, Global design issues: clocking, interconnect, physical design, sub-system

design, power, testing as well as CAD tools. The course includes a project component in which students design and layout a small circuit (Chip).

Prerequisites

- ELEC370 with a minimum grade D

ELEC534 Power System Distribution (3 CH)

Generation, Transmission and distribution, Load characteristics, load estimation, Subtransmission lines and distribution substation, Primary systems, Secondary systems, Voltage drop, power loss, Application of capacitor banks, Distribution systems voltage regulation, Distribution System faults, Distribution System protection, Earthing systems, Power quality assessment, system reliability and Distribution automation.

Prerequisites

- ELEC472 with a minimum grade D

ELEC551 Digital Image Processing (3 CH)

An introduction to basic techniques of analysis and manipulation of pictorial data by computer, image /output devices, Image processing software, Enhancement, Segmentation, Property measurement, Hough transform, Fourier analysis, Computer encoding, processing, and analysis of curves.

Prerequisites

- ELEC360 with a minimum grade D
- MATH2220 with a minimum grade D

ELEC561 Java Programming Applications (3 CH)

Introduction to Java applications & applets, Control structures, Methods, Arrays, Object-oriented programming, Strings & characters, Files and streams, GUIs, Term project.

Prerequisites

- ELEC330 with a minimum grade D

ELEC562 Embedded System Design (3 CH)

An investigation of current microcomputer structures with emphasis on design of control software, hardware implementation of I/O, analogy to digital (A/D) converter, serial communication, direct memory access, interrupts, interfacing external memory device, and microprogramming.

Prerequisites

- ELEC451 with a minimum grade D

ELEC570 Special Topics Computer Engineering (3 CH)

Topics in computer engineering are chosen by the course instructor at the beginning of the term and approved by the department council.

Prerequisites

- GENG230 with a minimum grade D
- ELEC451 with a minimum grade D

ELEC580 Special Topics in Electronic Engineering (3 CH)

Topics in electronic engineering are chosen by the course instructor at the beginning of the term and approved by the department council

Prerequisites

- ELEC370 with a minimum grade D

ELEC582 Analog Integrated Circuit Design (3 CH)

Integrated-circuits devices and modeling. Design of basic analog circuits, such as current sources and mirrors, differential amplifiers. Basic amplifier circuits, CMOS opamps, opamp compensation. Comparators. Noise. Reference circuits.

Prerequisites

- ELEC370 with a minimum grade D

ELEC585 Design and Critical Thinking in Electrical Engineering (3 CH)

This course concentrates on the rigors of communication, design, and critical thinking in an engineering context including problem identification, feasibility study of alternative solutions, preliminary design, technical writing, teamwork, and formal presentations. A team of students will apply the knowledge gained throughout their study and from industrial training to an engineering design project, emphasizing critical thinking, creativity, and originality. The selected alternatives will be the foundation of the capstone design project. A final report is required.

Prerequisites

- GENG215 with a minimum grade D
- GENG315 with a minimum grade D
- CHEM2706 with a minimum grade D
- (ECOM320 with a minimum grade D or ELEC320 with a minimum grade D or ECOM360 with a minimum grade D)
- ELEC325 with a minimum grade D
- ELEC370 with a minimum grade D
- ELEC375 with a minimum grade D
- ELEC451 with a minimum grade D
- ELEC380 with a minimum grade D
- MATH2220 with a minimum grade D

ELEC590 Capstone Engineering Design Project (3 CH)

This course builds on the outcomes of ELEC 585 course to perform detailed design and cost estimate of the selected alternative solutions to a well-defined engineering problem. Student teams are expected to apply knowledge gained

throughout their studies to an engineering design project, emphasizing creativity and originality. A final report is required.

Prerequisites

- ELEC585 with a minimum grade D

ELEC592 Power Electronics (3 CH)

The Thyristor, AC and DC diode circuits, Thyristor commutation techniques, Single and three-phase converters, Controlled rectifiers, different static switches, AC voltage controllers, inverters and cycloconverters, DC Choppers. Thyristor data sheets, Protection of diodes and circuits.

Prerequisites

- ELEC320 with a minimum grade D
- ELEC370 with a minimum grade D

ELEC600 Numerical Methods in Engineering (3 CH)

This course focuses on numerical methods for the analysis and design of engineering processes and systems. The course will include approximation and interpolation, root-finding, solution of linear and nonlinear equations, curve fitting, numerical differentiation and integration, numerical optimization, solution of ordinary and partial differential equations, finite difference and introduction to finite element techniques, regression estimation, and uncertainty analysis.

ELEC602 Linear Systems (3 CH)

Mathematical description of systems, fundamental of matrix algebra and quadratic forms, state space solution and realization of linear systems, stability of linear and nonlinear systems, controllability and observability, minimal realization and coprime fractions state feedback and state estimators.

Prerequisites

- MATH2220 with a minimum grade C

- ELEC431 with a minimum grade C

ELEC604 Advanced Digital Signal Processing (3 CH)

Review important concepts in digital signal processing and introduce a number of advanced topics and applications in one-dimensional digital signal processing. Review the basic discrete time transforms including discrete time Fourier transform (DTFT), discrete Fourier transform (DFT), and Z-transform. Introduce selected topics from IIR and FIR filter design, short-time Fourier analysis, modern spectral estimation, linear prediction, adaptive filtering, and array processing. Applications from speech / music analysis and synthesis would also be included.

Prerequisites

- ELEC360 with a minimum grade C

ELEC612 Communications Networks (3 CH)

Fundamental concepts of communication networks, architecture for access and internetworking, packet switching; protocols and throughput optimization, routing; error and flow control, TCP/IP and other internet protocols, topological design algorithms, queuing theory and its applications, multiple access schemes.

Prerequisites

- ECOM432 with a minimum grade C

ELEC613 Wireless Communications (3 CH)

Evolution of radio communications and broadcast systems, new trends, economics of radio communications, spectrum usage; Cellular concept, coverage, frequency reuse, interference; Broadcast concepts; Radio propagation; Large scale path loss, small scale fading and multi-path; Wireless modulation techniques; Multiple access techniques; Networking and planning; Case studies.

Prerequisites

- ECOM360 with a minimum grade C

ELEC615 Adaptive Signal Processing (3 CH)

Basic concepts and applications of adaptive signal processing; adaptive filters, beam-formers, optimum space/time processors and their adaptive implementation, adaptive algorithms.

Prerequisites

- ECOM451 with a minimum grade C

ELEC617 Antenna Design & Applications (3 CH)

Review of antennas basic theory: radiation pattern antenna impedance, gain, directivity, bandwidth, beam width, and frequency dependence. Advanced level treatment of antenna design and analysis. Analysis and synthesis of phased arrays. Reflector antennas. Micro strip antennas. Single and dual reflector systems. New concepts of primary radiator design. Primary feeds for monopulse radar. Antennas for navigation aids. Adaptive phased arrays and their application to radar.

Prerequisites

- ELEC325 with a minimum grade C

ELEC619 Advanced Topics in Communication Engineering (3 CH)

Consent of instructor where topics are to be chosen every year according to specific interests.

Prerequisites

- ECOM360 with a minimum grade C

ELEC620 Analytical Techniques in Engineering (3 CH)

This course focuses on mathematical formulation and analysis of engineering processes and systems, including initial and boundary value problems. The course will include matrices and vectors, system of equations, ordinary and partial differential equations, and complex variables. Mathematical methods such as separation of variables, Laplace transformation, Fourier transformation, integral transformation, orthogonal functions and Bessel functions will be covered.

Prerequisites

- MATH2210 with a minimum grade C
- MATH2220 with a minimum grade C

ELEC622 Power Systems Protection (3 CH)

Review of power system symmetrical components & fault analysis, protective device operating principles, instrument transformers, over current protection, distance and pilot protection, equipment protection: machines, transformers, buses, protection aspects of power system phenomena.

Prerequisites

- ELEC472 with a minimum grade C

ELEC625 Power Systems Quality (3 CH)

Power quality disturbances, power quality standards, CBEMA and ITIC curves, power quality indices, power interruption, faults as a sources of sags and swells, motor starting sags, mitigation of sag and swell disturbances, waveform distortion, voltage fluctuation, power frequency variation, harmonic sources, power system responses to harmonics, resonance, harmonic analysis methods, harmonic mitigation, transients, capacitor-switching transients, interaction of capacitor banks, circuit analysis of cap-switching transients, mitigation of transients, power quality monitoring, detection classification and measurement, power quality and deregulation. Solving power quality problems, power conditioning devices, static circuit breaker, static shunt and series compensator, passive and active harmonic filters.

Prerequisites

- ELEC472 with a minimum grade C

ELEC629 Advanced Topics in Power Engineering (3 CH)

This course deals with advanced power / power electronics topics as per instructor area of expertise.

Prerequisites

- ELEC472 with a minimum grade C

ELEC637 Sensors Design and Applications (3 CH)

Design, analysis and application of sensors used to measure physical quantities such as flow, level, temperature, pressure and density.

Prerequisites

- ELEC370 with a minimum grade C

ELEC639 Advanced Topics in Electrical Engineering (3 CH)

Topics to be chosen every year according to specific interests.

Prerequisites

- ELEC370 with a minimum grade C

ELEC641 Contemporary Digital Systems (3 CH)

Introduction to combinational & sequential logic, finite state machines, high performance digital systems: theory and application of modern design, alternative implementation forms and introduction to HDL, sequential logic technologies.

Prerequisites

- ELEC335 with a minimum grade C

ELEC644 Artificial Neural Networks (3 CH)

Overview of neuro-engineering technology, basic neural network architectures, single layer perception classifiers and multi-layer feed forward networks, single-layer feedback networks, and associative memories, Kohonen models and counter propagation networks, adaptive resonance theory and Boltzmann machines, Simulated annealing, temporal modeling, supervised and unsupervised learning, Implementation, basic applications to pattern recognition.

Prerequisites

- MATH2210 with a minimum grade C
- MATH2220 with a minimum grade C

ELEC646 Computational Vision (3 CH)

The fundamentals of computer vision and techniques for image understanding and high-level image processing. Includes computational techniques, image segmentation, geometric structures, relational structures, inference, matching, stereo vision, sequence of images, shape, color and texture, three dimensional scene analysis, vision systems, and applications.

Prerequisites

- MATH2210 with a minimum grade C
- MATH2220 with a minimum grade C

ELEC649 Advanced Topics in Computer Engineering (3 CH)

Topics to be chosen every year according to specific interests.

Prerequisites

- ELEC230 with a minimum grade C
- ELEC451 with a minimum grade C

ELEC652 Nonlinear Control (3 CH)

Analysis of nonlinear control systems; Lyapunov stability, numerical methods, phase-plane techniques, describing functions, and linearization via feedback.

Prerequisites

- ELEC602 with a minimum grade C

ELEC656 Optimal Control (3 CH)

Optimal control by dynamic programming. Pontryagins maximum principle, and variational methods; minimum time, energy, and fuel problems for linear continuous and discrete systems.

Prerequisites

- ELEC431 with a minimum grade C

ELEC659 Advanced Topics in Control Systems (3 CH)

Topics are to be chosen every year according to specific interests.

Prerequisites

- ELEC431 with a minimum grade C

ELEC691 Graduate Seminar I (0 CH)

Thesis option students should present a research proposal in front of a panel appointed by the EE Graduate Studies committee. Research projects are discussed to decide on the Master's Thesis.

ELEC693 Master's Research Thesis (9 CH)

Supervision of research work is made towards the completion of M.Sc. requirements for Thesis option students.

ELEC694 Research / Design Paper (3 CH)

Supervision of research/design paper is made towards the completion of M.Sc requirements for Non-Thesis option students.

ELEC711 Micro and Nano Systems (3 CH)

The objectives of this course are to provide a deep insight of the materials used in the fabrication of micro and nano based electronic devices and sensors. Advancement in integration and packaging processes and techniques to be covered. The course also presents the applications of micro and nanosystems. Multiphysics tools will be utilized for simulations and modelling. Also, this course should address the fundamental and frontier of modern nanoelectronics

ELEC712 Advanced Circuits and Systems (3 CH)

The course is intended to cover the current technology and interest in Circuits and Systems. The topics include energy harvesting, biomedical, RF and biotechnology. It also cover the circuit/system characterizations and modeling along with testing and reliability measurements. It also involves the utilization of signal processing for circuits and systems

ELEC731 Power System Planning (3 CH)

Economic dispatch, unit commitment, dynamic programming, power system planning and operation, control, generation modeling, AGC, and power protection

ELEC733 Multivariable Feedback Control (3 CH)

Introduction to multivariable control; limitation on performance in multi-input-multi-output (MIMO) systems; robust stability and performance analysis for

MIMO systems; controller design and structure for MIMO systems; model reduction; linear matrix inequalities (LMI)

ELEC735 Advanced Topics in Electrical Eng I (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Electrical Engineering

ELEC736 Advanced Topics in Electrical Eng II (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Electrical Engineering

ELEC742 Detection and Estimation Theory (3 CH)

Random processes; detection and estimation theory, with applications to communication systems and statistical signal processing; decision-theory concepts and optimum-receiver principles; parameter estimation; linear and nonlinear estimation; Application in spectral estimation, filtering, and array signal processing

ELEC743 Information Transmission Systems (3 CH)

Random processes and mathematical models of communication; Modulation schemes and principles; Multicarrier and multiples access systems; Transmission over fading channels; Multiple antenna and multiple users systems; Principles of Communication network modeling , Modeling error control, flow control and medium access control protocols

ELEC800 Comprehensive Exam (0 CH)

Passing the comprehensive exam is required to enter into PhD candidacy. The exam evaluates the research ability of potential PhD candidates.

ELEC810 Prospectus Exam (0 CH)

PhD student submits and defends a Research Proposal in front of a prospectus examination committee as stipulated in the COE prospectus examination guidelines.

Prerequisites

- ELEC800 with a minimum grade D

ELEC900 Dissertation Doctoral Research (30 CH)

Open to students who have successfully completed the comprehensive exam. PhD student conducts original research under the direction of a supervisory committee. Credits are determined in consultation with the dissertation supervisor.

ELEC910 Dissertation Defense (0 CH)

Two part exam, open and close, to defend the results of PhD research work

Prerequisites

- ELEC810 with a minimum grade D

Engineering Requirements Unit

GENG215 Engineering Ethics (2 CH)

This course introduces students to Engineering Ethics, as a set of moral principles that relate to Engineering projects and designs. The course explores creative ways of reconciling conflicting moral claims. It outlines the responsibilities of Engineers towards public safety and the environment, within economic constraints and governing laws. A systematic Engineering Design process is introduced. Each design stage explores relevant methods and their

ethical implications. The course critically examines litigations that involve the engineering profession in relation to product liability.

Prerequisites

- ESPU107 with a minimum grade D or ESPU102 with a minimum grade D or ESPU1014 with a minimum grade D or ESPU103 with a minimum grade D or ESPU104 with a minimum grade D or ESPU1081 with a minimum grade D or ESPU106 with a minimum grade D

GENG220 Engineering Thermodynamics (3 CH)

Thermo-physical properties of pure substances and gases. 1st law of thermodynamics, conservation of energy, and closed and open systems. Limitations and efficiencies of energy conversion processes. Introduction to the 2nd law of thermodynamics and entropy. Applications in Engineering.

Prerequisites

- PHYS105 with a minimum grade D
- Pre/Co PHYS135 with a minimum grade D

GENG230 Computer Programming (3 CH)

Introduction to computing, data types and variables, expressions, selection and repetition control structures, library and user-defined functions, files and streams, arrays, library and user-defined classes, pointers.

GENG315 Engineering Economics (3 CH)

Introduction to the basic concepts and principles of engineering economics. Familiarization of the different cost components, cost estimation techniques, cash flow analysis, time value of money, and measures of project performance. Comparing alternatives. Application of engineering practice and entrepreneurship to engineering design and projects.

Prerequisites

- MATH1110 with a minimum grade D

GENG701 PhD Research Seminar (1 CH)

This course offers the students the opportunity to integrate their knowledge, skills, and practical experience with their peers and the course instructor. The course will contribute to the student's professional development focusing on skills and professional experience. It consists of presentations on current research or applied projects in engineering, informatics, or related fields. The presentations are delivered by the course instructor, registered PhD students, faculty members, or invited speakers.

GENG702 Research Methods (2 CH)

This course provides students with a comprehensive understanding of research methodologies. It will cover the fundamental concepts of theory and scientific research, literature search and referencing, design and analysis of experiments, problem identification and formulation, research design including experimentation, measurements and sampling, data analysis, and paper and thesis organization. The course also includes proposal presentation, ethical issues in research and the importance of time management and multi-disciplinary research.

GENG710 Optimization Methods for Engineering (3 CH)

This course focuses on the use of numerical search and optimization tools for purposes of conducting advanced technical decision-making. It will provide students with the fundamentals of the theory of optimization. The topics to be covered in this course include: formulation of optimization problems, mathematical modelling, non-gradient and stochastic search techniques, gradient-based optimization algorithms for unconstrained and constrained problems, numerical methods for sensitivity analysis, global optimization and surrogate modelling. A series of practical examples and case studies will complement the course material

Mechanical Engineering

AERO200 Aircraft Operations and Flight Mechanics (3 CH)

This courses lays down the fundamentals of aeronautical engineering. It introduces a wide range of backgrounds to the basic concepts of aircraft aerodynamics, flight performance theory and practice, aircraft operations, flight mechanics, accelerated flight, and it introduces the concept of stability in particular longitudinal stability.

Prerequisites

- PHYS105 with a minimum grade D
- PHYS135 with a minimum grade D
- MATH1110 with a minimum grade D

AERO215 Thermofluids (3 CH)

This course aims to provide students with essential understanding of the concepts of applied thermodynamics, fluid mechanics, and heat transfer. Topics covered include: Second law of thermodynamics analysis, introduction to exergy, gas power cycles, basics of compressible flows, momentum equation for finite control volumes, Bernoulli equation, Basic introduction to Navier-Stokes equations, Basic heat transfer by conduction and radiation.

Prerequisites

- GENG220 with a minimum grade D

AERO220 Aerospace Lab 1 (1 CH)

This lab course is an Introduction to lab equipment and safety, an introduction to techniques for engineering measurement, estimation of measurement uncertainty, error analysis, data acquisition, calibration, post processing using computational packages. Basic skills for engineering research are taught, which include: analog electronic circuit analysis, fundamentals of digital data acquisition, measurements of physical quantities related to aerospace engineering: pressure, temperature, flow rate, heat transfer, and static forces and moments.

Prerequisites

- PHYS140 with a minimum grade D
- STAT210 with a minimum grade D

AERO300 Aerodynamics 1 (3 CH)

Aerodynamic forces & moments; classification of aerodynamic flows, governing equations for aerodynamic flows, elementary potential flows and superposition principle, Aerodynamics of airfoils, introduction to supersonic flows, Boundary layer. Introduction to low speed wind tunnels and testing, and an introduction to CFD methods.

Prerequisites

- AERO215 with a minimum grade D

AERO305 Aircraft Propulsion (3 CH)

Study of the aero-and thermodynamics of jet and liquid and solid rocket engines. Air-breathing engines as propulsion systems. Turbojets, turbofans, turboprops, ramjets. Aerodynamics of gas-turbine engine components, ideal cycle analysis, component performance, non-ideal cycle analysis. Rocket vehicle performance. Introduction to space propulsion.

Prerequisites

- AERO215 with a minimum grade D

AERO310 Aircraft Structures 1 (3 CH)

Review of concepts of stress (deformation, strain, displacement and equations of elasticity); Aircraft structural components; Airworthiness and airframe loads; Applications to aerospace structural elements. Shear flow in thin walled sections; Design of thin-walled multi-cell sections. Introduction to fracture mechanics and fatigue.

Prerequisites

- MECH305 with a minimum grade D

AERO315 Aerospace Manufacturing Processes (3 CH)

This course introduces students to the principal manufacturing processes using in aerospace engineering (metallic and composites). Furthermore, the fabrication and joining processes widely used in the manufacturing of aerospace engineering components will be covered.

Corequisites

- MECH390 with a minimum grade D

AERO350 Aerospace Lab 2 (1 CH)

The lab will include a number of experiments related to propulsion and thermofluids, low speed and high speed aerodynamics. Introducing the fundamental principles and concepts of thermodynamics and fluid dynamic systems. Developing the fundamental concepts of aerodynamics and provides a working knowledge for their application to the design of aircraft.

Prerequisites

- AERO305 with a minimum grade DAERO220 with a minimum grade D

Corequisites

- AERO402 with a minimum grade D

AERO402 Aerodynamics 2 (3 CH)

Compressible flow, normal shock wave, oblique shock wave, hypersonic flow, linearized supersonic, numerical techniques for nonlinear supersonic flow, supersonic flow over wedges and cones, shock expansion theory, shock wave

interactions and reflections, application to supersonic airfoils, introduction to finite element method and CFD.

Prerequisites

- AERO300 with a minimum grade D

AERO411 Flight Dynamics, Stability and Control (3 CH)

Introduction to the dynamics and control of atmospheric flight vehicles, aircraft coordinate systems, coordinate system transformations, inertial acceleration, aerodynamic forces and moments (stability derivatives), derivation of aircraft equations of motion EOM, linearization of EOM for a given trimmed flight condition, static stability in longitudinal and lateral-directional, small disturbance equations of unsteady motion, dynamics stability.

Prerequisites

- MECH409 with a minimum grade D
- (AERO200 with a minimum grade D or MECH384 with a minimum grade D)

AERO450 Aerospace Lab 3 (1 CH)

The lab will include a number of experiments related to flight dynamics, stability, control and structures. It will also serve as a brief introduction to avionics. Laboratory experiments on using autopilots and controlling of multicopters, extracting stability and aerodynamic derivatives of model airplanes using the wind-tunnel, flight simulator, testing of aircraft structural components.

Prerequisites

- AERO310 with a minimum grade D
- AERO350 with a minimum grade D

Corequisites

- AERO411 with a minimum grade D

AERO495 Industrial Training (0 CH)

Students spend one semester on a full-time basis in engineering or consulting office in the UAE or abroad to earn practical skills. This course aims at offering career exploration opportunities for students as well as opportunities to correlate their academic preparation to the reality of conducting professional practice, to interact effectively with others in practice, to develop professional skills and the ability to communicate effectively in the workplace and to gain true practical experience that is necessary for their future practice as engineers in their respective discipline after graduation

AERO496 Aircraft Design (3 CH)

The course allows student to experience the entire aircraft design process. Topics covered in the workshops include conceptual design of a modern airplane to satisfy a given set of requirements. Estimation of size, selection of configuration, weight and balance, and performance. Satisfaction of stability, control, and handling qualities requirements. The course is complemented with laboratory sessions that involve using the mechanical workshop, conducting wind-tunnel testing, using the flight simulator.

Prerequisites

- AERO450 with a minimum grade D

AERO500 Computational Fluid Dynamics (3 CH)

The course will equip the students with knowledge to use computational techniques to solve problems related to aerospace engineering. Particularly, students will have hands-on experience in using computational fluid dynamics to solve aerospace related problems. Governing equations, discretization schemes, numerical methods, mesh quality and independence test, numerical errors, and boundary conditions as related to solving Navier-Stokes equation and energy equation will be introduced in the course.

Prerequisites

- AERO402 with a minimum grade D

AERO501 Selected Topics in Aerospace Engineering (3 CH)

Selected topics that meet students' interests, faculty capabilities and available resources in the aerodynamics and flight mechanics area. More than one section of this course may be offered in any semester when different topics need to be covered.

AERO505 Spacecraft Propulsion (3 CH)

This course considers the basic theory and principles of operation of chemical and electric propulsion systems for spacecraft. Both solid and liquid propellant chemical propulsion systems are considered, as is a variety of electric propulsion systems utilizing different propellant acceleration mechanisms. The course addresses propulsion manufacturing, testing, flight operations (orbit-raising and station-keeping), propellant life predictions, and final de-orbiting strategies at spacecraft end-of-life.

Prerequisites

- AERO305 with a minimum grade D

AERO506 Spacecraft Engineering Design (3 CH)

This course integrates the design elements and fundamental analyses necessary to complete the conceptual design phase of an unmanned spacecraft. It will explore topics such as mission design, propulsion, power, structure, thermal, attitude control, communication, command, and data handling and attitude control systems. It will emphasis the role of project management and systems engineering throughout the design process.

Prerequisites

- PHYS270 with a minimum grade D

AERO511 Aircraft Structures 2 (3 CH)

This course introduces students to structural instability of columns and thin plates. Thin plate theory, Plate subject to pure bending and combined loading. Different analysis methods (Virtual work and energy and matrix methods including FEM) for stress and deflection calculations in determinant and

indeterminate structures. Introduction to Composite materials analysis and design. Modelling and analysis of basic aircraft structural components in Ansys. The course includes a project where students design and build a small aircraft wing.

Prerequisites

- AERO310 with a minimum grade D

AERO515 Aviation Regulations and Certifications (3 CH)

This course deals with civil aviation safety and formal processes that assure acceptable levels of flight safety. It provides an overview of the Civil Aviation Regulations (FAR and EASA). It focuses on Airworthiness, Airworthiness Certification Procedures, Aviation System Safety, Engineering Procedures Manuals, Flight Manual, Unmanned Aircraft Regulation, Product Development and Life Cycle Management, Quality Systems and Quality Management and Safety Management Systems.

Prerequisites

- AERO200 with a minimum grade D

AERO585 Design and Critical Thinking in Aerospace Engineering (3 CH)

This course concentrates on the rigors of communication, design, and critical thinking in an engineering context including problem identification, feasibility study of alternative solutions, preliminary design, technical writing, teamwork, and formal presentations. A team of students will apply the knowledge gained throughout their study and from industrial training to an engineering design project, emphasizing critical thinking, creativity, and originality. The selected alternatives will be the foundation of the capstone design project. A final report is required.

Prerequisites

- AERO495 with a minimum grade D or (GENG315 with a minimum grade D and MECH305 with a minimum grade D and MECH310 with a minimum grade D and MECH315 with a minimum grade D and MECH350 with a

minimum grade D and ELEC372 with a minimum grade
D and AERO300 with a minimum grade D and AERO305 with a minimum grade D and AERO310 with a minimum grade D and AERO350 with a minimum grade D and AERO315 with a minimum grade D)

AERO590 Capstone Engineering Design Project (3 CH)

This course builds on the outcomes of AERO 585 course to perform detailed design and cost estimate of the selected alternative solutions to a well-defined engineering problem. Student teams are expected to apply knowledge gained throughout their studies to an engineering design project, emphasizing creativity and originality. A prototype and final report are required.

Prerequisites

- AERO585 with a minimum grade D

AERO601 Spacecraft Systems (3 CH)

This course deals with the design aspects of spacecraft and launch vehicles. It includes the impacts of the atmosphere and the space environment on the mission selection and on the requirements and configurations of various subsystems. It focuses on the principles and design aspects of structure, material, propulsion, power, thermal, communication, electronic and control subsystems. The course will be complemented by case-studies.

AERO602 Spacecraft Dynamics and Attitude Control (3 CH)

This course provides students with a comprehensive treatment of spacecraft attitude dynamics and control, starting with the basic fundamentals of rotational kinematics and dynamics to more advanced topics such as nonlinear attitude control. This includes theory and applications of spacecraft attitude dynamics and control; Euler angles, direction cosines, quaternions; attitude sensors and control actuators; spin, three-axis active, reaction wheel, control moment gyro, and gravity gradient control systems; environmental effects.

Prerequisites

- AERO601 with a minimum grade D

MECH200 Introduction to Engineering Drawing and Workshop (1 CH)

This lab covers free hand sketching using orthographic and isometric projections, sectional views, dimensioning, surface finishing, materials marking, and working and assembly drawings. The course also introduces the use of basic machines and develop the hand skills and safety in the workshop. This includes basic hand tools, basic machining operations, woodwork, sheet metal work and measuring instruments.

MECH210 Measurement and Instrumentation lab (1 CH)

This lab is an introduction to techniques for computer and microcontroller based engineering measurement, data acquisition, calibration, processing, and analysis.

Prerequisites

- PHYS135 with a minimum grade D

MECH240 Introduction to Computing Lab in ME (1 CH)

Fundamental concepts of structured programming and algorithmic problem solving using technical computing commercial packages (e.g., MATLAB). This includes basics of programming, data visualization, software built-in functions, development of efficient codes, testing, and debugging programs. The lab focuses on providing programming practice on mathematical applications relevant to mechanical engineering.

Prerequisites

- MATH1110 with a minimum grade D
- GENG230 with a minimum grade D

MECH305 Mechanics of Materials (3 CH)

This course aims at introducing basic concepts and applications of elastic stress analysis. Topics covered include stress, strain, Hooke's law, axial

loading, flexural loading. torsional loading, combined loading, Mohr's circle with applications, column buckling.

Prerequisites

- CIVL240 with a minimum grade D

MECH306 Manufacturing Processes (3 CH)

This course aims to provide students with basic manufacturing processes such as casting, welding, metal cutting and metal forming. Topics include: Mold design, casting and welding processes, theory of metal cutting, tooling features, mechanics of selected bulk deformation, sheet metalworking processes, and manufacturing process selection for a given product. Ethical issues and entrepreneurial activities are also covered.

Corequisites

- MECH390 with a minimum grade D

MECH311 Applied Thermodynamics (3 CH)

This course aims to provide students with essential understanding of the concepts of applied thermo-dynamics. Topics include: Second law analysis, introduction to exergy, vapor and gas power cycles, ideal gas mixtures and psychrometry, basic air conditioning processes, basic refrigeration cycles, basics of combustion thermodynamics, basic compressible flow.

Prerequisites

- GENG220 with a minimum grade D

MECH315 Geometric Modeling (2 CH)

This course aims to introduce students to geometric modeling techniques. Topics include: orthographic and isometric projections, sectional views, and dimensioning. Introduction to geometric modeling and representation, solid modeling, parametric and feature-based modeling will also be covered.

Students will use a modern mechanical engineering package (e.g. Pro/E, Solidworks, CATIA) throughout to apply the concepts learnt during this course.

Prerequisites

- (MECH200 with a minimum grade D or AERO220 with a minimum grade D)
- GENG215 with a minimum grade D

MECH340 Fluid Mechanics (3 CH)

This course aims to provide students with essential concepts of fluid mechanics. Topics include: Fluid properties, similitude, fluid statics, Bernoulli?s equation, applications of the mass, momentum and energy equations, viscous flow in pipes, flow over immersed bodies, and introduction to turbo machinery.

Prerequisites

- CIVL240 with a minimum grade D

MECH348 Fluid Mechanics Lab (1 CH)

This lab aims to provide students with in-depth understanding of theoretical phenomena studied in the fluid mechanics course. Students are required to use data acquisition system to acquire, analyze, and interpret results. Experiments include: Measurement of pressures, pressure loss in pipes, impact of jet, hydrostatic forces, viscosity, fluid flow rate, lift and drag, boundary layer; flow visualization, shock wave, velocity profiles in laminar and turbulent flows, performance of turbo machines.

Prerequisites

- MECH210 with a minimum grade D
- Pre/Co MECH340 with a minimum grade D

MECH384 Mathematics for Mechanical Engineering (3 CH)

This course aims to introduce students to the applied mathematics for engineers. Topics include: Vector Calculus, Ordinary and Partial Differential Equations, Analysis of systems of Linear and Nonlinear Differential Equations, Fourier series, including but not limited to, structural mechanics, dynamic systems, mass, momentum and heat transfer equations.

Prerequisites

- MATH2210 with a minimum grade D

MECH390 Engineering Materials (3 CH)

This course aims at studying basic concepts and fundamentals of material science and engineering. Topics covered include atomic structure, arrangements, unit cells, types of engineering materials; metallic alloys, polymers, ceramics, composites, nanocomposites, testing, mechanical and electrical properties, processing, in service behavior, corrosion, deformation, material and process selection.

Prerequisites

- CHEM111 with a minimum grade D
- CHEM175 with a minimum grade D

MECH407 Machine Design I (3 CH)

This course aims at introducing fundamental skills and concepts of machine design with applications to simple elements. Topics covered include considerations affecting design, fits and tolerances, design of screws, fasteners and connections, welded joints, shafts, and flexible mechanical elements (springs, belts, ropes, flexible shafts, etc). Ethical and Entrepreneurial issues and autonomous learning techniques will be employed throughout the course where relevant.

Prerequisites

- MECH305 with a minimum grade D
- MECH315 with a minimum grade D

MECH409 Dynamic Systems & Control (3 CH)

This course aims to introduce students to the fundamental knowledge of control system theories and applications. Topics include: Mathematical modeling, dynamic system responses, feedback control characteristics, stability of feedback systems, feedback control design, design steps of PID controller, and control design using root-locus method. The course also includes applications using modern engineering tools, such as MATLAB for control system design, simulation, and analyzes.

Prerequisites

- MECH350 with a minimum grade D
- MECH310 with a minimum grade D

MECH411 Heat Transfer (3 CH)

This course aims to provide students with essential concepts of Heat Transfer. Topics include: Steady and transient heat conduction, forced and natural convection, internal and external flows, principles of engineering thermal radiation, heat exchanger, boiling and condensation. The course also aims to inspire students as well as enhance their entrepreneurial skills, as related to the heat transfer area.

Prerequisites

- GENG220 with a minimum grade D
- MECH384 with a minimum grade D
- MECH240 with a minimum grade D
- MECH340 with a minimum grade D

MECH412 Machine Design II (3 CH)

This course aims at covering the theory and application of design methods for complicated machine components. Computers will be used to help design integrated systems. The course also focuses on gaining skills in self-research, critical thinking and working within design groups. Topics covered include design of journal and rolling-element bearings, gears and gear boxes, clutches, couplings, and brakes. Ethical issues and Entrepreneurial opportunities and case studies will be explored throughout the course.

Prerequisites

- MECH407 with a minimum grade D

MECH417 Kinematics Design of Machinery (3 CH)

This course aims to introduce students to the knowledge of kinematics of machinery analysis and synthesis. Topics include: Mobility analysis, kinematics of mechanisms, vector methods of analysis of plane mechanisms, introduction to the synthesis of plane linkages, force analysis of mechanisms, static and dynamic balancing of machines, and analysis and synthesis of cams. The course includes project work where students formed in teams perform analysis and simulation of mechanisms applications. The course also includes applications using modern engineering tools, such as MATLAB or MSC-AdAMS for mechanisms simulation and analysis.

Prerequisites

- MECH310 with a minimum grade D

MECH426 Thermofluid System Design & Analysis (3 CH)

This course aims to provide students with basic design concepts for thermal-fluid systems. Topics include: Design and analysis of thermal-fluid systems: applications are drawn from power generation, HVAC/R and industrial processes. Introduction to energy management and identification of energy management opportunities. The course also aims to inspire students as well as enhance their entrepreneurial skills. Contemporary issues as well as commitment to standards of ethical practice will be emphasized.

Prerequisites

- MECH311 with a minimum grade D
- MECH411 with a minimum grade D

MECH430 Thermal Engineering Lab (1 CH)

This lab aims to provide students with in-depth understanding of theoretical phenomena studied in the thermodynamics and heat transfer courses. Students are required to use data acquisition system to acquire, analyze, and interpret results. Experiments include: Psychometric processes; performance of refrigeration cycles and components; thermodynamic properties and equations of state; convective heat transfer; combustion engines; heat exchangers. The lab aims to inspire students and enhance their entrepreneurial skills as relevant to the area of thermal engineering.

Prerequisites

- Pre/Co MECH426 with a minimum grade D

MECH433 Introduction to Computer Aided Manufacturing (2 CH)

This course aims to provide students with the fundamentals of computer-aided manufacturing. Topics include: Computer numerical control, application of geometrical modelling, part programming, and introduction to computer integrated manufacturing. Students gain hands-on skills in using a computer aided manufacturing package and computer numerical control machine tools. This course also provides students with the awareness of the entrepreneurial activities in manufacturing.

Prerequisites

- MECH306 with a minimum grade D

MECH440 Design and Manufacturing Lab (1 CH)

This course aims to integrate theoretical and practical knowledge gained from previous design, materials, manufacturing, dynamics and some aspects of thermofluid courses. Students design and realize typical mechanical engineering systems or components through a series of projects and experiments. Students are required to use conventional and modern engineering tools as well as to develop commitment to ethical, environmental, social and global issues, and to be aware of entrepreneurial opportunities relevant to design and manufacturing.

Prerequisites

- MECH407

Corequisites

- MECH433 with a minimum grade D

MECH450 Dynamic Systems and Control Lab (1 CH)

The lab provides students with hands-on skills of dynamic systems analysis and control implementation. The lab consists of experiments based on representative thermal, fluid, and mechanical systems. For each experiment the students will model the related process, simulate it, design a controller for it, and implement the final control system on a microcontroller.

Prerequisites

- MECH409 with a minimum grade D

Corequisites

- MECH417 with a minimum grade D

MECH495 Industrial Training (15 CH)

Students spend one semester on full-time basis in an industrial plant, engineering, or consulting office in the UAE or abroad to earn practical skills. (This course is conducted over a full semester (before the last study year). No courses are allowed to be registered during the internship).

Prerequisites

- GENG215 with a minimum grade D
- GENG220 with a minimum grade D
- MATH2220 with a minimum grade D
- GENG315 with a minimum grade D

- MECH305 with a minimum grade D
- MECH310 with a minimum grade D
- MECH311 with a minimum grade D
- MECH315 with a minimum grade D
- MECH340 with a minimum grade D
- MECH348 with a minimum grade D
- MECH350 with a minimum grade D
- MECH384 with a minimum grade D
- MECH390 with a minimum grade D
- ELEC330 with a minimum grade D
- ELEC372 with a minimum grade D
- STAT210 with a minimum grade D

MECH506 Control Engineering (3 CH)

This course covers theoretical and experimental studies of feedback control techniques as applied to mechanical systems control. Topics include, review on classical control compensator design, state space methods of analysis and design, control implementation using computer hardware and system integration issues, and introduction to nonlinear methods in motion control.

Prerequisites

- MECH409

MECH510 Selected Topics in Thermal Sciences (3 CH)

Selected topics that meet students' interests, faculty capabilities and available resources in the thermal sciences area. More than one section of this course may be offered in any semester when different topics need to be covered.

MECH512 Intermediate Heat Transfer (3 CH)

This course aims at explaining multidimensional conduction. Topics covered include combined conduction/convection, unsteady conduction, convection heat transfer, boundary layers, mixed forced/ natural convection, boiling and condensation, heat exchangers, mass transfer fundamentals and equations, steady molecular diffusion, and connective mass transfer.

Prerequisites

- MECH411

MECH513 Air Conditioning Systems (3 CH)

This course aims to introduce air-conditioning theory and applications. Topics covered include air-conditioning systems, cooling load calculations, types of air-conditioning systems, central stations, air-distribution and control systems, cooling water systems design, vibration and noise problems, and selection of optimum air-conditioning system.

Prerequisites

- MECH311 with a minimum grade D
- MECH411 with a minimum grade D

MECH514 Heat Engines (3 CH)

This course aims at explaining internal combustion engines, theory and design. Topics covered include air standard cycles, fuel air, and actual cycles, supercharging, knocking in petrol and diesel engines, fuel rating, engine performance, spark ignition and compression ignition engines, non-conventional engines, and air pollution from I.C. engines.

Prerequisites

- MECH311 with a minimum grade D

MECH516 Energy Management (3 CH)

Energy management principle, energy auditing process, utility rate structures, economic principles and life cycle cost. Energy management applications in buildings, boilers and thermal systems, waste heat recovery, electrical systems, motors and insulation material. Environmental impacts and utilization of renewable energy technologies associated with energy management.

Prerequisites

- MECH311 with a minimum grade D
- MECH340 with a minimum grade D

MECH517 Turbomachinery (3 CH)

This course covers a broad treatment of axial and radial turbo machines. Dimensional analysis. Basic laws and equations. Hydraulic pumps, pump and system matching. Centrifugal compressors and fans, pre-whirl, surging, choking. Axial compressors and fans, stage reaction and stage loading, multi-stage performance, axial-flow ducted fans. Axial and radial flow turbines, stator and rotor losses. Efficiencies.

Prerequisites

- MECH311 with a minimum grade D
- MECH340 with a minimum grade D

MECH520 Selected Topics in Bioengineering (3 CH)

Selected topics that meet students' interests, faculty capabilities and available resources in the Bioengineering area. More than one section of this course may be offered in any semester when different topics need to be covered.

MECH521 Biomechanics (3 CH)

Mechanical properties of bone, muscle, and soft tissue. Static and dynamic analysis of human movement tasks such as locomotion. Transport phenomena with emphasis on biomedical engineering fluid systems.

Prerequisites

- MECH305 with a minimum grade D
- MECH310 with a minimum grade D
- MECH340

MECH522 Bioinstrumentation (3 CH)

Principles of medical instrumentation. Studies of medical diagnostic instruments and techniques for the measurement of physiologic variables in living systems.

Prerequisites

- MECH390 with a minimum grade D

Corequisites

- ELEC372 with a minimum grade D

MECH525 Introduction to Bioengineering (3 CH)

Physiology of the muscular and cardiovascular systems. Principles of biomechanics, statics and dynamics of human movements. Fundamentals of biomaterials, properties of soft and hard tissue, biocompatibility. Principles of medical instrumentations. Contemporary issues, tissue engineering, genetic engineering, and informatics.

Prerequisites

- MECH305 with a minimum grade D
- MECH310 with a minimum grade D
- MECH340 with a minimum grade D

MECH530 Selected Topics in Mechatronics (3 CH)

Selected topics that meet students' interests, faculty capabilities and available resources in the mechatronics area. More than one section of this course may be offered in any semester when different topics need to be covered.

Prerequisites

- MECH350 with a minimum grade D or ELEC451 with a minimum grade D

MECH531 Introduction to Robotics (3 CH)

Spatial description and transformation. Manipulator kinematics and inverse manipulator kinematics. Jacobians: Velocities and static forces. Manipulator

dynamics. Trajectory generation and linear control of manipulators. Introduction to mobile robot. Laboratory applications.

Prerequisites

- MECH417 with a minimum grade D

MECH532 Design of Mechatronics Systems (3 CH)

The course focuses on the design of embedded control systems with applications to electromechanical, electro-fluidic/pneumatic and/or electro-thermal system control. Modeling, simulation and parameter identifications of the designed system are covered. Topics also include real-time embedded system programming using C, representative computer communication protocols, integration of sensors and actuators, design of system/user interface, and applications of ADC and PWM interfaces. A project covering the course topics is used to exemplify the mechatronics system design.

Prerequisites

- MECH350 with a minimum grade D or ELEC451 with a minimum grade D

MECH533 Mechanical Vibration (3 CH)

This course aims to provide students with knowledge in the area of mechanical vibrations. Topics include: Free and forced vibration of one-degree-of-freedom systems. Free and forced vibrations of multi-degrees-of-freedom systems, natural frequencies and mode shapes, vibration control, vibration measurement methods, and vibration of continuous systems.

Prerequisites

- MECH310 with a minimum grade D

MECH540 Selected Topics in Design & Manufacturing (3 CH)

Selected topics that meet students' interests, faculty capabilities and available resources in the design and manufacturing area. More than one section of this

course may be offered in any semester when different topics need to be covered.

MECH541 Non-conventional Manufacturing (3 CH)

This course aims at studying non- conventional manufacturing processes such as Electro Discharge Machining (EDM), ultrasonic machining and welding. Theory of plasticity for metal forming is covered.

Prerequisites

- MECH306 with a minimum grade D

MECH542 Introduction to Composites Design & Manufacturing (3 CH)

This is an introductory course in composite design and processing. Topics that will be covered include: matrix materials and reinforcement, introduction to the mechanics and performance of composite materials, design and manufacturing methods, assembly testing and quality control of composites parts and damage control and repair. For each topic, an analogy will be drawn with conventional materials and design methods. In addition, several case studies will be discussed.

Prerequisites

- MECH306
- MECH390

MECH543 Introduction to Rapid Tooling (3 CH)

This course aims at introducing a class of rapid prototyping technologies for rapid product development. Topics covered include integrating 3D CAD modeling with rapid prototyping, reverse engineering for CAD model construction from an existing part, rapid tooling for quick batch production.

Prerequisites

- MECH433

MECH545 Maintenance Engineering (3 CH)

This course aims at studying methods and management of engineering maintenance. Topics covered include the role of statistics and probability in failure, types of maintenance, manpower, spare parts and materials, maintenance procedures, planning and organization. Inventory control, work distribution, and administration structure.

Prerequisites

- MATH1120 with a minimum grade D

MECH547 Intermediate Mechanics of Material (3 CH)

The course aims at studying 3-D stress and strain analysis, generalised Hooke's law. theories of failure, stress function, applications to selected plane and axi-symmetric problems, linear-elastic fracture mechanics (LEFM), fatigue analysis and experimental stress analysis.

Prerequisites

- MECH305 with a minimum grade D

MECH550 Introduction to Aerospace Engineering (3 CH)

Historical perspectives of aerospace engineering, aerospace engineering profession,. Standard atmosphere. Introduction to aircraft performance (steady flight, flight performance, aircraft maneuvers). Introduction airplane aerodynamics and propulsion, introduction to flight controls and stability and introduction aircraft structures.

Prerequisites

- GENG220 with a minimum grade D

Corequisites

- MECH340 with a minimum grade D

MECH551 Foundations of Aerodynamics (3 CH)

Aerodynamics forces & moments, non-dimensional coefficients; classification of aerodynamic flows, integral and differential form of governing equations for aerodynamics flows; streamlines, irrotaional and rotational flow, circulation and Kelvin's circulation theorem; low speed wind tunnels, solution for irrotational flows, elementary potential flows and superposition principle, aerodynamics of airfoils, introduction to to supersonic flows, boundary layer.

Prerequisites

- MECH340 with a minimum grade D

MECH552 Aircraft Structures (3 CH)

Review of concepts of stress, deformation, strain, displacement and equations of elasticity; Aircraft structural components; Airworthiness and airframe loads; Application aerospace structural elements including general bending and torsion of open and closed thin walled structures, box beams and thin flat curved panels; Shear flow in thin walled sections; Design of thin-walled multi-cell sections; Failure theories and yield criteria and introduction to fracture mechanics and fatigue; Introduction to finite element methods; introduction to stiffness (displacement) method and truss equations

Prerequisites

- MECH305 with a minimum grade D

MECH553 Flight Dynamics, Stability and Control (3 CH)

Introduction to the dynamics and control of atmospheric flight vehicles, aircraft coordinate systems, coordinate system transformations, inertial acceleration, aerodynamic forces and moments (stability derivatives), derivation of aircraft equations of motion EOM, linearization of EOM for a given trimmed flight condition, static stability in longitudinal and lateral-directional, small disturbance equations of unsteady motion, dynamics stability.

Prerequisites

- MECH310 with a minimum grade D

MECH554 Aerospace Propulsion (3 CH)

Study of the aero-and thermodynamics of jet and liquid and solid rocket engines. Air-breathing engines as propulsion systems. Turbojets, turbofans, turboprops, ramjets. Aerodynamics of gas-turbine engine components, ideal cycle analysis, component performance, non-ideal cycle analysis. Rocket vehicle performance. Introduction to space propulsion.

Prerequisites

- MECH311 with a minimum grade D
- MECH340 with a minimum grade D

MECH585 Design and Critical Thinking in Mechanical Engineering (3 CH)

This course is a culmination of the design experience earned by the student in the program. The course comprises several activities, such as literature search, data acquisition and analysis, system modeling and simulation, application of computational techniques. The project should reflect the knowledge and the skills acquired by the student throughout his/her study to test his/her ability to tackle a technical problem. Submission of a written report is an essential requirement for completion of the course.

Prerequisites

- STAT210 with a minimum grade D
- GENG315 with a minimum grade D
- MECH305 with a minimum grade D
- MECH306 with a minimum grade D
- MECH310 with a minimum grade D
- MECH311 with a minimum grade D
- MECH315 with a minimum grade D
- MECH340 with a minimum grade D
- MECH348 with a minimum grade D
- MECH350 with a minimum grade D
- MECH384 with a minimum grade D

MECH590 Capstone Engineering Design Project (3 CH)

This course builds on the outcomes of MECH 585 course to perform detailed design and cost estimate of the selected alternative solutions to a well-defined engineering problem. Student teams are expected to apply knowledge gained throughout their studies to an engineering design project, emphasizing creativity and originality. A final report and prototype are required.

Prerequisites

- MECH585 with a minimum grade D

MECH612 Advanced Mechanical Vibrations (3 CH)

Multidegree of freedom discrete systems, continuous systems, approximate methods, finite element method, vibration control, random vibration, and nonlinear vibration.

MECH614 Advanced Control Systems (3 CH)

Review of classical control. Discrete-time systems. Linear difference equations. Z-transform. Design of digital controllers using transform methods. Statespace representations of continuous and discrete-time systems. State-feedback. Controllability and observability. Pole placement. Optimal control. Linear- Quadratic Regulator (LQR). Probability and stochastic processes. Optimal estimation. Kalman Filter.

MECH615 Advanced Dynamics (3 CH)

This course covers three-dimensional kinematics and dynamics of particles and rigid bodies using vector (Newton-Euler) and analytical (Lagrange's equations and Hamilton's principle) methods. Study of how kinematic constraints are incorporated into forming the governing equations and their relationship with constraint forces. Holonomic and nonholonomic constraints. Linear and angular momentum, and energy conservation. Using rotating coordinate systems to solve dynamics problems. Two- and three-dimensional rigid body dynamics. Gyroscopic motion. Lagrange multipliers. Kane’s equations. Instruction on advanced topics in analytical dynamics, incorporating D'Alembert's principle, Hamilton's principle and the general Lagrange equations. Reinforcement of concepts through computer analysis using Matlab.

MECH626 Fatigue & Fracture Mechanics (3 CH)

Analysis of the general state of stress and strain in solids; dynamic fracture tests (FAD, CAT). Linear elastic fracture mechanics (LEFM), Griffith- Irwin analysis, ASTM KIC, KIPCI, KIA, KID. Plane stress, plane strain; yielding fracture mechanics (COD, JIC). Fatigue crack initiation. Goodman diagrams and fatigue crack propagation. Notch sensitivity and stress concentrations. Low-cycle fatigue, corrosion and thermal fatigue.

MECH630 Advanced Solid Mechanics (3 CH)

The course covers fundamental principles and techniques in stress analysis of trusses, beams, rigid frame, and then-walled structures. State of stress and strain at a point, stress-strain relationships: topics in beam theory such as unsymmetrical bending, curved beams, and elastic foundations: torsion of noncircular cross-sections. Emphasis is placed on energy methods associated with calculus of variations.

MECH632 Advanced CAD/CAM (3 CH)

Wire frame and other precursors to geometric models. Parametric and Bozier curves; B-splines and NURBS. Boundary representation models. Set theoretic (or CSG) models. Implicit solids and surfaces. Non-manifold geometric models. Feature-based modeling and recognition. Intelligent CAD systems. Numerical accuracy problems in geometric models. Integral properties of geometric models. Procedural shape definition. Types of engineering constraints. Constraint based systems. Techniques for constraint resolution. Rapid prototyping. Part Programming and Machining, NC cutting, path planning and process planning.

MECH633 Finite Element Methods (3 CH)

This course covers fundamental concepts of the finite element method are presented and developed for one- and two-dimensional problems. Applications in the areas of structural analysis, heat transfer and fluid flow are stressed. Computer implementations of finite element method are emphasized. The course focuses on structural mechanics using spring element, bar elements, 2D trusses elements, beam elements, two-dimensional plane stress/strain elements and axisymmetric elements. Heat transfer, solid mechanics and fluid mechanics problems will also be analyzed.

MECH640 Directed Studies in Mechanical Engineering (3 CH)

This will require students to discuss and critique original and recent journal articles, describing a major scientific advancement in a research area, which will be chosen in consultation with the student's supervisor. Students are required to make presentations, submit reports and participate in discussions.

MECH645 Advanced Heat Transfer (3 CH)

This course will cover two major topics in heat transfer: conduction and convection. Specific conduction topics covered will include: methods of solving the (one dimensional & multidimensional) heat conduction equation for various boundary conditions, homogenous vs. nonhomogenous problems, transient versus steady state in rectangular and cylindrical coordinates. The various methods to solve the heat conduction equation involve separation of variables, Duhamel?s Theorem, Laplace Transform technique and integral methods.. Specific topics in convection include: laminar and turbulent heat transfer, thermal boundary layers, ?limiting? condition flows, transpiration cooling, external flows and natural convection.

MECH650 Advanced Fluid Mechanics (3 CH)

Kinematics of fluid motion. Constitutive equations of isotropic viscous compressible fluids. Derivation of Navier-Stokes equations. Lessons from special exact solutions, self-similarity. Admissibility of idealizations and their applications; inviscid, adiabatic, irrotational, incompressible, boundary- layer, quasi one-dimensional, linearized and creeping flows. Vorticity theorems. Unsteady Bernoulli equation. Basic flow solutions. Basic features of turbulent flows.

MECH654 Advanced Thermodynamics (3 CH)

Thermodynamic potentials: Maxwell relations, stability criteria. Barometric formula: applications to clouds, solar chimney, etc. Phase mixtures: chemical potential, osmosis, phase equilibrium, Gibbs phase rule, phase diagrams, fugacity and activity. Reacting mixtures: law of mass action and applications, enthalpy and entropy constants, heat of reaction, combustion, flames, adiabatic flame temperature, reaction rates. Thermodynamics of fuel cells: efficiency, causes of losses, comparison with heat engines.

MECH660 Mechanical Engineering Seminar (0 CH)

Special topics in Mechanical Engineering presented by post-graduate students, invited speakers from industry and academia.

MECH690 Thesis (9 CH)

Supervision of research work is made towards the completion of M.Sc. requirements for Thesis option students.

MECH710 Research Methodologies (3 CH)

This course deals with both qualitative and quantitative research methods. The course includes engineering design, data analysis, and simulation model building. The course introduces students to statistical design, analysis of experiments, experimental design, measurements, instrumentations, experimentation, computer simulations in engineering, validity and reliability. The course also deals with academic writing, research program development, thesis organization, proposal presentation, ethical and moral issues in research and the importance of time management and multi-disciplinary research.

MECH711 Optimal and Robust Control (3 CH)

This course is aimed at an introduction (with rigorous treatment) to the fundamentals of optimal and robust control. It will be divided roughly into two parts. The first will cover aspects of robust control including model reduction, H_2 and H_ infinity control, and feedback control of uncertain systems. The second will delve into optimal control including topics such as the linear quadratic regulator, the calculus of variations, the maximum principle, and the Hamilton-Jacobi-Bellman equation

MECH712 Nonlinear Systems and Control (3 CH)

Introduction to the theory and design methods of non-linear control systems. Application to robotics, vibration and noise control, fluid control, manufacturing processes, and biomedical systems. Mathematical methods based on the theory of differentiable manifolds; non-linear control techniques include

feedback linearization, back-stepping, forwarding, and sliding mode control. Additional course topics will include controllability and observability, Lyapunov stability and its applications, limit cycles, input-output stability, zero dynamics, center manifold theory, perturbation theory, and averaging

MECH720 Failure Analysis and Prevention (3 CH)

Failure analysis, methodology and procedure. Failure mechanisms: mechanical, corrosion, high temperature. Detection and evaluation of material defects. X-ray radiography, ultrasonic, dye penetrate, magnetic particle and eddy current techniques. Case studies illustrating various causes of failure and prevention techniques: design faults, fabrication, welding, finishing, heat treatment, material selection, service condition

MECH730 Advances in Manufacturing Processes (3 CH)

This course addresses recent advances in manufacturing processes with more focus on non-conventional manufacturing processes. Key areas of research are addressed such as optimization the material removal rate, surface roughness and other output parameters of the nonconventional manufacturing processes, comparing between different nonconventional processes. The course targets graduate student with interest in current trends of manufacturing processes, students who complete the courses successfully will be able it identify the ongoing research in non-conventional manufacturing processes and its real life applications

MECH735 Advanced Topics in Mechanical Engineering I (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Mechanical Engineering

MECH736 Advanced Topics in Mechanical Engineering II (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Mechanical Engineering

MECH742 Convective Heat Transfer (3 CH)

This course aims at providing students with essential concepts of Convective Heat Transfer. Topics covered include: Differential and integral formulations of convection Heat Transfer. Parallel and nearly parallel laminar (boundary layer) flows. Similarity solutions. Kinetic and thermal scales. Multiple scale dimensional analysis. Analytical solutions to the momentum and energy conservation equations

MECH750 Advanced Computational Fluid Dynamics (3 CH)

The objectives of this course are to introduce students to general governing equations including Euler equation, Navier-Stokes equation, Diffusion equation and advection equation. Introduce students to Semi-discretization based on finite-difference and finite-volume methods, stability of time-integration methods, and selection of a suitable time-integration method for a given spatial discretization, accuracy and stability of full discretization, development of a CFD code to solve the Euler and Navier-Stokes equations in a simple geometry

MECH760 Measurements and Instrumentation (3 CH)

This course is to explore the application of time- and frequency-domain methods to time series data. Topics include tools for random data analysis (including types of random data, mean values, mean-square values, probability density and distribution functions, moments and characteristic functions, spectral and correlation analysis); bias and random error estimates in data measurements; input-output system models; measurement examples.

MECH800 Comprehensive Exam (0 CH)

Passing the comprehensive exam is required to enter into PhD candidacy. The exam evaluates the research ability of potential PhD candidates.

MECH810 Prospectus Exam (0 CH)

PhD student submits and defends a Research Proposal in front of a prospectus examination committee as stipulated in the COE prospectus examination guidelines.

Prerequisites

- MECH800 with a minimum grade D

MECH900 Dissertation Doctoral Research (30 CH)

Open to students who have successfully completed the comprehensive exam. PhD student conducts original research under the direction of a supervisory committee. Credits are determined in consultation with the dissertation supervisor.

MECH910 Dissertation Defense (0 CH)

Two part exam, open and close, to defend the results of PhD research work

Prerequisites

- MECH810 with a minimum grade D

MEME621 Operations Research for Engineers (3 CH)

This course introduces a number of models that are efficient and effective in solving certain classes of engineering problems. Students will learn how to apply linear and integer and dynamic programming, forecasting models, simulation, queuing analysis, inventory systems for engineering management decisions.

MEME635 Project Management for Engineers (3 CH)

This course introduces the life cycle stages of a project and functions of management. Project analysis and evaluation including comparison of alternatives are explored. Project screening and selection. Project organizational structure, work breakdown structures and management of human resources in projects. Conflict management and resolution. Also this course focuses on the basic concepts of project planning including network scheduling techniques including the use of the Gantt Chart and Critical Path Method (CPM). Using PERT for scheduling activities with uncertain durations. Time-Cost Tradeoff analysis. Resource management including resource leveling and allocation. Cost and schedule control. Updating cost and schedule estimates.

MEME651 Quality Engineering (3 CH)

The objective of this course is to strengthen and improve the ability of engineering managers in detailing with the theory and design of quality control systems. The course covers techniques of quality control and to utilize reliability consideration in engineering design. This course addresses statistical quality control, quality control charts, ISO 9000, sampling and quality audit, quality control OC curves, Six-Sigma principle.

Prerequisites

- Pre/Co STAT609 with a minimum grade C

MEME661 Engineering Process Management (3 CH)

The focus of the course is managing engineering processes irrespective of the branch of engineering it belongs to. Topics covered include work systems and how they work, Methods Engineering and Layout planning, integration of Process Information in Manufacturing Systems, Process Safety and Environmental Regulations/Standards (ISO 14001), Occupational Hazards, Ergonomics, Maintenance Procedures and Systems Reliability, Planning for and management of health and safety within a process.

MEME676 Product Development and Marketing (3 CH)

The focus of the course is management of new product development processes, from product definition, design, and ethics through ramp-up of product manufacturing. The Students will be asked to design and develop a product or service by collecting customer and consumers' needs, analyzing the data, developing a product specification and constructing prototypes. The course will encourage the students to interact with the end users during the product development. The course will introduce the marketing elements to the students in basic forms. This includes, but not limited to, packaging, SWOT analysis, BCG, Positioning, 4Ps. This marketing introductory work will help students to design, develop and construct a product that fulfills customers' needs and therefore, increase the competitiveness of the firm and the firms' market share.

MEME685 Action Project (Capstone) (3 CH)

This course focuses on implementing all courses, technology, and skills learned thus far. The course explores the impact of marketing, information systems and technology, finance, branding, leadership, Porters factors, SWOT and PESTLE analysis, and innovation on good projects and business plans. It also introduces the opportunities and challenges of managing projects to meet the needs of private and government sectors executives, customers, and partners. In the end, students are expected to produce a business plan or design a business concept.

Prerequisites

- STAT609 with a minimum grade C
- MEME635 with a minimum grade C
- ACCT603 with a minimum grade C

MTSE625 Independent Studies in Materials Science and Eng. (3 CH)

This will require students to discuss and critique original and recent journal articles, describing a major scientific advancement in a research area, which will be chosen in consultation with the student's supervisor. Students are required to make presentations, submit reports and participate in discussions.

MTSE630 Mechanical Properties of Materials (3 CH)

Mechanical behavior of materials at the macroscopic level and the relationship to material structure and mechanisms of deformation and failure in metals, polymers and ceramics. Elasticity, viscoelasticity, plasticity creep, fracture and fatigue. Case studies and examples are drawn from structural an functional applications that include a variety of material classes: metals, ceramics, polymers, thin films, and composites.

MTSE735 Advanced Topics in Material Science and Engineering I (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Architectural Engineering

MTSE736 Advanced Topics in Material Science and Engineering II (3 CH)

To be designed to the specific interest of the exiting PhD students with emphasis on new frontiers in Architectural Engineering

MTSE800 Comprehensive Exam (0 CH)

Passing the comprehensive exam is required to enter into PhD candidacy. The exam evaluates the research ability of potential PhD candidates.

MTSE810 Prospectus Exam (0 CH)

PhD student submits and defends a Research Proposal in front of a prospectus examination committee as stipulated in the COE prospectus examination guidelines.

Prerequisites

- MTSE800 with a minimum grade D

MTSE900 Dissertation Doctoral Research (30 CH)

Open to students who have successfully completed the comprehensive exam. PhD student conducts original research under the direction of a supervisory committee. Credits are determined in consultation with the dissertation supervisor.

MTSE910 Dissertation Defense (0 CH)

Two part exam, open and close, to defend the results of PhD research work

Prerequisites

- MTSE810 with a minimum grade D

College of Agriculture and Veterinary Medicine

Department of Integrative Agriculture

AGRB200 Agricultural Economics (3 CH)

Course description includes theoretical development of factors affecting demand and supply for food and fiber and for agricultural inputs. Methods of selecting optimal levels of agricultural production and consumption variables. Evaluation of market structure and price formulation for agricultural products and resources. Course includes physical and value relationships, perfect and imperfect competition, and natural resource economics.

Prerequisites

- MATH105 with a minimum grade C

AGRB210 Introduction to Agribusiness (3 CH)

Course description includes the role and organization of agribusiness, financial management and control, marketing, operations, and human resources management. Course will include orientation to the agribusiness sector of agriculture. An overview of the breadth, size, scope and management aspects of the agricultural business complex.

AGRB220 Introduction to Agricultural Extension (3 CH)

This course offers exploration of the relationship between agricultural development and the role of agricultural extension. It introduces the concepts, principles, methods and techniques of agricultural extension. It also exposes students to basic concepts, principles and methods of adult education and training.

Prerequisites

- ARAG200
- ARAG307
- AGRB210
- ARAG330

AGRB300 Marketing Management for Agribusiness (3 CH)

Course description includes food and fiber marketing, examining commodity, industrial, and consumer product marketing from a managerial viewpoint. A global perspective in understanding consumer needs and developing the knowledge of economics, political, social and environmental factors that affect food and fiber marketing systems. Course includes structure and organization of the food systems.

Prerequisites

- AGRB200

AGRB312 Logistics in Global Agriculture (3 CH)

Course description includes inter-model transportation strategies, economic order quantities, inventory levels and deployment, carrier routing and scheduling, shipment size and consolidation, assignment of stocking parts or sourcing parts, number, size and location of facilities. Course also includes scope and elements of the agribusiness logistics systems.

AGRB333 Applied Agricultural Education and Extension (3 CH)

This course offers exploration of the applications of agricultural extension theory and principles. The course discusses agricultural extension service, learning process, and human capital development. The course applies the agricultural extension principles to critical subjects such as agricultural communication, leadership, community development, technology diffusion, and agricultural extension program monitoring and evaluation.

Prerequisites

- AGRB220 with a minimum grade D

AGRB335 Computer and IT Applications in Agriculture (3 CH)

This course focuses on computer applications for professional uses and other software packages to solve agricultural and resource management problems.

Students will gain knowledge on advanced word processing concepts, designing presentations, and the use of spreadsheets and geographic information systems applications in agriculture.

Prerequisites

- STAT130

AGRB341 E-Commerce & Agri-food Industries (3 CH)

The course is centered on discussing e-commerce strategies for marketing, sales, communication, purchasing, logistics and support activities through focusing on discovering, analyzing and evaluating the electronic commerce methods used by Agri-food Industries. It takes a marketing perspective and examines the Internet as a tool for managers/owners used in their decision making process.

Prerequisites

- AGRB200

AGRB352 Agribusiness Entrepreneurship (3 CH)

This course introduces the management of entrepreneurial enterprises in the system of agribusiness. Instruction includes units on the nature of entrepreneurship, economic management concepts, financial planning, organizational planning, market planning, and the components of a business plan. Emphasis will be given to problems and practices particular to the establishment and operation of agribusiness enterprises.

AGRB360 Global Agri-food Trade (3 CH)

The course stresses to provide students with an opportunity to develop a greater understanding of agricultural food trade and the economic theory relevant to the analysis of trade issues. Specific topics that are covered include: understanding food system in UAE, major players in global food Trade, scarcity of world food and agricultural resources, international food trade and food security, WTO and other organizations concerned with global food trade, the concept of economic growth and agri-food trade, trade barriers, trade and

exchange rate policies, and major issue related to food trade in the United Arab Emirates

Prerequisites

- ECON125
- AGRB200

AGRB365 Economics of Food Security and Sustainability (3 CH)

This course enables the students to explore, examine, and synthesize social, environmental, economic, and institutional dimensions of food security and sustainability. The course provides students with scientific knowledge and analysis skills in relation to the economics principles food availability (supply), access to food, food consumption/utilization (demand) and food prices stability. The course involved practical examples on food sustainability and food security from production to consumption and their impacts on consumers' nutritional and health well-being. The course also includes offering the students learning methods to examine and analyze the importance of consumers' awareness about better nutrition, and impact of the UAE food security strategies on producers and consumers.

Prerequisites

- ECON125

AGRB371 Linear Programming for Agribusiness (3 CH)

This course includes application of linear programming techniques to agribusiness problems and research. Methods, techniques, and uses of linear programming applications in agribusiness with emphasis on interpretation of conditions and results which ensure optimality for programming techniques.

Prerequisites

- AGRB200

AGRB374 Fundamentals of Production Economic (3 CH)

This course explores the topics of theory of the firm utilizing marginal analysis, production functions, cost functions, the production possibility curve, profit maximization with one variable input and two variable inputs, isoquants, isocost lines, production frontiers, cost minimization with one and two variable inputs, and duality between production and cost functions.

Prerequisites

- AGRB200

AGRB377 Principles of Economic Development (3 CH)

This course is grounded in the body of theory associated with economic development, but concentrates on the many practical problems such as poverty, population growth, urbanization, education and the environment. It also covers the various factors affecting economic development; foreign aid; trade and strategies in economic development; balanced and unbalanced growth; import substitution; export promotion; planning and the use of price mechanisms in economic development; monetary and fiscal policies for development; selecting strategies; plans and policies for economic development.

Prerequisites

- AGRB200
- ECON125

AGRB391 Applications Of Quantitative Research Techniques to Social Sciences (3 CH)

This course focuses on the process of developing a food product from idea generation and screening through product testing and copy/positioning evaluation, identification and evaluation of new markets to enter, designing and testing of product. The course provides techniques in secondary, international, and primary data collection, business to consumer and business-to-business interactions, experimental designs and statistical analysis.

Prerequisites

- STAT130
- ECON231

AGRB392 Introduction to Resource & Environmental Economics (3 CH)

This course covers the economics of exhaustible and renewable resources and discusses how economic approaches can be used to analyze issues related to efficiency, externalities, opportunity cost concept, sustainability, valuation, externalities, property rights, emission charges and subsidies, governmental policies, and benefit cost analysis.

Prerequisites

- AGRB200
- ARAG220

AGRB395 Contemporary Food Sustainability and Nutrition (3 CH)

This course enables the students to explore, examine, and synthesize social, environmental, economic, and institutional dimensions of food sustainability. The course provides students with scientific knowledge and analysis skills in relation to the food systems, food sustainability and food security from production to consumption and their impacts on consumers' nutritional and health well-being. The course also includes offering the students learning methods to examine and analyze the importance of consumers' awareness about better nutrition, policies, and public health strategies.

AGRB410 Internship (4 CH)

The course goal is to integrate theory and practice for students through their participation in practical training. The objectives of such practical internship are for students to better understand work environments, gain on-job practical training, and enhance students' work ethics and communication skills. The students will be given the opportunity to perform real work and actively participate in the operations of different institutions during their actual working hours. At the end of the internship, students are required to prepare a written report and an oral presentation. The internship is conducted over 13 weeks in the last semester.

AGRB421 Agribusiness Strategy (3 CH)

Course description includes a term paper for a bankable business plan prepared individually, the use of a strategic planning model will be used for analyzing agribusiness cases, an emphasis on activating strategy into an actual plan will be a central part of the course, and the focus will be on decision making as a managing director.

AGRB422 Agricultural and Food Policy (3 CH)

Course includes general knowledge of major agricultural resources, understanding of allocation of agriculture resources under different market structures, understanding of different policies needed in allocation of agricultural resources and knowledge of their development. Course includes changing agricultural trade prospects in a dynamic world economy, and agricultural resource allocation issues.

Prerequisites

- AGRB360

AGRB444 Farm Management (3 CH)

The course involves the introduction of various economic principles and business management concepts which are involved in the decision-making process when organizing and operating a farming operation. These include production economics, record keeping systems, financial budgets and analysis, crop and livestock enterprise analysis, leasing arrangements, depreciation, farm business organizations, farm investment analysis, and production efficiency indicators.

Prerequisites

- AGRB200
- ARAG200
- ARAG330
- ARAG307
- AGRB210AGRB352

AGRB445 Feasibility Studies of Food and Agriculture Projects (3 CH)

The course examines methodologies for evaluating agribusiness projects, involving many economic, financial, social, and environmental factors. Basic techniques of cash flow analysis, net present value analysis, life-cycle costing, benefit-cost analysis, internal rate of return, and other approaches to project evaluation are discussed.

Prerequisites

- AGRB352

AGRB450 Agribusiness Senior Seminar (2 CH)

Course description includes a seminar discussing strategic marketing management issues for consumer brands, including developing and managing brand equity in consumer markets, and managing marketing innovation and product development. Student discussions and presentations from professionals.Pre requisites:Complete 90 credit hours.

Prerequisites

- AGRB391

AGRB480 Senior Project (4 CH)

The course is a capstone course to be individually designed by the faculty advisor for each senior student to integrate all courses and training of the student, from all activities involved by the student, during his/her entire stay at UAEU. Research methods, analysis of data collected, interpretation, and hypothesis must be developed by the students on a specific topic. A written thesis is to be produced by the student at the end of the course. Pre requisites: Complete 90 credit hours

AGRB605 Agribusiness Marketing Research (3 CH)

The course serves as a tool for a manager to understand marketing research and to be able to specify what needs to be studied, how to study it, and how to interpret the results. This course presents an overview of marketing research in terms of needs, definition, process, analysis and reports. The approach is

practical and mainly quantitative. By understanding the research discipline, the practice and application will become comfortable and available to students.

AGRB613 Major Project in Food and Agribusiness Management (3 CH)

This is a management project course leading to a referenced technical report selected topics of food and agricultural management importance. Completion of this course requires delivery of a final report and a formal presentation of the project to faculty members.

Prerequisites

- ECON621
- ECON631
- AGRB602

ARAG200 Principles of Soil and Water (3 CH)

This course introduces the basic principles of soil and water related to crop production. The key topics discussed in this course include physical and chemical interactions affecting the soil, basics of soil and its relation to agriculture, soil and water origin and sources in the UAE, hydrological cycle, and basics of soil and water conservation

ARAG205 Introduction to Fish & Animal Science (3 CH)

The course aims to define animal agriculture and its characteristics in Aridland agriculture. It describes growth, biology of chicken, technology of reducing the effects of heat stress on egg and meat production, production practices, and genetic improvement of ruminant animals in a desert climate. The course also overviews related concepts such as marine environment, fish biology, fishing and aquaculture in the Arabian Gulf.

ARAG220 Natural Resources (3 CH)

The course is meant to introduce students to the unique geographic region, characteristics, ecology, and environmental systems. The course will emphasize the importance of water and soil management techniques for the

balance of environment, sustainability, production and processing of agriculture and foods in UAE and the Gulf region.

ARAG230 Principles of Fisheries Management (3 CH)

This course includes the study of ichthyology and limnology as applied to fishery science, and fisheries techniques applied to a variety of aquatic habitats. The course stresses techniques such as collection of laboratory and field data and applies statistical methods to evaluate the data. Topics include distribution, ecology, and life history of fish common to the UAE region. The impact of fish on ecosystems and management of undesirable fish will be evaluated.

ARAG242 Principles of Plant Protection (3 CH)

This course aims at studying the major pest groups of economic crops and the principal measures for their control. It includes the classification and life - history of selected species of pest groups; the damage induced; the crop loss assessment; the principal measures of pest control with examples from pest problems occurring in the UAE.

ARAG304 Range and Pasture Management (3 CH)

The course aims at studying the principles of utilizing and improving range and pasture crops. It includes range management, grazing systems, forage production, and utilization, and improvement of range, pasture lands in the Gulf, and neighboring countries. The integration of range with other forage plants is also highlighted.

ARAG305 Principles of Organic Horticulture (3 CH)

The course introduces students to the philosophy, principles and history of organic farming as well as theory and practice. All aspects of growing organic plants such as soil management, rotations, pest and diseases, regulations, marketing, and the process of farm conversion to organics will be addressed.

Prerequisites

- ARAG307

ARAG307 Introduction to Horticulture (2 CH)

This course provides a basic understanding of the types of plants used for food production and for beautifying the environment. The key topics included are classification of horticultural plants, structure of horticultural plants, physiological and environmental factors in plant growth, soils and soil management, plant development, seed propagation, asexual propagation, chemical control of plant growth, and landscaping with ornamentals.

ARAG308 Soil Fertility and Fertilizer (3 CH)

The course aims at introducing the basic principles of soil fertility and plant nutrition. It includes essential nutrients, their sources, and interaction in the soil, methods of fertilizer application, soil testing and analysis and its applications in determining plant nutrient deficiencies and needs.

ARAG310 Agricultural Technology Transfer (3 CH)

This course aims at identifying the systems of agricultural technology transfer in the arid areas. The course will discuss appropriate educational programs and communication methods for technology transfer, organizations of the agricultural technology system, system analysis in technology transfer, diffusion and adoption of technology and staff development for technology transfer in the arid areas.

ARAG311 Plant Propagation (2 CH)

The course includes the principles and practices associated with sexual and asexual propagation of plants. The course will include discussion of the biology of plant propagation, anatomical aspects of cutting propagation, types of cuttings and use of growth regulators, stock plant manipulation, different types of propagation, treatments to enhance germination, development of seed-propagated cultivars, seed production processing and storage, biotechnology and seed propagation.

ARAG313 Urban Tree Management (3 CH)

Students learn to perform all aspects of tree surgery and develop the diagnostic skills necessary for proper tree care practices. Covers, pruning,

insect and disease identification and control, fertilization, cabling, and lightning in urban tree management will be studied. Extensive field training is provided so that students can learn and develop marketable skills.

ARAG314 Animal Breeding & Biotechnology (3 CH)

The first objective of this course is to provide students with principles and applied methods for genetic improvement of farm animals. It includes: population and quantitative genetics, genetic parameters and estimation, breeding values, and genetic and environmental interaction. The second objective of this course is to describe the basic principles of molecular biology, and to discuss the current knowledge in biotechnology and its application in modern animal breeding.

ARAG316 Animal Nutrition (3 CH)

The objective of this course is to provide students with the basics of animal and poultry nutrition. The emphasis will be on digestion, absorption, and metabolism of nutrients (water, protein, carbohydrates, fats, minerals, and vitamins). The interrelationships between nutrients, types of feedstuff, and biotechnology in animal nutrition will be discussed. In addition, it will focus on the role of nutrition in reducing heat stress and animal feeding in arid land

ARAG318 Camel Management (3 CH)

The objective of this course is to provide the student with background on the potential merits of the camel and its contribution to milk and meat production. It includes numbers, distribution, types and breeds, husbandry and nutrition, reproductive performance, potentialities of camels and their relation to a desert ecosystem. The feeding and management of racing camels are discussed in details.

ARAG319 Anatomy & Physiology of Animals (3 CH)

Course includes a comprehensive overview of the anatomical terminology, gross and microscopic anatomy of the principal systems of farm animals, poultry and fish and learning the homeostasis of mammalian organism. It includes introductory anatomy and physiology of the reproductive systems, and overview of the endocrine system for farm animals, poultry and fish.

ARAG320 World Herbs and Vegetables (3 CH)

This course introduces the students to a variety of vegetable crops which are herbaceous in nature used for culinary purpose. Emphasis placed on the genetic, phytochemical and botanical diversity and importance of food phytochemicals and the role of vegetables in nutrition. It also provides information on introducing the herbs in this region that has similar growing conditions in other parts of the world.

ARAG321 Floriculture Crop Production (3 CH)

The Course emphasizes problem- solving and management practices important in the propagation, production, and utilization of floral crops with an emphasis on bedding plants, perennials, and cut flowers. To grow, market, and utilize herbaceous plants to modify the environment. The scientific basis for cultural practices will be discussed and students will understand the concepts behind manipulation of environmental factors to achieve desired plant growth and quality. Function, culture, and use of herbaceous plants in the landscape will also be covered in relation to how this information can be conveyed to various clientele groups.

ARAG322 Introductory Poultry Production (3 CH)

The course includes egg and meat production in hot climates, incubation, hatchery management, brooding, rearing, housing, equipment, feeding, disease control, and introduction to modern techniques in poultry production, processing, marketing, and price discovery. The course also covers consumption trends, breeds, and consumer grades related to poultry production.

ARAG323 Post-Harvest Physiology of Plant and Animal Systems (3 CH)

This course objective is to understand post-harvest physical and chemical changes in plant and animal products affecting sensory properties and nutritional value. The specific topics include effects of pre and post slaughter stress on muscle pH, muscle color, and sensory properties of cooked product, and muscle components. The course will also highlight effects of dehydration on texture, color changes post-harvest, and modified atmosphere storage and modified atmosphere packaging in plant products.

ARAG325 Fisheries Management and Conservation (3 CH)

The course objective is to understand the importance of aquatic living resources, current world fisheries and their future, biological principles of fisheries conservation and management, development and implementation of fisheries policy, case histories of successful and unsuccessful fishery management systems.

ARAG326 Mariculture (3 CH)

The course covers topics such as controlled spawning, cultivation, harvesting, processing, and marketing of marine and estuarine invertebrates and fishes. The course will examine the effects of laws and regulations, engineering, and economics on a worldwide basis. In addition, the culture of food items used in rearing marine and estuarine species will be discussed.

ARAG327 Plant Physiology and Environmental Stress (3 CH)

This course includes the physiological and biochemical processes of plants with emphasis on the effects of environmental stresses on plant growth. It will cover plant cell organization, mineral nutrition, flow of energy, respiration, photosynthesis, mitosis and meiosis, development of vegetative and reproductive structures, phytohormones, stress physiology, water deficit, drought resistance and salt stress, heat stress, and others.

ARAG329 Organic Animal Production (3 CH)

Students will learn to apply a management program and marketing techniques to organic animal production. This course will cover animal welfare, animal management as related to organic production, nutrition, animal health and an organic approach to alternative medicine. Performance evaluation, marketing and certification of organic animal products will be discussed.

ARAG330 Principles of Animal Sciences (3 CH)

The course introduces the students to the fundamental principles of animal science. It will cover the concepts and basics understanding of animal breeds, breeding and selection, genetics, animal anatomy and physiology, animal

nutrition, feed, growth, reproduction, artificial insemination, lactation, egg laying, animal disease and health care. The course focuses on dairy, poultry, camel, small ruminants. The course will also highlight the state of the agricultural animal wealth of the United Arab Emirates, global agricultural animal industry and society.

Prerequisites

- BIOC100 with a minimum grade D

ARAG335 Production Medicine (3 CH)

The course covers basic disease concepts, fundamentals of immunology and therapeutics, infectious and non-infectious disease prevention principles, pre-harvest food safety, meat and milk product quality assurance, herd health management programs for production efficiency and product quality.

ARAG339 Management of Sport Animals (3 CH)

This course covers main breeds and strains of falcons, racing camels and horses. The course provides understanding on selection, management, feeding, and health of these types of animals. The methods of hunting with falcons, rules and regulations of racing camels and horses are described. In addition, topics such as the thoroughbred horse racing industry, bloodlines, import/export regulations, management guidelines, and the business structure will be covered.

ARAG376 Soil Processes in Organic Farming (3 CH)

The course teaches sound organic principles using soil management as the basis. The course is structured around the theories of soil mineral balance and improving of the soil physical, chemical and biological characteristics. The course also covers the interactions of soils, plants, microbes, and animals with management and environmental factors and the decomposition of organic matter, carbon transformation, nitrogen, sulfur, phosphorus and other mineral transformations.

ARAG401 Sustainable Agriculture in Arid Lands (3 CH)

The course aims at studying the principles of sustainable agriculture under different farming systems. This includes conservation of natural resources, farming systems, farm management, low input agriculture, and greater use of the biological and genetic potential of plant species, and studying some case studies from arid environments.

ARAG402 Woody Plants in the Landscape (3 CH)

Principles and practices of managing trees and shrubs in the urban landscape and other managed environments. Topics include woody plant form; growth response and adaptation; tree management in relation to soil, moisture, climate; plant problems.

ARAG404 Vegetable Production in Arid Lands (3 CH)

This course aims at providing students with commercial production methods of vegetable crops under arid conditions. The course also covers agricultural practices, physiology and physiological disorders. In addition, the course covers vegetable production in greenhouses, including an overview of greenhouse construction and management. Prerequisite: ARAG 307

ARAG407 Design of Organic Production System (3 CH)

The course covers the interactions of soils, plants, microbes, and animals with management and environmental factors related to annual and perennial crops and livestock. The core principle of problem avoidance rather than problem solving is illustrated with practical examples from such dimensions as integration of crop and livestock agriculture, farm- scale nutrient budgeting, permaculture, and herd health in the production of organic field crops (grains and oilseeds), horticultural crops (fruits and vegetables), and livestock beef, sheep, dairy, pigs, chickens).

ARAG408 Survey of Plant Communities in Arid Lands (3 CH)

The course covers the survey and morphological and taxonomical description of the plant species existing in the arid region, identification of endangered species, conservation of the species and maintenance of germplasm.

ARAG410 Fruit Production in Arid Lands (3 CH)

This course aims at studying the physiological and ecological factors affecting fruit tree production under Aridland conditions. It includes fruit species cultivars and cultural practices with emphasis on fruit trees adapted to high temperature, drought, water, and soil salinity.

ARAG412 Specialty Crops (3 CH)

Management of the major food, feed, fiber, and specialty crops. Emphasis on how crops grow and respond to climatic and cultural influences. Alternate cropping systems assessed from the standpoint of potential productivity and cost/ benefit analysis of the major food, feed, fiber, and specialty crops. The course will emphasize on the crops like salt tolerant alfalfa, mushrooms, native species of UAE which is traditionally used in cosmetics, dyes, nutrasuticals etc.

ARAG414 Plant Breeding and Horticultural Biotechnology (3 CH)

The course examines the fundamentals of plant molecular biology and biotechnology with emphasis on their applications to horticultural plants propagation and improvement for environmental stresses tolerance/ resistance. Laboratories include hands on experience in plant tissue culture, and plant molecular biology techniques. This course also introduces the students to Plant Genetic Engineering and its applications.

ARAG423 Dairy Cattle Management (3 CH)

This course emphasizes on science, technology, management, and business associated with dairy cattle production. Biology of dairy cattle with emphasis on genetics, reproduction, lactation, and nutrition are discussed. Management and adaptation of dairy cattle in arid zones are given special consideration.

Prerequisites

- ARAG205 with a minimum grade D

ARAG424 Fish Breeding and Propagation (3 CH)

This course provides the students with the basic knowledge about fish breeding, including reproductive systems, endocrine glands and their relation to gonads maturation, reproduction, broadstock selection, natural spawning and induced breeding, sex reversal, larval rearing and hatchery management.

Prerequisites

- ARAG230 or ARAG326

ARAG425 Shellfish and Molluscan Aquaculture (3 CH)

The course introduces students to an overview of shellfish and mollusks aquaculture. it familiarizes students with the life cycles, reproductive biology, brood stock condition and larval biology, and the use of triploidy animals in the industry applied biology, and Hatchery and farm technology and techniques for a range of Shellfish species; shrimp, lobsters, crabs and mollusks species; oysters, mussels, abalone, scallops, giant clams and pearl oysters.. Emphasis will be placed using water recirculation systems in production and reproduction, feeding, and larval rearing and grow- out systems.

ARAG426 Aquatic Ecology (3 CH)

The course addresses the following topics: Ecosystems: Components, Energy Flow, and Matter Cycling, Biogeography: Climate, Aquatic Habitat Zonation, and Life in the hot: Organisms adaptations to tolerate worm seawater temperatures in winter. Aquatic Biodiversity: Structure, Life History, Interactions, Succession, and Sustainability. Aquatic Habitat (Water Physics and Chemistry, Primary and Secondary Productivity, streams & rivers, marshes, forested wetlands, ocean, estuaries and seashores), Marine ecosystem salt marshes, mangroves and coral reefs Resources and Sustainability: Growth and Carrying Capacity; Food and Water Resources; Geological Resources; Energy Resources and Renewable Energy. Seabird Ecology, Human Impacts on Aquatic Ecosystem.

ARAG428 Animal Welfare (3 CH)

This course deals with well- being of Animals, with emphasis on farm animals. Issues include what we mean by animal welfare, what the animal welfare issues are in modern society, and how we use etiology and physiology to

assess animal welfare. The international efforts to improve on farm animal welfare will be discussed.

ARAG430 Fisheries Stock Assessment (3 CH)

The course emphasizes quantitative analysis of fisheries data to determine fishery response to alternative management actions. Major topics include production models, stock, and recruitment, catch at age analysis, and formulation of harvest strategies.

ARAG432 Sheep and Goat Production (3 CH)

This course aims to provide students with the principles and applied knowledge in sheep and goat production. The course includes importance of sheep and goat production in arid regions, field and management practices applied in sheep and goat farms such as reproduction, nutrition, selection, intensive lamb and goat production and dairy goats.

ARAG433 Fish Nutrition (3 CH)

This course provides students with the basic knowledge on fish nutrition. It generally covers feeding habits, digestive systems, food digestion, absorption and metabolism, natural food, nutritional requirements of farmed fish (protein, lipids, carbohydrates, vitamins and minerals), feed formulation, feeding regimes and recent approaches in fish nutrition.

Prerequisites

- ARAG326 with a minimum grade D or ARAG316 with a minimum grade D

ARAG434 Reproductive Physiology (3 CH)

The course provides students with basic information on reproductive functions and their characteristics in farm animals and evaluation of reproduction of herds and solving problems facing the breeder. It includes the study of reproductive organs of farm animals; hormones and their relationships with reproductive functions, gamete production, conception, pregnancy, and parturition. Seasonality, semen production, artificial insemination, multiple ovulation, and embryo transfer.

ARAG435 Egg Production (3 CH)

The course description includes all phases of commercial egg production such as strain selection in adaptation to environment, egg gathering and handling, environmental controls as in lighting management, temperature management, nutrition, housing, breeding, disease control, harvesting, and marketing concerns. Laboratory sessions will emphasize practical application of the skills.

ARAG436 Poultry Meat Production (3 CH)

Course description includes all phases of poultry meat production from chickens and turkeys such as selection of strains-preferred size and adaptation to temperature, breeding and genetic problems caused by intense selection for high meat production, reproductive performance, lighting system, health and vaccination program, nutrition, environmental control, computer record keeping, harvesting and transportation.

ARAG437 Disease and Insect Pests (3 CH)

This course covers important diseases and insect pests of horticultural plants. It will include the principles of entomology, the economic importance of insect and non-insect pests of plants used in an arid environment. The course will provide knowledge to identify plant diseases, their causal organisms, symptoms, damage, and common measures for their control.

Prerequisites

- ARAG306 with a minimum grade D

ARAG439 Pesticides (3 CH)

This course aims at studying the importance of using pesticides in agriculture and associated problems and issues. The course include topics on different methods of chemical control, pesticide classes, toxicity of insecticides and their modes of action, different methods of pesticide analysis, the effect of pesticides on the environment and natural enemies, and recent advances in pest control.

Prerequisites

- ARAG306 with a minimum grade D

ARAG440 Seminar in Animal Science (1 CH)

This course presents topics of interest related to the various disciplines of animal science including nutrition, reproduction, and genetics and breeding. Students will be assigned topics for oral presentations under the supervision of the course advisors. The course will stress to initiate discussions during the seminar on areas such as strategies improvements as well as challenges presented by new developments in animal production industries

ARAG442 Protected Agriculture (3 CH)

This course covers protected agriculture techniques, greenhouse site selection, environmental control, sensors and computer systems for heating, cooling, light management, carbon dioxide enrichment, and energy conservation. This course provides students with a broad background in greenhouse structures, electromechanical systems and production regimes. As a part of protected agriculture, hydroponics, basic requirement of hydroponics, problems in protected agricultural crops, new development in protected agriculture will be explored in this course.

ARAG443 Irrigation, Drainage and Water Management (3 CH)

This course provides students an introduction to irrigation through discussion of water resources, soil-water characteristics, and crop water requirements. The students will learn about designing irrigation and drainage systems. The surface and pressurized irrigation systems and drainage systems for salinity control are evaluated. The course also covers concepts and issues involved in water management and conservation.

ARAG445 Internship (3 CH)

This course aims at providing students with the professional and behavioral skills needed for their future work. The student will get training for 8 weeks in different work sites such as local municipalities, agricultural departments,

Ministry of Agriculture and Fishery, farms and research centers under the joint supervision of the college and the respective authorities. (This course is conducted on 2 days/week during a semester in the last study year. Courses can be registered in the other days of the week and student should complete 100 credit hours before taking this course).

ARAG450 Advanced Animal Nutrition (3 CH)

The course description includes the metabolism of proteins, carbohydrates, lipids, vitamins, minerals, and water, and the relationship of nutrient utilization to animal growth and production. Topics will include digestion, absorption, and metabolism of proteins, carbohydrates, lipids, vitamins, minerals, and water. Functions of minerals and vitamins in animal nutrition. The interrelationship of minerals, vitamins, and resultant symptoms of deficiency or toxicity will also be discussed.

ARAG451 Landscape Management for Arid Lands (3 CH)

The course covers topics on selecting soil and its effect on plant growth, planting site evaluation, species selection, obtaining quality plants, plant installation, preventing construction damage, care after planting, weed management, pruning trees and shrubs, fertilizing landscape plants, plant health care, diagnosing landscape plant health problems.

ARAG452 Palms and Dates (3 CH)

This course aims at improving date palm productivity especially under arid conditions. It includes studying the morphology, physiology environmental conditions and cultural practices that affect productivity such as punition, pruning, and thinning. The methods to improve fruit quality, varieties, and diseases are studied.

Prerequisites

- ARAG307

ARAG453 Indoor Plants and Flower Arrangements (3 CH)

This course aims at introducing indoor plants and flower arrangement. It includes identification of indoor plants and their propagation, planting, the environmental requirements for growing, maintenance and their use interior landscaping. It also includes production of cut flowers and flower arrangement.

ARAG454 Landscape Design (3 CH)

This course aims at introducing the principles of landscaping and different landscape styles. It includes landscape design and maintenance of different public and private gardens with emphasis on arid landscaping.

Prerequisites

- ARAG307 with a minimum grade D

ARAG455 Nursery and Greenhouse Operations (3 CH)

This course combines business and plant production aspects to provide the skills needed to manage a nursery, greenhouse or landscape operations, using current technical and economic data for efficient production, development of total nursery enterprise designed for workable and profitable business establishment, pest management and governmental regulations concerning the nursery industry.

ARAG456 Turfgrass Management (3 CH)

This course introduces students to the principles and culture of turf grass management. It covers topics on adaptation of turf species to arid environments, growth and establishments, growth and establishments, growth and establishment, maintenance, fertility, pest management, irrigation, mowing, seed production, equipment and management. The uses of turf for different landscaping and identification of vegetative turf grasses will be explored.

ARAG459 Issues in Animal Protein Production (3 CH)

Course aims to explore the social, political, and environmental forces that will affect food animal production in the future. This will be achieved by presentations by invited speakers, university faculty, as well as the student class members. The topics will include water quality, water quantity and distribution, biodiversity loss, desertification, terrestrial as well as marine, food safety, international trade-GATT, animal rights, animal welfare, genetic engineering, biotechnology, and air quality.

ARAG465 Salt and Drought Tolerant Plants (2 CH)

This course introduces the student to the important horticultural plant species that are used for food production and for ornamental purposes in the landscape in an arid environment with high salt content irrigation water and drought. Plant identification, adaptation, and utilization will be covered. Course includes plant classification, fruits, vegetables, woody ornamentals, herbaceous ornamentals, grasses and native plants. The course also focuses on the drought management practices to be followed to overcome drought situation.

ARAG470 Camels and Equine Nutrition (3 CH)

This course introduces students to the field of livestock nutrition with emphasis on Camels and Equine nutrition. The objectives are to establish a thorough working knowledge of nutrition and diet formulation. By the end of the course students will be able to solve practical problems based on knowledge of nutritional theory and devise suitable rations for camels and horses.

ARAG475 Molecular Biology Genetics (3 CH)

This course covers basic principles of classical genetics and molecular biology. The classical genetics section includes discussions on Mendelian genetics, linkage and meiotic mapping, sex determination, cytoplasmic inheritance, and chromosomal aberrations. The molecular biology section continues with discussions on DNA structure and replication, chromosomal organization, transcription, translation, the genetic code, mutations, DNA repair, and transposable elements. Basic principles of population genetics are also presented.

Prerequisites

- BIOC100
- CHEM283

ARAG485 Senior Project (3 CH)

The course is a capstone course to be individually designed by the faculty advisor for each senior student to integrate all courses and training of the student, from all activities involved by the student, during his/her entire stay at UAEU. Research methods, analysis of data collected, interpretation, and hypothesis must be developed by the students on a specific topic. A written thesis is to be produced by the student at the end of the course. Prerequisite: Completing 90 Credit hours

ARAG800 Comprehensive Examination (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student's knowledge of his or her discipline, as well as the student's scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. It must be taken before the start of the student's fifth semester in the program. Students taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end of the student's fifth semester. A second unsuccessful attempt leads to immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

HORT610 Seminar in Horticulture (1 CH)

Students discuss and elaborate on how to identify knowledge gaps in horticulture, and to plan research approaches that will yield novel information. Students practice to critically evaluate and convincingly present research findings.

HORT611 Ecology and Agriculture (3 CH)

Integration of ecological approaches into agricultural research to develop environmentally sound management practices. Topics include crop autoecolgy, biotic interactions among crops and pests, and crop systems ecology.

Interaction of expectations, maintenance needs, cost/benefit analysis, physiology and ecology in managing landscapes on a sustainable basis

HORT620 Plant Communities in UAE (3 CH)

Plant community ecology studies the interactions among groups of plant populations, their dynamics, and relation to site and disturbance. This course will examine how plant communities are organized; investigate dynamics over various time scales; explore environmental and other site factors that affect their structure and composition; introduce field and quantitative methods; and examine human impacts on plant communities

HORT622 Research Perspectives in Horticulture (3 CH)

Discussions of scientific methodology, students develop research proposals aided by classroom discussions and individual interactions with instructors. Lectures and critiques of ?classical papers? provide a sense of the evolution of the current concepts in perennial plant biology

HORT630 Greenhouse & Nursery Crop Production (3 CH)

Horticultural Plant Production is a technical course that prepares students to produce greenhouse and nursery crops and to maintain plant growth and propagation structures. Instruction includes plant classification and identification; plant propagation; greenhouse and nursery structures, tools, and equipment; and cultural requirements for growing greenhouse and nursery crops. Related topics include environmental control, safety, and crop scheduling and marketing

HORT631 Post Harvest Technology of Horticulture Crops (3 CH)

Intensive study of current procedures for post harvest handling of fruits, vegetables, and ornamentals in UAE. This course will discuss the theory and practice of technologies used in the production of horticultural crops. Topics include: crop establishment, cultural management, environmental regulation, crop protection, harvesting, and post harvest handling.

HORT632 Small Fruit Production (2 CH)

Strawberries Fragaria, blackberries as berries (Rubus), blueberries-cranberries Vaccinium as important nutritional resources; their origin, production and utilization with emphasis on recent progress in integrated management.

HORT633 Crop Management Systems for Vegetable Production (3 CH)

Horticultural principles applied to production and management systems for vegetable crops. Laboratory and discussion will illustrate efficient field management and resource use practices.

HORT634 Forage Crop Ecology (3 CH)

Forages as a world resource in food production. Ecological principles governing the adaptation, establishment, growth and management of perennial and annual forages, including pastures, rangelands and hay; aspects of forage quality which affect feeding value to livestock.

HORT635 Systems Analysis in Agriculture and Resource Management (3 CH)

The process of systems analysis and dynamic simulation of biological and environmental systems, use of systems analysis for development of optimal management strategies for agricultural and environmental systems.

HORT636 Physiological Principles in Environmental Horticulture (3 CH)

Physiological principles and processes essential to floriculture, nursery crop production, turfculture and landscape horticulture. Emphasis on the control of vegetative and reproductive development for a broad species range in greenhouse and extensive landscape environments.

HORT638 Turfgrass and Amenity Grassland Utilization and Management (3 CH)

Utilization and management of amenity and landscape grassland systems. Emphasis on biology of grass species, ecology and culture practice of sports

turf and landscape grassland systems, social and environmental benefits, environmental impacts, and integrated management systems.

HORT639 Woody Plants in the Landscape: Growth, Ecology and Management (3 CH)

Principles and practices of managing trees and shrubs in the urban landscape and other managed environments.Topics include woody plant form; growth response and adaptation; tree management in relation to soil, moisture, climate; plant problems. - II. (II.) Berry

HORT640 Tree Biotechnology (3 CH)

The course examines the science of GMO with emphasis on aridland trees such as date palms, decision making in the GMO creation process though. Discussions center on targeting traits, genetic interventions, selection and evaluation steps, multiplication, and release and introduction, relative safety of biotechnology, using case studies of biotechnology risks and risk assessment, and integrated understanding of the national and global policy and regulatory issues concerning plant biotechnology.

HORT642 Water Quality, Soil, Salinity and Reclamation (3 CH)

This course provide the student with better understanding of the effect of water quality upon soil and crops and to assist in selecting suitable alternatives to cope with potential water quality related problems that might reduce production under prevailing conditions of use. In addition, this course covers the sources of soluble salts, Salt balance in the soil, and the concept of leaching fraction. The course also includes an assessment of crop salt tolerance: soil profile salinity, water uptake model and time-weighted salinity. This course provides students information on specific ion toxicity, Sodicity and alkalinity hazards, reclamation of saline, sodic and/or alkaline soils.

HORT643 Irrigation & Drainage Systems (3 CH)

Engineering and scientific principles applied to the design of surface, sprinkle and micro irrigation systems and drainage systems within economic, biological, and environmental constraints. Interaction between irrigation and drainage will be emphasizedSmart ET based irrigation systems, deficit irrigation, optimal irrigation scheduling, water quality and saline irrigation will be discussed.

HORT644 Landscape Ecology (2 CH)

The course emphasizes on large areas and the ecological effects of spatial patterns on ecosystems. Landscape ecology considers characterizing physical template and environmental constraints on the biotic and abiotic process, landscape dynamics to detect the change of landscape patterns, analyzing and simulating landscape changes and human intervention on landscape management process.

HORT646 UAE Floristics (3 CH)

Survey of the flora of the UAE, with emphasis on field recognition and identification of important vascular plant families and genera characterizing the major floristic regions. review the taxonomic diversity, evolutionary relationships, and geographical patterns of UAE flora.

HORT647 Ecology of Crop Systems (3 CH)

Ecological processes governing the structure and behavior of managed ecosystems. Emphasis on mechanistic and systems views of the physical environment, photosynthetic productivity, competition, adaptation, nutrient cycling, energy relations and contemporary issues such as climate change.

HORT649 Plant Propagation (3 CH)

Principles and practices of propagating plants covering anatomical, physiological, and practical aspects.

HORT650 Reproductive Biology of Flowering Plants (3 CH)

Fundamental mechanisms of reproductive biology of flowering plants and their influence on genetic variation, 0evolution, and cultural practices.

HORT651 Concepts & Systems of Plant Protection and Pest Management (3 CH)

Ecological perspectives of agricultural systems, the role of pests and pest management in these systems, and the monitoring and modeling of the systems.

HORT699 Thesis (6 CH)

This course is directed to work on a research topic under the supervision of faculty main supervisor and co-advisors; the practical research is carried out during the semester terms and the research is presented as an M.Sc. thesis.

HORT720 Innovative Technologies for Horticultural Production Systems (3 CH)

The course provides students with an understanding of the most recent technological advancements related to protected horticultural production systems, including robotics and artificial intelligence. Prospects and challenges pertaining to the use of SMART- IOT- and remote sensing-based technologies for the management of horticultural plant production sites are explained and discussed. The course reviews research approaches at the interfaces of horticulture and engineering, as well as horticulture and computing. Guest lecturers from the related disciplines may be invited to deliver parts of this course.

HORT725 Methods in agricultural microbiology (3 CH)

This course will train students in sophisticated methods for identification, cultivation and monitoring of microorganisms relevant to plant and animal production. Risks and prospects pertaining to the exploitation of microorganisms that could potentially be used to improve plant or animal health and performance will be discussed. In addition, aspects of hygiene related to global trade of agricultural plant and animal material will be discussed.

HORT730 Control and evaluation of agricultural product quality (2 CH)

This course will outline components of harvest product quality, and how these can be evaluated. Health and hygiene components of quality will be discussed as well as product taste and visual appearance. Research approaches aiming at investigating how agricultural production practices affect harvest product quality will be presented. The course will also address the relationship between quantity and quality of yield in a range of plant and animal production systems.

HORT741 Modeling Horticultural System (3 CH)

The purpose of the course is to teach graduate students how to design, construct, use and interpret simulation models of horticultural systems. Webegin with an introduction to data management and linear programming that provides a theoretical basis for resource optimization. The second part of the course consists of a survey of literature related to crop and growth modeling and use of computer models to answer a variety of crop management problems, including irrigation water and inputs' application. The last part focuses on the use of global and regional models in the study and forecast of climate change effects on horticultural systems.

HORT748 Conservation of Plant Genetic Resources (3 CH)

The course will focus on the genetic variability within the diversity of cultivated species and the wild relatives, develop efficient conservation and management practices under ex situ, in situ and in vitro conditions, and employ conventional breeding and biotechnology approaches for utilization of the available genetic resources to the best use of mankind. The ethical, moral and economic issues involved in identification, conservation and utilization of the biodiversity will be emphasized.

HORT800 Comprehensive Exam (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student's knowledge of his or her discipline, as well as the student's scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. It must be taken before the start of the student's fifth semester in the program. Students taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end of the student's fifth semester. A second unsuccessful attempt leads to

immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

HORT805 Molecular approaches in plant research (3 CH)

This course aims to provide theoretical and practical insights into modern plant molecular biology, and plant biotechnology. Also included will be lectures, seminars and selected literature discussions. The extensive molecular approach part will cover a broad spectrum of techniques relevant to advanced plant research and biotechnology, genetic engineering, genomics and functional genomics, transcriptomics, proteomics and metabolomics. Molecular biology and biotechnology aspects will be related to the basic cellular mechanisms and gene networks that govern plant growth and development, as well as their responses to biotic and abiotic stresses.

HORT810 Research Proposal (0 CH)

Student prepares a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The Research Proposal course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Prerequisites

- HORT800

HORT815 Assessment of energy and element fluxes in agroecosytems (3 CH)

In this course students will learn how to evaluate the sustainability of agroecosystems based on their energy and element fluxes. The effect of horticultural practices on carbon budgets and cycling or through-flow of water and nutritional elements will be addressed. Advanced models and concepts aiming at maximizing the resource utilization efficiency of agricultural systems

will be presented and evaluated for their applicability to modern society and arid lands.

HORT820 Urban landscape planning, policy and management (3 CH)

This course will discuss the development of urban landscapes and management. Learn policy, planning and process issues; management of urban vegetation; sustainability concepts of urban landscape management practice.

HORT900 Dissertation Research (30 CH)

This course is the mandatory research course for PhD students that leads to the student's PhD dissertation (thesis) and its defense. The PhD dissertation is based on original and independent research and investigation leading to a thesis that will be defended in an open session and a closed session. The areas of research include all relevant Horticultural aspects. The research topic is a specific problem related to field problems and/or a combination fields covering soils, fruits & vegetables, plant physiology, plant biotechnology, microbiology, landscapes &ornamental horticulture, crop science etc. Every PhD student is expected to have at least two research papers published for in peer-reviewed publications/journals before the final defense of his/her dissertation. The results of the candidate's individual inquiry must be presented in a written dissertation comprising a genuine contribution to knowledge in the particular academic field. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the college of graduate studies (CGS).

HORT910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based on two main parts: (1) the Committee's evaluation of the dissertation document and (2) the Committee's evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal. The Dissertation Defense course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript

Department of Food Science

COFA670 Global Food Supply Chain Management (2 CH)

This course focuses on theoretical knowledge and applications in relation to coordination and integration of global food logistics, purchasing, operations and marketing channel strategies. The course applies the global food supply chain management framework, explores the implications of food industry globalization drivers, and reviews global food supply chains management practices such as skills on building networks optimizations models, and shipments cost models. The course also covers case studies in relation to the links between global food supply chain management and social responsibility and ethics concerns. The course provides the participants with skills on performing costs and benefits analyses on international food safety standards.

COFA760 Advance Scientific Writing (2 CH)

Students train their ability to write a text in English language that satisfies international standards for research publications and project proposals. The course deals with the structuring of text, maintenance of coherence and means by which the desired emphasis on the most relevant aspects can be achieved. Students further learn how to simplify texts, and to avoid unclear or non-scientific expressions.

COFA770 Sustainable Food and Agriculture (3 CH)

This course will explore environmental dimensions of food and agriculture, the emerging global challenges revolving climate change, resource depletion, and sustainable, regenerative, and climate smart agriculture. It will also explore the concept of food security, including production, storage, distribution, access, stability, nutritional value of foods produced in the arid and land regions.

FDSC250 Contemporary Food Science & Nutrition (3 CH)

The course introduces students to principles and issues in food sciences, nutrition, and health systems. The course helps student to understand the nature, properties, characteristics, quality and safety of foods, post-harvest handling of fresh foods, preparation and conversion of food commodities into

high quality products. In addition, students will study food choices and its effects on personal health, nutritional needs, nutrients, and relationships between diet and disease.

FDSC260 Principles of Food Science (3 CH)

This course is designed to orient newly admitted students to the Food Science discipline and the program at UAEU. The course introduces students to the multidisciplinary nature of Food Science and explains the three core competencies (food chemistry & analysis, food safety & microbiology, and food processing & engineering). The course provides an overview of the major Food Science topics and the other courses.

FDSC280 Food Hygiene (3 CH)

The course explores the history, development and enforcement of laws and regulations that affect the food animal processing industry and food consumers. A comprehensive approach to microbiological and physical food borne hazard identification, testing and sampling is taken. Food borne diseases and hazard prevention and control including Hazard Analysis and Critical Control Points systems will be taught.

FDSC309 Sensory evaluation (3 CH)

This course aims at providing students with the principles of sensory evaluation of foods and types of tests. The course includes panel training, product presentation, and statistical procedures for evaluation of sensory scores. The course includes use of case studies to illustrate sensory attributes of foods, consumer acceptability, and preference tests.

FDSC319 Food packaging (3 CH)

This course provides the students with fundamental knowledge and basic principles about food packaging materials and technology. The course will cover the elements of food packaging sciences, technology and engineering as applied to preservation, distribution and marketing of various food products. In addition, it describes the different procedures involved in developing, evaluating and testing of food packages in accordance to international standards

Prerequisites

- CHEM282
- FDSC260 with a minimum grade D

FDSC330 Fundamentals of Food Science (3 CH)

This course deals with food products evaluation and testing, nutritional labeling, and issues affecting food safety. It also discusses the effect of processing and cooking on the food quality and nutrient content. The cornerstones of this course are food chemistry, food processing and food safety.

Prerequisites

- FDSC250 with a minimum grade D
- CHEM111 with a minimum grade D
- BIOE230 with a minimum grade D

FDSC331 Fundamentals of Food Preparation (4 CH)

The objective of this course is to introduce the basic principles of food preparation and techniques applied to the preparation and preservation of food. The course includes introduction to laboratory policies and procedures, including sanitation and safety, the role of food in daily life throughout the life cycle, functional and sensory properties of foods and the role of additional ingredients on food quality.

FDSC340 Food Microbiology (3 CH)

This course deals with the microorganisms important in food including bacteria, yeasts, molds, and viruses. The course handles principles of culturing, isolation, identification, enumeration, and growth and death curves of the microorganisms. Applications utilizing useful microorganisms to produce fermented food products are also discussed. The course teaches microbial contamination, food spoilage and preservation, and associated chemical changes. It also emphasizes on foodborne illnesses caused by microorganisms and their toxins.

Prerequisites

- FDSC260 with a minimum grade D
- BIOE230

FDSC347 Food Process Engineering I (3 CH)

This course aims at providing the student with a background on some basic engineering principles that are applied to food processing (units and dimensions, thermodynamics, material and energy balances, fluid flow and rheology, mass and heat transfer and thermal process calculation).

Prerequisites

- MATH105 with a minimum grade D

FDSC350 Food Chemistry (3 CH)

The objective of this course is to study structural and functional properties of some important food and chemical compounds responsible for color, texture, flavor, sweetness and food additives with important food reactions and analytical techniques. Changes of food chemicals during post-harvest storage that may influence the quality of processed end products will be discussed.

Prerequisites

- CHEM283 with a minimum grade D

FDSC351 Food Plant Sanitation (3 CH)

This course includes prevention of food contamination with microorganisms, effective clean-up procedures and use of appropriate anti-microbial sanitizing agents. The course focuses on the use of good manufacturing practices, plant maintenance, personal hygiene, sanitary food handling, and Hazard Analysis and Critical Control Points (HACCP) programs.

Prerequisites

- FDSC340 with a minimum grade D

FDSC352 Food Safety (3 CH)

This course focuses on food safety issues and addresses physical, chemical, and biological hazards. It discusses food contamination with e.g. glass, metal, plastic, bone, pesticides, heavy metals, toxins, allergens, pathogenic microorganisms, GMOs, and irradiation and their relation to public health.

Prerequisites

- CHEM283 with a minimum grade D

FDSC355 Food Processing (3 CH)

This course aims to provide students with knowledge about basic food processing operations utilized for food preservation and related technology. The course teaches different food processing methods including dehydration, chilling & freezing, microwave heating, high pressure processing, extrusion, irradiation, fermentation, membrane separation, etc.

FDSC357 Technology of Muscle Foods (3 CH)

This course introduces the students to the basic knowledge of animal foods (meat, poultry, and seafood) for studying their nature and changes that occur during processing. It introduces methods of preservation and processing and the hygienic condition during handling. It covers the reuse of secondary products and wastes of secondary products from slaughterhouses and fish processing plants.

Prerequisites

- FDSC355 with a minimum grade D

FDSC363 Fruit and Vegetable Technology (3 CH)

This course is designed to introduce theoretical and practical principals of the technologies (preservation and processing) used in vegetables and fruits, with

concentration on those common to the arid areas. It includes the technology of tomato products, citrus fruits, palm fruits products and others. It covers the most important factors that affect the quality of processed products.

Prerequisites

- FDSC355 with a minimum grade D

FDSC378 Cereal Technology (3 CH)

This course is designed to give students an understanding of the technologies used in cereal processing. The course reviews the cereal grains and their processing methods including milling, baking, malting, pasta processing, and extrusion cooking as well as how these technologies will alter the chemical, technological, and nutritional properties of the grains. The course will teach the chemical and physical methods used in the evaluation of products' composition and properties as well as basic concepts of quality assurance and quality control applicable to cereal processing. The course will explain the applications of cereals and their differently processed products in foods and will provide a focus on the chemistry and health benefits of dietary fibers from cereal grains.

Prerequisites

- FDSC355 with a minimum grade D

FDSC402 Technical Problem Solving in Food Industry (3 CH)

This is a capstone course designed for senior level students to use problem-based learning to gain an experience in attempting solving problems relevant to the food industry, including problem identification, analysis, understanding of underlying causes, investigating possible remedy strategies, and proposing creative solutions. The students will work on example case studies and they will select their own case study to work on in groups. Individually and in groups, the students will have opportunism to enrich their personal reflections, exploration and creativity. Well-structured group work will enable the students to develop skills in problem solving, communication, and cooperation and team work. (Pre requisite: Finish all the compulsory courses)

FDSC425 Internship (3 CH)

The course aims at providing students with practical skills relevant to their future career. The student spends eight weeks of practical training in food control Authorities, food processing companies or food service institutions. ((This course is conducted over half a semester (8 weeks) during the last study year. Offered condensed courses should be taken during the other half of the semester and student should complete 105 credit hours before taking this course).

FDSC450 Food Analysis (3 CH)

This course deals with sampling and sample preparation and instrumental methods used in analysis of physical and chemical attributes of foods. Principles behind the food components (water, ash and minerals, carbohydrates, proteins, lipids, vitamins) analysis, instrumental color analysis, and pesticides analysis will be covered. Instrumental methods will include spectrophotometry (visible, UV, and IR spectrum) spectroscopy, chromatography (TLC, LC/HPLC, UPLC, GC/GLC), electrophoresis, and rheology (viscosity and texture).

Prerequisites

- FDSC350 with a minimum grade D

FDSC453 Quality Control and Assurance (3 CH)

This course aims to provide the student with the theoretical and practical skills in the field of food quality control. The course covers quality assurance, HACCP, ISO quality and safety management systems, total quality management, statistics applied to establishment of sampling plans, acceptance or rejection of lots, control charts, probability distributions, process capabilities and six sigma.

Prerequisites

- STAT235 with a minimum grade D
- FDSC355 with a minimum grade D

FDSC454 Food Laws (2 CH)

This course includes discussion on relevant food laws in UAE trading partner countries as they affect food imported into the UAE or exports of UAE products to these countries. Local and regional regulations related to customs or traditions (Islamic Dietary Laws and Processing requirements), US food laws, international food standards-Codex, labeling standards, and nutritional information will be examined.

FDSC455 Food Inspection (3 CH)

This course provides a comprehensive coverage of the concepts and approaches of food inspection. It deals with the general inspection procedures and regulations including sampling and acceptance sampling plans, logistics, and collection of analytical data, hazard analysis, reporting and documentation. The course will also include general inspection approach for primary production facilities, food preparation, food processing facilities, and retail food service.

Prerequisites

- Pre/Co FDSC453 with a minimum grade D

FDSC458 Dairy Product Technology (3 CH)

This course is designed to give students an understanding of the basic information on milk and dairy products, including the composition of milk, the chemistry, structure and function of its individual components. It covers the manufacture of milk and various dairy products. Fundamental dairy processes involved in the manufacture of various products will be covered. Examples are high temperature short time (HTST), ultra high temperature (UHT), evaporated milks, low-fat dried milk (NFDM) powder, dried milks and related products, butter and related products, ice cream, sherbets, cheeses, and fermented dairy products.

Prerequisites

- FDSC355 with a minimum grade D

FDSC460 Hazard Analysis Critical Control Point (HACCP) (3 CH)

Hazard Analysis Critical Control Point (HACCP) is required by legislation and applied throughout the food industry as a food safety protection system. This course aims to enable students to develop competence in HACCP methodology. It uses a number of case studies and can be applied to a number of sectors of the food industry. It will also provide students with the theoretical foundations and practical techniques together with essential skills to develop effective HACCP systems. This undergraduate course is ideal for students who are working in, or want to work in the food industry, local government and the private sector.

Prerequisites

- FDSC453 with a minimum grade D

FDSC465 Food Safety Management (3 CH)

This course focuses on the importance of food safety in the manufacture and retail environments. It provides food handlers with the knowledge of how they can contribute to product safety. The importance of good personal hygiene, cleaning, waste management, and recognizing are also stressed. In addition to the fundamentals of food safety, attendees will gain an appreciation of the specific types of hazards (physical, chemical and biological), controls and monitoring associated with food manufacture and retails. This course also covers the legislations applicable to food safety. Managerial procedures, required to make sure that safe food is manufactured and served at all times, are covered.

Prerequisites

- FDSC453 with a minimum grade D

FDSC466 Food Product Development (3 CH)

This course introduces students to the principles of new product development from idea generation, to production of prototype, and product testing. The course includes organizing a product development team, use of case studies to describe possible new product, defining its attributes, development of product prototype, preliminary testing, modification, and sensory testing of prototype.

Prerequisites

- FDSC355 with a minimum grade D
- FDSC309 with a minimum grade D

FDSC470 Current Issues in Food Science (2 CH)

This course aims to study the current developments in the discipline of Food science. It allows students to study the current scientific literature on the new concepts and methods applicable to Food Science. The course includes oral presentation and discussion of scientific publications, special reports, and techniques of specialized topics in the area of food sciences.

FDSC477 Oil and Fat Technology (3 CH)

This course is designed to give students an understanding of the technology and chemistry of oil and fat. The course includes extraction procedures of oil and fat from plant and animal origins, clarification, characteristics, chemistry of lipids, and changes that occur during storage. It covers oil hydrogenation, manufacturing of shortening, and margarine.

Prerequisites

- FDSC350 with a minimum grade D
- FDSC355

FDSC480 Senior Project (3 CH)

The course is a capstone course to be individually designed by the faculty advisor for each senior student to integrate all courses and training of the student, from all activities involved by the student during his/her entire stay at UAEU. Research methods, data collection, analysis of data collected, interpretation, and hypothesis must be developed by the students on a specific topic. A project report is to be produced by the student at the end of the course. Pre requisite:(Finish all the compulsory courses)

FDSC605 Graduate Seminar (1 CH)

This course targets the analysis of current and prospective issues in specified subject areas in the field of food science includes student exploration of unsolved food science problems and opportunities. This course exposes the student to the literature search, interprets and analyses the literature review, the methodologies and discussion. The student is expected to provide a critical review of the scientific papers in the specified subject areas. The student should subsequently develop confidence in presenting information, communication and analyze presentation styles and effectiveness. This exercise will continue till the student defends his/her thesis.

Prerequisites

- FDSC610
- FDSC622
- FDSC633
- FDSC640

FDSC610 Advanced Food Chemistry - 1 (2 CH)

This course focuses on important chemical reactions leading to alterations in chemical structures or properties. Major reactions that will be studied in depth are lipid oxidation, Maillard reactions, enzymatic and fermentation reactions, macro- and micro- molecular changes, and reactions causing changes in food colors and flavors.

FDSC611 Food Physics (2 CH)

This course covers water activity, sorption isotherm and their models, mass and density, geometric properties, rheological properties, interfacial phenomena, permeability, thermal properties, electrical properties and optical properties and how they are related and affected by food processing.

Corequisites

- FDSC610

FDSC622 Advanced Food Analysis - I (2 CH)

This course provides a comprehensive coverage of the important field of food analysis. It deals with the conceptual framework of food analysis including qualitative and quantitative aspects of food composition and food properties (both chemical and physical analyses). It discusses sampling, extractions, analysis, standardization, statistical evaluation, and analytical method validation. By the end of the course, students will have a profound knowledge of the basic concepts and specific knowledge of different analytical techniques and their applications in food analysis. The course will also include aspects of OMIC technologies pertinent to food analysis.

FDSC630 Advanced Food Technologies (3 CH)

This course emphasizes development in advanced and emerging food processing technologies including nano food technology, smart packaging, supercritical extraction, freeze–drying, encapsulation techniques. Effect of food processing technologies on the quality and nutrient composition of different foods.

Corequisites

- FDSC633

FDSC631 Enzymes Technology and Fermentation (3 CH)

This course deals with principles of modern enzymology and biotechnology and their application in food science and food industry. This course also focuses on kinetics of growth, death of industrial microorganisms. Batch, fed-batch and continuous fermentation, agitation, mass transfer, and scale-up in fermentation systems. Food enzymes classifications and nomenclature, enzymes immobilization techniques, enzyme activity, enzymes in recombinant DNA technology, enzyme kinetics incorporating inhibition effect, selected application of enzyme technology in food processing.

Corequisites

- FDSC633

FDSC633 Advanced Food Processing I (3 CH)

This course deals with concept of reaction kinetics in foods, their application in shelf life prediction and thermal process calculation. Detailed discussions will be given to emerging processing technologies such as aseptic packaging technology, high pressure processing, ohmic heating microwave processing, high pulsed electric field and extrusion technology.

FDSC640 Advanced Food Microbiology - I (3 CH)

This course will discuss current issues in food microbiology and emerging food pathogenic microorganisms including bacteria, molds and viruses. This is an advanced graduate level course on the pathogenesis bacterial infections and intoxications. Specific topics will cover the most common and important microorganism food pathogens, their incidence and behavior in various foods. Other topics to be covered will include the microbial ecology of food, factors affecting the growth and survival of microorganisms in foods, and strategies for the production of safe food.

FDSC650 Food Inspection (2 CH)

This course focuses on issues related to food inspection including rules and regulations, logistics, information collection, sampling, chemical/microbiological analyses, hazard analysis, critical control points, food safety management, and certification. Issues related to consumers protection from unwholesomeness, unhealthiness, and fraud in food will be covered.

Corequisites

- FDSC640

FDSC651 Advanced Food Laws and Regulations (2 CH)

This course deals with food laws and regulations and food standards in UAE, the Gulf region, Middle East, and their trading partner countries as they related to food quality and safety principles and applications. Local and regional regulations related to customs or Islamic Dietary Laws traditions and processing requirements, US food laws, international food standards, Codex, labeling standards and nutritional information will be covered during this course.

Prerequisites

- FDSC640

FDSC660 Novel and Functional Foods (3 CH)

This course focuses on the new trends and innovations of food design. It discusses typical examples of functional foods including lipid modifications, soluble and insoluble fibers, bioactive compounds especially antioxidants and cholesterol-lowering agents, as well as new food concepts targeting satiety and glycemic index. The course also discusses the processes of verification of added value and procedures for health claims approval.

FDSC691 Special Topics in Food Science (2 CH)

This course exposes the student to the literature search, interpretation and analysis of literature, review, the methodologies and discussion as well as to reading current books related to a specific topic in food science. It includes selected reading and in-depth discussions of current and emerging issues and critical analysis of current and prospective issues in specified subject areas.

Prerequisites

- FDSC610
- FDSC622
- FDSC633
- FDSC640

FDSC695 Graduation Research Project (3 CH)

This course is designed to ensure that graduates can carry out successful research on a topic in Food Science, write a scientific paper and give an oral presentation/defense of the project.

Prerequisites

- FDSC610
- FDSC622

- FDSC633
- FDSC640

FDSC699 Research Thesis (9 CH)

This course is directed to work on a research topic under the supervision of faculty main supervisor and co-advisors; the practical research is carried out during the semester terms and the research is presented as an M.Sc. thesis.

Prerequisites

- FDSC610
- FDSC622
- FDSC633
- FDSC640

FDSC701 Independent Studies in Food Science (1 CH)

This course exposes the student to the literature search, interprets and analyses the literature review, the methodologies and discussion as well reading current books related to the food science and technology. It includes selected reading and in-depth discussions of current and emerging issues and critical analysis of current and prospective issues in specified subject areas. Topics are to be assigned and approved by the Department PhD committee. The course may be repeated for credit to a maximum of 3 credit hours.

FDSC710 Advanced Food Physics (3 CH)

This is an advanced level course in which the existing knowledge on physical properties of materials will be applied to characterize different foods and package. The students will learn how physical parameters are affected on interaction between various food components at micro-scale. They will also learn about structure-property relationships for various food systems.

FDSC715 Advanced Shelf Life of Stored Foods (3 CH)

This course focuses on the factors and processes that affect the shelf life of foods. It deals with kinetics and mechanisms of physical, chemical and microbial spoilage of foods. The role of processing, packaging and storage on

shelf life will be covered. Furthermore, the shelf-life assessment process will be discussed in detail, and later, the students will do class activities related to shelf-life prediction using data from published literature.

FDSC740 Rapid Methods in Food Microbiology (2 CH)

The course aims to update knowledge in rapid methods for the microbiological analysis of foods. Theoretical methods reviewed include bioluminescence, impediometry, immunological techniques, gene probes, rapid test kits, RT-PCR and other emerging technologies. Practical applications will also be discussed.

Prerequisites

- FDSC640

FDSC750 Advanced Food Chemistry II (3 CH)

This course deals in details with the principle chemical reactions and their role and mechanisms in affecting the quality of food. Selected advanced topics on chemistry of food proteins, carbohydrates and lipids and related changes in food will be discussed in detail. Emphasis will be on the critical evaluation and interpretation of scientific information and problem-solving skills based on the application of scientific principles of food chemistry.

FDSC760 Advanced Food Processing 2 (3 CH)

This course will cover emerging technologies and equipment used in food processing. The course will deeply examine the application of different thermal and non-thermal methods in food processing. Detailed discussions will be given to processing technologies such as aseptic packaging technology, high pressure processing, ohmic heating, microwave processing, high pulsed electric field, nanotechnology, and extrusion technology. Student evaluation will be based on students' participation in discussions and student reports.

Prerequisites

- FDSC633

FDSC790 Conceptual & Multidisciplinary Food Science Studies (3 CH)

This course exposes the student to the wide scope of Food Science concepts and its multidisciplinary nature. The topic(s) to be covered in this course are supportive to the student's area of research and are not available in the course list of this program. Students perform literature search, interpret, analyses and review recent literature, and critically evaluate methodologies and discussion employed, as well as extensively utilize reference books related to food science and technology. Student work will include selected reading and in-depth discussions of current and emerging issues and critical analysis of current and prospective issues in specified subject areas.

FDSC800 Comprehensive Exam (0 CH)

This examination is taken after 3 or 4 semesters to cover advanced knowledge in Food Science and to present the achieved accomplishment in the student's research area.

FDSC801 Research Thesis (1 CH)

A directed research works on a specialized topic under the supervision of faculty main supervisor and advisors; the practical research is carried out during the semester terms.

FDSC805 Advanced Food Analysis II (3 CH)

This course aims to support Ph.D. students to develop a deep and critical understanding of the theoretical and practical aspects of food analysis. It focusses on the advanced analytical techniques (spectroscopy and chromatography) and their applications in food analysis. The course also includes hyphenated techniques, chemometrics, OMIC technologies, and microscopy and discusses their applications in the analysis of foods. The course will be based on presentations, discussions, course project, and examinations.

Prerequisites

- FDSC622

FDSC810 Research Proposal (0 CH)

Student prepares a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The Research Proposal course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Prerequisites

- FDSC800

FDSC820 Advanced Food Microbiology 2 (3 CH)

This course targets advanced knowledge in food microbiology and modern food microbiology concepts, including food safety and spoilage, food fermentation, food biotechnology, and hygienic production of food. The course covers emerging food pathogenic microorganisms including bacteria, molds and viruses as well as beneficial utilization of microorganisms in food processing and preservation. The course depends on student activities and synthesis of knowledge (Bloom's Taxonomy V-VI). Evaluation will be based on students' participation in discussions and student reports.

FDSC900 Dissertation Research (30 CH)

This course is the mandatory research course for PhD students that leads to the student's PhD dissertation (thesis) and its defense. The PhD dissertation is based on original and independent research and investigation leading to a thesis that will be defended before the University Community. The areas of research include food chemistry, food analysis, food microbiology, food quality and assurance, and food processing and technology. The research topic is a specific problem related to one or a combination of these fields. Every PhD student is expected to have at least two research papers considered for publication in peer-reviewed publications/journals before the final defense of his/her dissertation. The manuscripts submitted by Ph.D. candidates to peer-reviewed journals are well-prepared and reflect well on the institution and Ph.D. advisor. The results of the candidate's individual inquiry must be presented in a written dissertation comprising a genuine contribution to

knowledge in the particular academic field. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the college of graduate studies (CGS).

FDSC910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based on two main parts: (1) the Committee's evaluation of the dissertation document and (2) the Committee's evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal. The Dissertation Defense course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript

Department of Veterinary Medicine

ANSC650 Precision Diet Formulation (2 CH)

Theoretical and applied principles associated with precision feeding and diet formulation to optimize nutrient requirements; optimization using least-cost formulation, ingredient inventory, farm and feed mill management, and nutrient management of non-ruminants (horse), ruminant animals (camel, sheep and goats, and dairy) and fish

Prerequisites

- CHEM641

ANSC655 Metabolism of Vitamins & Minerals (2 CH)

This course provides an in-depth introduction to vitamin and mineral metabolism with particular emphasis on factors that influence nutrient bioavailability, regulation of nutrient homeostasis, and biological function. Other topics include the health effects of inadequate and excessive micronutrient intakes, nutrient requirements across life stages, role of micronutrients in environmental exposures, and controversies/support for nutrient supplementation/fortification programs. The course will consist of lectures on the major metabolic topics for each micronutrient and discussions on nutrient-related health concerns from the current literature.

Prerequisites

- CHEM641

ANSC660 Applied Animal Breeding Strategies (3 CH)

This course focuses on the definition of breeding objectives and the evaluation of animal breeding strategies. The course is devoted to the practical aspects involved in deriving economic weights of various traits, selecting animals for breeding, designing breeding strategies, predicting the consequences in terms

of genetic progress and inbreeding of these strategies and using this to optimize breeding strategies

ANSC670 Mammalian Endocrinology (2 CH)

The course covers topics in endocrinology, including hormone synthesis, receptors and intracellular signaling, and hormonal feedback loops. Original research articles will be discussed to clarify these principles in the context of endocrine systems

ANSC720 Applied Animal Genomics (2 CH)

Theory and application of genomics by livestock industries; consideration of genetic markers, gene mapping methods, genome analysis and emerging technologies such as microarrays, transgenesis, cloning and marker assisted selection; exposure to bioinformatics tools for genomics.

ANSC800 Comprehensive Exam (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student's knowledge of his or her discipline, as well as the student's scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. It must be taken before the start of the student's fifth semester in the program. Students taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end of the student's fifth semester. A second unsuccessful attempt leads to immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

ANSC805 Advanced Reproductive Physiology and biotechnology (3 CH)

Collection, evaluation, and preservation of ova, spermatozoa and embryos; application of methods of natural breeding and techniques of artificial insemination and embryo transfer; herd sire and dam evaluation; pregnancy determination; gestation and parturition; infertility; recent advances in theriogenology.

Prerequisites

- ANSC670

ANSC810 Research Proposal (0 CH)

Student prepares a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The Research Proposal course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Prerequisites

- ANSC800

ANSC815 Animal Growth and Development (3 CH)

This course will examine the embryonic development and growth of agriculturally important species with an emphasis on the cellular and molecular mechanisms regulating these processes. Current research concerning hormonal and nutritional factors influencing embryo survival and juvenile growth will be discussed along with novel approaches, such as gene transfer and hormone treatment, for the manipulation of growth rate and body composition

Prerequisites

- CHEM641

ANSC820 Animal Production and Management Systems (3 CH)

Students will learn how to plan animal and poultry production facilities, and get to know methods by which productivity and resource utilization efficiency can

be measured in farming systems based on animals. As the demand for animal and poultry products is steadily increasing, this course will also address major environmental challenges and demand for future research pertaining to the intensification or expansion of animal production.

ANSC900 Dissertation Research (30 CH)

Student conducts high quality academic research under the direction of his/her supervisor. Student and supervisor shall meet on regular basis and discuss progress and issues related to the student's dissertation research. Furthermore, the student writes an annual report based on a meeting with supervisor and Advisory Committee, in which a review is conducted to determine progress, identify problems, and project dates for completion of various tasks. The research shall represent original contribution to human knowledge in the particular academic field and is presented in a written research dissertation of a publishable standard. The document shall also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the College of Graduate Studies.

ANSC910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based on two main parts: (1) the Committee's evaluation of the dissertation document and (2) the Committee's evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal. The Dissertation Defense course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript

VMED100 Animal Anatomy I (3 CH)

The course focuses on the study of the basic structural and comparative anatomy of the main domestic species of animals. It includes study of the gross anatomy of the domestic mammalian and avian muscloskeletal, renal, endocrine, digestive, reproductive, respiratory and nervous systems.

VMED110 Introduction to Veterinary Medicine (3 CH)

This course aims at introducing students to the concept of animal health, care, disease recognition, prevention and biosecurity, as well as the importance and role of veterinary sciences in the human societies. Various types of domestic animals and their use and behavior will be covered. Important concepts such as ethics, animal value and welfare will also be included. Students will be exposed to life skills such as values, attributes, aptitudes, and behaviors that are essential to their success in their careers.

VMED120 Animal Husbandry (3 CH)

This course teaches basic domestic animal husbandry techniques. This includes behavior, restraint, animal biosecurity, basic feeding principles, animal handling, principles of humane care, housing and management (exclusive of reproduction). Also discussed are species and breed identification as well as principles of applied genetics.

VMED150 Animal Anatomy II (4 CH)

This course is a continuation of anatomical study of animals in Anatomy I. The course focuses on the study of the structural, comparative and applied anatomy of the main domestic animal species (large and small ruminants, horse, camel and avian).

Prerequisites

- VMED100

VMED210 Animal Physiology (3 CH)

The course describes the neural and hormonal control mechanisms, biochemistry of muscular contraction, lactation, circulation, respiration, and defense mechanisms of the body.

VMED240 Animal Welfare and Ethics (3 CH)

The normal and abnormal behavior and bionomics of various domestic livestock, companion and laboratory species are examined in this course. Issues of importance to the general welfare of animals are reviewed. Ethical principles governing professional practice and the self-regulatory nature of control within the profession are discussed in relation to malpractice and professional misconduct.

VMED250 Immunity and Infection (Microbiology) I (3 CH)

This course is designed to introduce the veterinary student to the theoretical and practical aspects of microbiology and the correlation between disease and etiological agents. Topics include the study of microorganisms with emphasis on their morphology, physiology, biochemistry, culture and identification. Their importance in the veterinary practice is introduced. Disinfection and sterilization methods are studied as they relate to the handling of micro-organisms, and health related topics associated with them.

VMED260 Neuroscience (3 CH)

This course includes the study of the anatomy of the central nervous system (CNS) as well as peripheral nervous system (PNS), neurologic diseases and principles of the neurological examination, Cerebrospinal fluid sampling and analysis. Neurological syndromes. Disorders of the brain. Vestibular syndromes-deafness. Cerebellar, paroxysmal syndromes. Peripheral neuropathies. Disorders of the spinal cord, neuromuscular junction, autonomous nervous system and myopathies.

Prerequisites

- VMED100

VMED270 Presentation of Selected Clinical Cases (1 CH)

Selected clinical cases will be presented by expertise clinicians. Each presentation will include the history, causes, signs, diagnosis, treatment and prognosis of the discussed clinical case.

VMED280 Immunity and Infection II (3 CH)

The course describes the morphology and classification of viruses. Reproduction and growth characteristics of viruses. Methods of isolation, identification and purification of viruses. Strain variation and pathogenicity of viruses. Important RNA and DNA Viruses of animals, their pathogenicity and diseases they cause. Prions and viroids. Basic immunology – History and definitions, innate immune systems, determinants: mechanical and physicochemical barriers, phagocytes, natural killer cells and soluble factors, complement. Adaptive immune system: fundamental features; development of the immune system; development and differences between T and B lymphocytes; antibody determination, principles of immunological testing, serological tests. Immunological diseases: Hypersensitivities, immunodeficiencies, and auto-immune diseases. The laboratory component of this course includes methods used for isolation and identification of viruses and various immunological assays.

Prerequisites

- VMED250

VMED300 Pharmacology and Toxicology (3 CH)

In this course, the principles of pharmacology, the mechanisms of action, pharmacokinetic properties, and the effects (therapeutic and adverse) produced on the various systems of the body by representative drugs belonging to each pharmacological class of drugs are presented. Species variations in pharmacodynamic activity or pharmacokinetic behavior that contribute to differences in drug dosage requirements are described, and special attention is given to unusual sensitivity of particular animal species (or breeds) to the effects produced by certain drugs. The common toxic agents involving in animal poisoning will also be reviewed.

VMED310 Parasitology (3 CH)

The course focuses on the morphology and biology of parasites of veterinary importance. It considers the pathogenesis, diagnosis, signs, and treatment of parasitic diseases of animals. Study includes the immunologic and pathophysiologic aspects of host/parasite relationships and the importance of zoonotic parasitic infections.

VMED320 Pathology (4 CH)

The course introduces the mechanisms of cellular reaction to injury, inflammation, circulatory disturbances, and neoplasia. It emphasizes mechanisms of disease at the level of cells and tissues. Pathology of specific lesions and diseases of each organ system is discussed at the gross and microscopic level. Emphasis is on diagnostic characteristics of diseases and the interpretation of common findings.

VMED330 Poultry Medicine (3 CH)

The course will introduce and teach the students the diagnosis and management of diseases of different species of poultry. Non-infectious, fungal and bacterial avian diseases: history, aetiology, epidemiology-transmission, clinical signs, gross lesions, diagnosis, differential diagnosis, prevention and treatment. Viral, parasitic and emerging avian diseases, as well as avian diseases of complex or unknown aetiology: history, aetiology, epidemiology-transmission, clinical signs, gross lesions, diagnosis, differential diagnosis, prevention and treatment. Tutorials and clinical classes: Types of vaccines, methods of vaccination in hatchery and farms and monitoring a vaccination program. Training in diagnostic procedures: case history, blood sampling, external examination, necropsy technique

VMED340 Clinical pathology and propaedeutic (3 CH)

The course introduces to clinical pathology and clinical examination techniques of domestic animals. Special consideration will be given to techniques commonly performed in farm animal practice. The course consists of lectures, laboratories and clinical practice.

VMED350 Infectious Diseases (3 CH)

The course defines and discriminates general mechanisms and principles and factors influencing the emergence of infectious diseases. Selected emerging food-borne, bacterial, viral, zoonotic diseases of animals and humans are described and analyzed.

VMED360 Camels and Equine Medicine (3 CH)

This course provides in-depth information about diseases that affect horses and camels. The pathophysiology of prominent diseases will be explained along with methods of diagnosis. Clinical examination of horses and camels. Clinical pharmacology. Vaccination and anthelminthic programs. Endocrine and metabolic disorders. The acute abdomen (colic) in horses. Diseases of the digestive system. Differential diagnosis of major epizootic diseases: strangles, rhinopneumonitis, infectious anemia, equine viral arthritis, influenza. Diseases of the respiratory and the cardiovascular systems. Clinical ophthalmology. Diseases of the nervous, the muscular and the urinary system. Clinical nutrition and treatment. Clinical bacteriology, virology and Skin diseases

VMED370 Histology (3 CH)

The course focuses on introduction of the basic histology and microscopic anatomy of animal organs and the study of domestic mammalian and avian systems such as endocrine, digestive, reproductive, respiratory and nervous systems. Knowledge of the normal structure is necessary to understand the study of abnormal (pathology), which deals with the alteration in the structure and function of the body tissues/organs caused by the disease process.

VMED380 Case Studies I (1 CH)

Students will present a number of clinical cases that had contacted during their practice in Animal Hospital. Each presentation will include the history, causes, signs, diagnosis, treatment and prognosis of the discussed clinical case.

VMED385 Meat Hygiene (2 CH)

This course consists of lecture series supplemented with projected illustrations on meat inspection for bacterial, viral, parasitic infections of slaughtered animals. Detection of chemical residues in meat and poultry, and judgment of fitness of the meat for human consumption are covered.

Prerequisites

- VMED320

VMED390 Training in meat inspection (Slaughter House) (1 CH)

Students will be trained in certified slaughter houses in UAE as meat inspector.

VMED395 Training in Camels & Equine Sport Medicine (Animal Hospital) (1 CH)

Students will be trained to specific cure and treatment for Camel and Equine athletes.

VMED400 Preventive medicine (2 CH)

This course focuses on viral, bacterial and parasitic pathogens of concern in the animals. Pathogens of importance to animal species are covered with special emphasis on farm animal diseases. In addition, diseases of concern to other animals such as swine, ruminants, fish, and birds are also discussed.

VMED410 Surgery (4 CH)

The introductory portion of the course reviews principles of surgery, including asepsis, instrumentation, and surgical techniques. The remainder of the course covers the management and treatment of surgical conditions for domestic animals, including soft tissue, orthopedic, neurologic, and ophthalmic conditions. Introduction to dentistry is also covered in this class.

VMED420 Anesthesiology (2 CH)

In this course, students will gain an understanding of the principles, concepts, and techniques utilized in general and local anesthesia in various small and large animal species, as well as the basic terminology and proper use of anesthetic equipment and monitoring devices.

VMED430 Case Studies II (1 CH)

Students will present a number of clinical cases that had contacted during their practice in Animal Hospital. Each presentation will include the history, causes, signs, diagnosis, treatment and prognosis of the discussed clinical case. In this course series, each student will be asked to present clinical cases concern

different animal species than the cases that the student presented in the Case Studies I.

VMED440 Sheep and goat medicine (3 CH)

The course will discusses diagnosis, treatment, and prevention of medical problems of individual small ruminants, sheep flocks and goat herds. Basic information on breeds, behavior, nutritional requirements, and management systems is supplied. Economically important contagious or metabolic diseases are discussed in depth. The diagnostic evaluation and differential diagnoses for common clinical presentations such as skin disease, neurologic disease, lameness, and mastitis are considered. Herd monitoring of economically important parameters and necropsy diagnosis of abortions and neonatal losses are addressed.

VMED445 Large animals (Cattle & Dairy Cattle) (3 CH)

The course will include diagnosis and treatment of the individual large animals and herd problems, preventive aspects of herd problems, and the regulatory and health aspects of herd management. Emphasis is on the production medicine aspects of herd and flock management of dairy cows. Although the majority of the problems presented will begin with the individual animal case, emphasis will be placed on control and prevention in the flock or herd.

VMED450 Theriogenology (3 CH)

This course deals with the normal reproductive function and management in the domestic animals. Diagnosis and management of reproductive diseases are considered. An advanced study in the breeding management, estrous cycle manipulation, parturition and neonates issues, reproductive disease diagnosis and treatment of common domestic species will be included. An introduction to the new reproductive technologies used in theriogenology will be discussed.

VMED455 Clinical Pharmacology (3 CH)

The course of veterinary clinical pharmacology will present interactions between drugs and animals and apply basic and clinical knowledge to improve rational drug use and patient outcomes. The aim of the program include establishing a functional interface between basic and clinical knowledge,

managing a large quantity of information, and mastering quantitative skills essential to successful drug administration and analysis of drug action.

VMED460 Companion Animal Medicine (2 CH)

The course will provide the student with core knowledge of the history about falcons, distribution and diseases, diagnosis and treatment. Infectious, metabolic and reproductive diseases of falcons. Medical diets, fluid therapy and hospital care designed for falcons.

VMED470 Falcon Medicine (2 CH)

The course will provide the student with core knowledge of the history about falcons, distribution and diseases, diagnosis and treatment. Infectious, metabolic and reproductive diseases of falcons. Medical diets, fluid therapy and hospital care designed for falcons.

VMED475 Exotic and Laboratory Animal Medicine (1 CH)

The program wish to broaden knowledge of advanced medicine and surgery of exotic animals (reptiles, pet birds, small mammals) and laboratory animals. Students will be introduced to concepts concerning the diagnosis, treatment, and management of medical diseases in non-traditional pet species.

VMED490 Training in Clinical Surgery (Animal Hospital) (1 CH)

The training will include conservative and surgical management of various cases, postoperative management, intensive care and hospitalization.

VMED495 Training in Sheep &Goats Med & Surgery (Animal Hospital) (1 CH)

The training will include discussion of clinical cases, farm visits, diagnostic approach and hospitalization of sheep and goats visiting to the Animal Hospital.

VMED510 Opthalmology and Dermatology (2 CH)

The Ophtalmology part will include a presentation of diseases of the eye and orbit, including anatomy, pathophysiology, and medical and surgical management. Congenital and acquired ophthalmic diseases will be considered. The dermatology part will focus on the diagnosis and treatment of animals with benign and malignant disorders of the skin, hair, ears, and nails. This includes evaluating patients for external parasites, allergies, hormonal skin diseases and auto-immune diseases.

VMED520 Diagnostic imagining (2 CH)

In this course principles of radiography will be reviewed, including the various potential hazards of radiation. Radiographic imaging techniques utilized in small and large animal species are described along with other imaging methods such as ultrasonography, CT, and MRI.

VMED530 Seminar in Veterinary Science (1 CH)

The course presents topics of interest, related to various disciplines of veterinary medicine and animal science including physiology, nutrition, reproduction, Biotechnology and medicine. Students will be assigned topics for oral presentation under supervision of course advisors.

VMED580 Senior project (3 CH)

The course is a capstone course to be individually designed by the faculty advisor for each senior student to integrate all courses and training of the student, from all activities involved by the student, during his/her entire stay at UAEU. Research methods, analysis of data collected, interpretation and hypothesis must be developed by the students on a specific topic. A written thesis is to be produced at the end of the course.

VMED590 Internship in Animal Hospital (9 CH)

The purpose of course is to give the student additional hands-on practical experience in a clinical setting in taking a clinical history, performing a physical examinations, creating problem lists, compiling lists of differential diagnosis, formulating diagnostic plans, formulating therapeutic plans, obtaining diagnostic samples, interpreting laboratory reports, discussing treatment options, generating medical records, and discharging patients. Students will be responsible for case follow up. The course will be taught using daily topic and case rounds as well as participation in clinical case management.

College of Humanities and Social Sciences

Arabic Language & Literature

ARAB730 Rhythm in Arabic Poetry (3 CH)

This course focuses on the study of rhythm and rhyme in classical Arabic poetry besides targeting the new tempos integral to blank verse and free verse and the prose poem.

ARB100 Styles of Literary Expression (3 CH)

This course is intended to acquaint students with the various genres of Arabic literature, ancient and modern (poetry, prose, the essay, fiction, biography, drama) and with certain grammatical and linguistic studies to familiarize them with the various modes of literary expression in Arabic. Students will practice writing used in various genres.

ARB105 Creative Writing (3 CH)

This course deals with techniques of creative writing such as story, novel and play. Such writings need, besides the talent, experience and training in order to develop students capability of creative writing.

ARB110 Introduction to Syntax & Morphology (3 CH)

This course deals with studying the Arabic word structure regarding its derivation, affixation, vocalization, etc. It studies, as well, the derivative types, the system of the Arabic nominal sentence and its nuclear constituents, and the different types of both the subject and predicate and their relati; such as anastrophe and the annullers, with a special attention to applications of these issues to the Qur'anic and different literary texts, and analyzing these texts in the light of modern linguistic methods.

ARB115 Womens Literary Theory (3 CH)

This course will look at Literary Theories of the twentieth century. It is this course is a survey of literary theory and it's a particular emphasis on providing

a context for women's theory. The course will also seek to view these theories in relation to Women's studies, with introductions to the most prominent informing theorists in Women's studies, and such topics as 'the relationship between Postmodernism and Women's' Studies.

ARB120 Arabic Rhetoric I (3 CH)

This course is intended to acquaint students with the rhetorical heritage of Arabic as represented by the three disciplines "al-Ma'ani" (Semantics), "al-Bayan" (Eloquence), and "al-Badi" (Art of Metaphors). The course also aims at directing the students' attention to the style of the Holy Qur'an and the aesthetic value of great literary texts.

ARB130 Literary Texts Analysis (3 CH)

This course deals with analyzing a variety of literary texts belonging to several genres from different periods. It aims at acquainting the students with the literary and linguistic analyses in the light of the old and modern analytical methods in language and criticism.

ARB160 General Linguistics (3 CH)

This course provides a survey of modern linguistic theories and their methodologies and applications to ancient and modern texts. It studies the concept of language, its nature and functions, and its psycho-socio-linguistic concepts.

ARB205 Writing and Technology (3 CH)

This course is concerned with connection between writing skill as a means of communication and digital technology which became very common nowadays. Special emphasis will be given to introduce students to the new writing techniques resulting from this connection and its types and characteristics. In addition, this course focuses on consequences of using new technological writing tools mouse – screen instead of that traditional ones pen – sheet and consequences of alteration writing material from simple words to sound and graphics besides words

ARB210 Phonetics (3 CH)

This course introduces students to Arabic phonetics and explains its relation to other branches of linguistics. Students will be trained to pronounce Arabic sounds correctly, distinguish between sounds and functions, understand the causes of sound change, and have some knowledge of the latest developments in the field. The course touches on the sound system of Arabic and the relation between phonetics and phonology, together with the methods of research and the modern apparatus available to teach this science.

Prerequisites

- ARB160

ARB215 Womens Studies & Arabic Literature (3 CH)

The purpose of this course is to introduce students to the Classical sources, methodologies, and the current debates focusing on women in Arabic heritage. The course will investigate social status of women with particular attention to issues of class and ethnicity. Thus, we will also explore the similarities and differences between old and contemporary notions of female identity and the position of women in society.

ARB220 Prosody (3 CH)

This course focuses on the meters of Arabic poetry, its beginnings, parts, changes, rhythm, and rhymes. The course also clarifies the developments of poetic meters and rhythm in different ages (from the age of al-muwashah to the age of the modern, new verse), with various poetic practices.

ARB230 Traditional Literary Criticism (3 CH)

This course is intended to acquaint students with the critical activity of the pre-Islamic, early Islamic, Umayyad, and Abbasids periods in order to familiarize them with its major theoreticians, trends, and issues through a study of the major critical texts

ARB240 Arabic Rhetoric II (3 CH)

This course studies the system of the sentence in Arabic and its semantic characteristics, The Arabic rhetorical heritage where the student may be able to draw on its artistic and aesthetic values and apply the insights of this discipline to texts written in verse and prose selected from all periods, and comparing the achievement of the ancients with the modern critical and stylistic studies in order to combine originality with modernity

Prerequisites

- ARB120

ARB250 Abbasid Literature I (3 CH)

This course surveys the history of poetry in the first Abbasid age and studies the achievements of the major poets of the period, linking them and their poetry to their cultural background. It also clarifies the intellectual, religious, and social phenomena that influenced their literary works.

ARB260 Emirati Literature (3 CH)

This course introduces students to Emirati literature: poetry, fiction, drama, and the essay. It compares the literary, artistic, and aesthetic features of Emirati Literature with Gulf and Arabic Literature. The course discusses the interrelationships of those literatures, which are connected by a common language and religion, but have differences in history, identity, and culture.

ARB270 Modern Arabic Gulf Literature (3 CH)

This course deals with contemporary Arabic literature in the Gulf: its relation to Arabic literature in general, its development, kinds, and trends, with an emphasis on the literature of the United Arab Emirates.

ARB301 Abbasid Literature II (3 CH)

This course studies the major Arabic literary works in the late Abbasid era (4th and 5th century) as an expression of the spirit of the age. It focuses on

intellectual and scientific developments and on literary issues in both poetry and prose.

Prerequisites

- ARB250

ARB305 Professional Writing (3 CH)

This course aims at developing functional writing skills of the students by training them how to write official letters, reports, notes, advertisements, personal invitations, filling out the application form, building curriculum vita resume, and summaries.

ARB311 Syntax II (3 CH)

This course tackles the Arabic verbal sentence regarding its nuclear constituents and the changes to which they submit; such as anastrophe, mentioning and deletion, with studying the sentence complements. It deals also with the prepositions and their meanings, the genitive, subordinators, and the major grammatical styles, with a special attention to applications to the Qur'anic and different literary texts, and analyzing these texts in the light of modern linguistic methods

Prerequisites

- ARB110 with a minimum grade D

ARB315 Modern Women's Literature (3 CH)

This course aims at introducing students to some Women's literary texts and their artistic characteristics. It connects the modern Arabic Women's literature to the international Women's issues. Course wills raises some questions such as: do we have, indeed, a modern Arabic feminist literature? Is that literature influenced by Arabic heritage/ international feminist movements/ local social circumstances? How did this literature arise?

ARB321 Semantics & Arabic Lexicology (3 CH)

This course surveys ancient and modern questions connected with semantics and the various semantic theories that contribute to lexicography, as they are applied to Arabic dictionaries. The study of semantics touches on its theories. Lexicography, on the other hand, is treated as the application of semantics. In addition, the course considers the various schools of Arabic lexicography and their views on meaning and explanation

Prerequisites

- ARB160

ARB343 Pre_Islamic & Islamic Literature (3 CH)

This course explores pre-Islamic poetry, its beginnings, and the influence of the Bedouin and urban environments on it. The course discusses matters like narration, recording, plagiarism, and documentation. This course surveys the literature of the early Islamic period and that of the Umayyads. It discusses the major issues, such as the attitude of Islam towards poetry, texts, and authors, linking them to the historical background

ARB381 Arabic Library / Heritage (3 CH)

This course studies the history of writing and recording the great books in the traditional Arabic heritage. Students also become acquainted with main sources of literature such as the anthologies, collections of poetry, general literary books, biographies, and the great books in language, criticism, syntax, rhetoric, lexicons, and encyclopedias.

ARB401 Philology (3 CH)

This course surveys the philosophy of language among the ancients and the moderns and the effects of these philosophies on matters like homonymy and autonomy. The course also deals with the origins of human language and its development in childhood, and with phonetic, morphological, and grammatical systems.

ARB405 Training Practicum (3 CH)

This practicum course requires students to apply the concepts, knowledge and skills they have acquired in their program studies to careers in education, libraries, diplomacy, journalism, media and cultural institutions. It develops skills required by teachers in lesson design and educational aids, librarians in cataloguing works, and all students in writing and editing official communications. Students are expected to use the university library, attend conferences and general lectures e.g. in the Zayed Center, and other university activities in the preparation of their projects, students will practice three hours a day.

ARB406 Research Methods in Language & Literature (3 CH)

This course focuses on acquainting the students with research in language and Literature regarding its concept, principles, characteristics, importance and sources and references. It introduces students to the methods of research in language and Literature.

ARB413 Arabic Linguistics (3 CH)

This course focuses on the development of the linguistic structure of Arabic and the Arabic of the early Islamic era as described by the early Arab phoneticians. Attention should be paid to the various schools of thought among Arab philologists in the light of modern linguistic theory

Prerequisites

- ARB160

ARB415 Seminar & Research in Women Studies (3 CH)

This course will draws upon the entire body of writing that concerns women in different programs, it may focus on different themes, periods, ideas, or issues related to women’s study and special emphasis will be given to the principal concerns of women in UAE. Each student will be expected to pursue an individual research project making use of primary material, scholarly journals, and other library material

ARB416 Andalusian & Maghribi Literature (3 CH)

This course surveys the literature of these areas and highlights its importance in the history of Arabic literature. It studies the literary relations between the eastern and western parts of the Arab world and stresses some of the new forms (musashshah and zajal) and themes (descriptions of nature, elegies on cities and states, the journey), and gives some attention to the most influential writers of verse and prose.

ARB424 Late Medieval Literature (3 CH)

This course studies the Arabic literature of the new metropolitan areas, the Zinky's to the Ottoman era, and pays particular attention to the forms and patterns arising in the new environments: popular modes of expression reflecting the contemporary state of the Islamic world. Literary texts of different ages in both poetry and prose will be analyzed.

ARB430 Modern Literature Criticism (3 CH)

This course involves a study of the various modern critical theories and their application. The major representatives of each school will receive particular attention and the major issues of criticism will be discussed

ARB436 Ex. in Syntax & Morphology (3 CH)

This course is intended to give practical training in matters covered in the theoretical courses in courses in grammar and morphology that the student has already studied. Its aim is to reinforce the students' theoretical and practical knowledge by helping them to acquire the necessary skills in oral and written expression. The texts chosen will be selected so as to instill in the students' minds the basic patterns of Arabic sentences, both nominal and verbal and to represent the different ages of Arabic language and literature.

Prerequisites

- ARB311

ARB440 Research in the Critical & Rhetorical H (3 CH)

This course encourages students to learn to appreciate our critical and rhetorical heritage by familiarizing them with texts from the major references. Students will study the critical and rhetorical issues raised by these texts and the influence they have exercised on our modern critics. Students are thus expected to approve or disapprove in accordance with objective standards originating in the past but modified by modern endeavors.

ARB444 Modern Arabic Literature (3 CH)

This course covers the rise and development of modern literary genres written in verse and prose and studies some of the major figures and texts. It touches on the following topics with specific analytical readings in poetry, novels, stories, and plays: General influences on modern Arabic literature, causes of development; poetry -- movements and major figures; prose -- forms and major figures.

ARB450 Comparative Literature (3 CH)

This course deals with a major field of literary studies. Comparative literature is an immense field that examines the literature of two or more different languages, cultures, or nations. This course looks at the rich interactions between and among Arabic literatures and English-language literatures, with a focus on the similarities and mutual influences in form, content, theme, characterization, aesthetics, and poetics.

ARB485 Integrated Capstone (3 CH)

This course provides students with basic research skills and enables them to research and investigate literary and linguistic cognitive fields according to their research interests, in addition to theoretical principles related to the process of research and knowledge. The student acquires the required knowledge on practical issues in terms of writing techniques, basics and the effective use of electronic and printed resources.

ARLN714 Issues in Syntax and Morphology (3 CH)

This course explores the complicated intersections between Arabic grammar and other related Islamic sciences such as logic and semantics.

ARLN716 Avant-Garde Trends in Arabic Syntax (3 CH)

This course investigates efforts by Arab grammarians to develop and modernize Arabic syntax . Moreover, the course will also tackle the avant-Garde studies and research works by scholars such as Ebrahim Shawqi Deif , Mahdi Al-Makhzoumi and others.

ARLN718 Seminar on Classical Arabic Language Studies (3 CH)

This course approaches different pivotal issues and major trends related to classical Arabic language studies within the parameters of Arabic language heritage.

ARLN800 Comprehensive Examination (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student's knowledge of his or her discipline, as well as the student's scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. It must be taken before the start of the student's fifth semester in the program. Students taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end of the student's fifth semester. A second unsuccessful attempt leads to immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

ARLN810 Research Proposal (0 CH)

Student prepares a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The Research Proposal course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Corequisites

- ARLN800

ARLN900 Dissertation Research (30 CH)

Student conducts high quality academic research under the direction of his/her supervisor. Student and supervisor shall meet on regular basis and discuss progress and issues related to the student's dissertation research. Furthermore, the student writes an annual report based on a meeting with supervisor and Advisory Committee, in which a review is conducted to determine progress, identify problems, and project dates for completion of various tasks. The research shall represent original contribution to human knowledge in the particular academic field and is presented in a written research dissertation of a publishable standard. The document shall also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the College of Graduate Studies.

ARLN910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based on two main parts: (1) the Committee's evaluation of the dissertation document and (2) the Committee's evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal. The Dissertation Defense course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

ARLT704 Trends in Classical Literature (3 CH)

This course traces the most significant trends in Arabic poetry and prose from the pre-Islamic period until the Andalusian era.

ARLT706 Schools of Comparative Literature (3 CH)

This course deals with major comparative literature schools encompassing American, French, German and Russian literatures. The courses also studies

areas of mutual influence among these schools. Furthermore, the course engages comparative zones such as literary translation, Orientalism and intertextuality.

ARLT708 Modern Issues in Literary Criticism (3 CH)

This course tackles contemporary literary theory from different perspectives including controversy over literary terminology, methodology and current critical trends integral to the criticism of poetry and prose.

ARLT710 Seminar in Classical Arabic Criticism (3 CH)

The seminar examines the genesis and evolution of classical Arabic criticism . Besides investigating the impact of foreign critical movements on Arabic criticism , the seminar aesthetically articulates the hermeneutics of interpretation including the text of the holy Quran. Further, the course critically approaches several classical poetic collections interrogating plagiarism in poetry and questioning the critical attitudes toward Al-Mutanabi and Abu-Tammam.

ARLT800 Comprehensive Examination (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student's knowledge of his or her discipline, as well as the student's scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. It must be taken before the start of the student's fifth semester in the program. Students taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end of the student's fifth semester. A second unsuccessful attempt leads to immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

ARLT810 Research Proposal (0 CH)

Student prepares a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work.

The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The Research Proposal course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Corequisites

- ARLT800

ARLT900 Dissertation Research (30 CH)

Student conducts high quality academic research under the direction of his/her supervisor. Student and supervisor shall meet on regular basis and discuss progress and issues related to the student's dissertation research. Furthermore, the student writes an annual report based on a meeting with supervisor and Advisory Committee, in which a review is conducted to determine progress, identify problems, and project dates for completion of various tasks. The research shall represent original contribution to human knowledge in the particular academic field and is presented in a written research dissertation of a publishable standard. The document shall also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the College of Graduate Studies.

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Languages and Literature

CHIN101 Beginning Chinese I (3 CH)

The course is designed for students with no prior knowledge of Chinese. Students will be familiarized with the language and some aspects of Chinese culture through systematic introduction of Chinese sound system (pinyin), basic grammar structure, character, and short passages or dialogues dealing with different topics related to the Chinese daily life, using audiovisual materials. Students will be exposed to basic vocabulary, grammar, and communication skills. Understanding of 200 characters related to daily life and school life and mastery 100 common Chinese characters are targeted in the course.

CHIN102 Beginning Chinese II (3 CH)

The course is a continuation of course CHIN 101. It is designed to enhance the four basic skills acquired in the previous course. Students will read texts about the Chinese language and culture faster and with more confidence. They will be able to describe and exchange more information in essential topic, acquire preliminary cross-cultural awareness and expand international perspectives. Emphasis will also be placed on the introduction of Chinese character writing and some elementary calligraphy, reading and writing. Understanding of 400 characters related to daily life and school life and mastery of 200 common Chinese characters are the specific objective of the course.

Prerequisites

- CHIN101

CHIN201 Intermediate Chinese I (3 CH)

This course is designed to improve student's communicative ability as well as grammatical accuracy by adding more complex, literary grammatical structures, as well as the discussion of contemporary cultural and political themes. Understanding of 600 characters and mastery of 300 common Chinese characters are the specific objective of the course.

Prerequisites

- CHIN102

CHIN202 Intermediate Chinese II (3 CH)

The course is a continuation of the course CHIN 201. It is designed to enhance the four basic skills acquired in the previous course. Students will be able to use complex grammatical structures and sentence patterns to communicate on most familiar topics through interaction and description. They can compose brief passages to express themselves clearly and their Chinese cultural knowledge are enhanced through more reading. Understanding of 800 characters and mastery of 400 common Chinese characters are the specific objective of the course.

Prerequisites

- CHIN201

CHIN301 Introduction to Chinese Culture (in English) (3 CH)

This course is an intensive introduction course for students who wish to build a solid foundation for the study of Chinese language and culture. It aims to develop students' appreciation and awareness of Chinese culture through 12 themed topics from a historical perspective. It will engage students in the exploration of various aspects of Chinese cultures, such as Chinese literature, Chinese festival, etc. through different instructional materials such as textbooks, ppt slides, sound and video clips, films, excerpted written texts…. This course will be taught exclusively in English for better understanding of Chinese culture and customs.

Prerequisites

- CHIN102

CHIN302 Business Chinese (3 CH)

This course is designed for students with certain background in Chinese language and who are interested in doing business in or with China. It is a language course which aims to enhance students' language skills under the context of business communication and promote their understanding of Chinese business environment and culture. This course will cover 12 units of business situation modules to describe the entire process and each phase of business activities. Each unit is divided into six sections, namely Cultural tip,

Words and Expressions, Practice makes perfect, Dialogues, Practice activities and Practical Chinese.

Prerequisites

- CHIN102

CHIN401 Advanced Chinese (3 CH)

This course is designed for non-native Mandarin speakers who have attained a fairly good mastery of basic Mandarin Chinese. It sharpens students' speech making, reading and writing skills through advanced Chinese readings on culture, civilization and society, with an emphasis on vocabulary, grammar and syntax. It also enhances students' cultural knowledge and awareness through a variety of carefully designed practices and activities. This course is taught predominantly in Chinese. Credit Hours: 3.000

Prerequisites

- CHIN202

CHIN402 Chinese Language and Culture (3 CH)

This course is designed for students who would like to pursue further study of Chinese Language and Culture after finishing the core courses of CHIN 101 to CHIN 202. The guiding principle for designing this course is to help students understand the breadth of Chinese culture and its importance to human civilization. It covers 12 topics with Chinese language and culture through short passages or dialogues related to Chinese daily lives, which are arranged from elementary to advanced hierarchy. In each of the lessons, it's divided into knowledge section including characters, words and phrases, key sentences and activities, and culture window, in which the history or other background knowledge, idioms and proverbs are included. This course is taught predominantly in Chinese.

Prerequisites

- CHIN202

CHSS700 Research Methods and Ethics (3 CH)

A practical and comparative overview of old and new research methods, with special attention to individual case studies and resources in the humanities and social sciences. Issues of field expertise, interdisciplinary, collaboration, qualitative/quantitative paradigms and data generation and use, as well as archival, laboratory and community work are considered along with questions of epistemology and ethics.

CHSS702 Critical Reading and Writing (3 CH)

This course focuses on the critical thinking, reading and writing needed to evaluate, write and discuss texts/papers and research proposals at postgraduate level. Students develop their ability to recognize and discuss ideas by relating generalization to supporting ideas and identifying the patterns into which ideas are structured.

DRA260 Practical Introduction to Theatre TA (3 CH)

Drawing first from the classic repertoire and then exploring the modern theatre, students will read a selection of works that will first expose them to the ways in which writers have envisioned their plays and the societal contexts from which these plays emerged. The next challenge will be to research how these plays were directed and the responses garnered by either reviews or by critical analysis. This approach will be complimented by the staging of certain scenes from the selected plays in order to give students a practical experience as to how the text is transformed from literature to performance.

DRA265 Approaches to Drama TA (3 CH)

This course will explore both the theoretical and practical component aspects of questions such as What are the seminal dramatic texts of the 20th century? What are the social, political, topical and cultural issues that have been expressed through the dramatic medium? What is the connection between the text and the execution of the dramatic material and how does a play provide the bridge between a society and its analysis of itself?. Drawing first from the classic repertoire and then exploring the modern theatre, students will read a selection of works that will first expose them to the ways in which writers have envisioned their plays and the societal contexts from which these plays emerged.

DRA360 Fundamentals of Stage Prod TA (3 CH)

This course takes place in the first semester of the fourth year and covers preparation for production from script selection and writing to the technical aspects of production progressing towards performance. It is primarily the preparatory course for the practicum and will include the roles involved in stage production, the writing of scripts as educational material, full-scale production or traveling theatre for schools. There will be visits to theatres to see theatre in action if it can be arranged.

DRA365 Drama in Education TA (3 CH)

This course will examine the fundamentals of both theatre-in-education (TIE) and drama-in-education (DIE). Students will explore how social, topical, political and cultural issues, be they historical or contemporary, can be illuminated and made three-dimensional though the use of recreation, mimesis, role-playing and drama.

DRA370 Playwriting & Performance in Arabic (3 CH)

This course will use the work of contemporary Arab playwrights, in translation, to illustrate the playwriting process. There will a strong emphasis on interpretation through dramatic reading and performance. Visits to Sharjah Theatre Festival and/or other performance venues will be arranged.

DRA460 Practicum Drama TA (3 CH)

This the culmination of the sequence of courses and involves the real-life outcomes in terms of planning, production, performance and self-evaluation, reflecting the gamut of skills and knowledge acquired by the student throughout the Drama Track. Specifically it builds on Fundamentals of Stage Production.

Prerequisites

- DRA260
- DRA265
- DRA365
- DRA360

ELAN750 Stylistics (3 CH)

The stylistic course will approach literary texts from different stylistic perspectives providing significant insights into literary interpretation and hermeneutics of style. The course will identify the pivotal concepts and most significant analytical frameworks in language and stylistics studies. Literary and non-literary texts will be examined within the joint parameters of literary criticism and stylistic analysis to integrate theory and practice. The course will also introduce the major principles of stylistic research within contemporary theories on style culminating in the analysis of language integral to literary texts in the three genres of poetry, prose and drama in addition to other non-literary discourses. As an application of stylistic theory to literary texts the course will methodically explore current trends in research on the intersection between language and literature.

ELAN782 World English (3 CH)

This course examines linguistic and cultural diversity in the English-speaking world. Through the study of literary and non-literary texts and their cultural contexts, students will gain insights into different forms and functions of language use, and into relationships between English and the indigenous languages of Terranglia. The development of English as a global language is the point of departure for these inquiries.

ELAN786 Roots of Modern English (3 CH)

This course examines the development of Modern English from its earliest roots. Students will trace the changes and the continuity of English language use in speaking and writing, from the Middle Ages to the present day. The nexus between language change and evolving concepts of Englishness deserves special attention throughout the debates, which simultaneously look to explain the growing significance English has gained across contemporary societies.

ELAN800 Comprehensive Exam (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student's knowledge of his or her discipline, as well as the student's scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. It must be taken before the start of the student's fifth semester in the program. Students

taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end of the student's fifth semester. A second unsuccessful attempt leads to immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

ELAN810 Research Proposal (0 CH)

Student prepares a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The Research Proposal course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

ELAN900 Dissertation Research (30 CH)

Student conducts high quality academic research under the direction of his/her supervisor. Student and supervisor shall meet on regular basis and discuss progress and issues related to the student's dissertation research. Furthermore, the student writes an annual report based on a meeting with supervisor and Advisory Committee, in which a review is conducted to determine progress, identify problems, and project dates for completion of various tasks. The research shall represent original contribution to human knowledge in the particular academic field and is presented in a written research dissertation of a publishable standard. The document shall also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the College of Graduate Studies.

ELAN910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based

on two main parts: (1) the Committee's evaluation of the dissertation document and (2) the Committee's evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal. The Dissertation Defense course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

ELIT710 Classicism/s (3 CH)

This course studies forms of literary classicism in various periods and traditions. Students will become acquainted with the roots of classicism in Greek and Roman antiquity, and then analyze the roles of Classical heritage in Europe and other parts of the world. Considerations of neo- as well as anti-classicism will supplement investigations of classicisms in non-European contexts such as Arabic or East Asian cultures.

ELIT740 Modernism/s (3 CH)

This course provides a comparative study of the rise and development of modernism in the 20th century, both in the so-called West and in parts of the world not usually included in this category. Considerations based on text analysis challenge the conventional assumption that modernism is born in and confined to the West. Studies of modernism in the East and in the "developing world" suggest an understanding of modernism as a global literary movement.

ELIT790 Literary Theory (3 CH)

This course provides grounds for critical reflection on the development of literary criticism. Understanding the main characteristics of movements such as formalism, structuralism, post-structuralism, post-colonial and gender-based criticism will lead to the recognition of their intersections on the one hand, and to detailed scrutiny of selected samples on the other. Specific jargon and technical terms distinguish theoretical discourse from the language studied in seminars revolving around primary sources.

ELIT800 Comprehensive Exam (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student's knowledge of his or her

discipline, as well as the student's scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. It must be taken before the start of the student's fifth semester in the program. Students taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end of the student's fifth semester. A second unsuccessful attempt leads to immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript

ELIT810 Research Proposal (0 CH)

Student prepares a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The Research Proposal course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Corequisites

- ELIT800

ELIT900 Dissertation Research (30 CH)

Student conducts high quality academic research under the direction of his/her supervisor. Student and supervisor shall meet on regular basis and discuss progress and issues related to the student's dissertation research. Furthermore, the student writes an annual report based on a meeting with supervisor and Advisory Committee, in which a review is conducted to determine progress, identify problems, and project dates for completion of various tasks. The research shall represent original contribution to human knowledge in the particular academic field and is presented in a written research dissertation of a publishable standard. The document shall also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The physical form of the dissertation must comply with the regulations stated in the Thesis and

Dissertation Preparation Guidelines, issued by the College of Graduate Studies.

ELIT910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based on two main parts: (1) the Committee's evaluation of the dissertation document and (2) the Committee's evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal. The Dissertation Defense course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

ENG210 College Reading and Writing (3 CH)

This course offers an intensive introduction to university-level reading and writing while also including verbal presentation and practice. It emphasizes comprehension (reading and listening for understanding), classification (identifying elements, strategies, and disciplines), and articulation (speaking and writing to communicate knowledge). Assessments will include quizzes, in-class writing, short essays, and presentations.

ENG250 English Grammar & Usage (3 CH)

This course is designed to activate the beginning student's passive language base and make him/her more conscious of the basic formal workings of grammar in English. Emphasis is on grammar use in oral and written communication.

ENG300 Critical Reading in the Disciplines (3 CH)

This course focuses on enhancing listening and speaking skills for academic purposes. Through the use of recorded lectures from a variety of academic disciplines, the course provides instruction and practice in accurate and concise note taking and in the recognition of key components to an academic

lecture. Students also receive instruction and practice in formal oral presentation skills which incorporate the use of visual media.

ENG310 Writing for Research (3 CH)

This course gives students a solid background in the writing process by focusing on the conventions of academic discourse and genre. It covers the rhetorical principles used to produce clear, well-reasoned argument and the academic conventions of style, cohesion and mechanical correctness. Assignments are based on readings in and discussions of literature, language and society.

ENG312 Cultural Literacy: English in the World (3 CH)

This course builds on the concerns of Writing 1 with increasingly sophisticated readings and assignments. It focuses on the critical evaluation of rhetorical principles used in persuasive papers, recognition and evaluation of arguments, effective conventions of style, cohesion, coherence, citation and mechanical correctness. Assignments are based on discussions of authentic sources in literature, language and society.

Prerequisites

- ENG310 with a minimum grade D

ENG450 Public Speaking and Debate (3 CH)

This course builds on the concerns of Writing 1 with increasingly sophisticated readings and assignments. It focuses on the critical evaluation of rhetorical principles used in persuasive papers, recognition and evaluation of arguments, effective conventions of style, cohesion, coherence, citation and mechanical correctness. Assignments are based on discussions of authentic sources in literature, language and society.

Prerequisites

- ENG300 with a minimum grade D

ENG454 Practicum: Writing for the Workplace (3 CH)

This course focuses on developing, organizing, writing and editing materials appropriate for professional and/or advanced academic use. You will learn and practice elements of effective writing for professional purposes, and be able to demonstrate the ability to a) write critically for purposes unique to your career objectives and b) present that material in context-appropriate ways, either for presentation or circulation. This course is designed for students with clear career goals and expectations to enter professional life within the year.

ENG489 Integrated Capstone (3 CH)

This course provides students with core knowledge, attitudes and skills to help them succeed in their lives and careers and to enhance their capacity for teamwork, leadership and innovation that will help them to successfully guide the economic, social and cultural development of the UAE.

Prerequisites

- LIT300 with a minimum grade D

ENGL716 World Diasporic Literature (3 CH)

This course will explore World Literature with an emphasis on the concept of Diaspora. This concept is relevant for the literary representation of, for example, Arab communities outside the Middle East. Diasporic literature foregrounds questions of cultural identity, and the choice of language often plays a crucial role. Close readings of selected texts will scrutinize the ways in which a sense of location, notions of home and exile, and cross-cultural interaction are portrayed.

ENGL720 Romanticism/s (3 CH)

This course investigates one of the most important movements in the global literary history of recent centuries. A critical overview of definitions and accounts of romanticism derives from readings of selected primary texts. A major focus of discussion will be the question to what extent a transnational or even a universal concept derives from romanticism’s encounters with realism/s. Inquiries revolve around the use of language in these distinct yet complimentary literary styles.

ENGL721 Literary Renaissances (3 CH)

At a time when anti-humanist postmodernist approaches have inflicted a great damage on literary studies by questioning the very notion of a humanist Renaissance, this course focuses not only on the European Renaissance and on the Renaissance of Islamic civilization with which it had immediate and direct links as a powerful precursor, but also on similar cultural movements in other parts of the world. The course will explore in detail the literary aspect of these renaissances.

ENGL745 Poetry and Poetics (3 CH)

This course examines poetic practice in different cultures and periods, in relation to descriptive as well as normative aspects of relevant theories. Students will explore the dialectics between Poetry as it is written and read, and Poetics as the conceptualization of what the essence of poetry is, and what poetry can or should be. The inquiry illuminates the concept of poetic language.

ENGL755 Fiction and Narrativity (3 CH)

This course examines fiction in relation to other forms of narrative discourse. Students will explore the relationship between fictional storytelling and historical, cultural, or ideological narratives and their functions in constituting communal identities, as well as in underpinning diverse hierarchic and hegemonic claims or practices. Selected texts will demonstrate original prosaic use of language.

ENGL765 Language and Performance (3 CH)

This course gives students a thorough foundation of drama and dramatic theory within a range of regions including, but not limited to British, American, Arab, African, and/or Asian. As one of the earliest forms of artistic literary expression, drama provides a visual insight into a culture. Students will gain an understanding of performance and learn how to apply theoretical frameworks to plays of the period. They will further comprehend theatrical elements of language such as dialogue and oratory.

ENGL770 Cinema Studies (3 CH)

This course analyses ways in which cinematography, editing and other basic elements of filmmaking allow for the telling of stories on screen. Selected films from different industries illustrate milestones in film history, different genres in cinema, and the capability of movies to represent and shape culture. Students will understand the basic vocabulary for film analysis, along with the unique team effort that successful film production requires.

ENGL785 Literature and Culture (3 CH)

This course will provide students with the analytical skills needed to critique the literature and culture of a given population. Popular culture, folklore, and songs for example, are important rhetorical components of society that are usually not produced in written format, but are nonetheless important to contemporary literary critics. This course provides students with the opportunity to explore the expansion of the word “text” from book to include other items of analysis.

ENGL793 Women’s Literacy Voices (3 CH)

In this course students will have an opportunity to analyze the theoretical concerns, foundational texts, and critical discourses of women voices in speeches, fiction, poetry, drama, film, and essays. Literary works by women have often been pushed to the margins and in this course we aim to move women from the margin to the center. This course may focus on particular trailblazers and trendsetters, a geographical region, or a historical tradition established by women intellectuals.

EWR215 Advanced Composition TA (3 CH)

Students consider writing and reading strategies, starting with the concrete, then progressing from representation to image. The student will study composition and rhetoric, theory of composition, essays that express contingencies of the theme (representations of global economy), and documentaries. Written language is complemented by oral language in various stages of the process and in editing. Concentration is on transition from narrative to argument.

EWR380 Creative Writing Non-fiction (3 CH)

This course will expose students to various forms of biographical and autobiographical writings, as well as to the concept of the bildungsroman. The major products of this course will be a personal diary, as well as a family history and/or a biography of someone beyond the student's personal circle of acquaintances.

EWR390 Creative Writing Fiction (3 CH)

This course will encourage students of English to explore and develop their talents as creative writers. The UAE has a strong tradition of fiction, poetry and story telling, and this course will endeavour to draw out both student's excellent sense of historicity and their innate ability in fiction and poetry. The process of discovering how fiction is created will provide them with a more intimate knowledge of the English language and empower them to express themselves more fully.

EWR395 Tech & Prof Writing TA (3 CH)

Students start with the assumptions of personas in the worlds of business, government, society, health, law, education etc. They will learn to write texts via assuming the reality of a profession or business that they wish to pursue. The memos, letters, job applications, reports, and feasibility studies that they write will grow out of the company, agency or organization they fictitiously represent. Students will learn the relationships between texts and the existential actualities of human life, politics, societies and events.

EWR480 Practicum Writing (3 CH)

The Practicum in Professional Writing is in effect the capstone of all the Thematic Applications (Writing) courses. It is a supervised working-and-learning experience in professional writing, editing, correspondence, and research under the supervision of a University faculty member and an employer (a participating company and/or governmental agency). A minimum of 12, maximum of 20 hours a week of a student's time is expected during the academic semester.

FCH260 Listening & Speaking (3 CH)

This course is designed for students with no prior knowledge of French language. It introduces them to listening and speaking skills for business and academic purposes. Listening is a receptive process that develops comprehension of oral French. Speaking is an interactive process in which students learn to communicate and react properly in real-life contexts. The course aims to develop a competency in spoken French by teaching students listening and speaking strategies and through appropriate application of vocabulary, grammar and pronunciation.

FCH270 French Language & Culture I (3 CH)

The course is designed for students with no prior or limited knowledge of French. The students will be familiarized with the language and the culture through short dialogues, short texts and reports dealing with different topics related to French daily life, using audiovisual material, thus allowing the acquisition in situation of the basis of vocabulary, grammar and communication skills. Emphasis will be placed on the fundamentals of French pronunciation, grammar and culture through a balanced development of the four skill.

FCH272 French Language & Culture II (3 CH)

As a continuation of French Language and Culture I, the course will give a global approach to the culture through authentic documents and longer texts presenting French culture and customs, while allowing long-term memorization, reuse of language fundamentals, as well as implementation of a spoken and written competence. The learning of vocabulary, structures and grammar will be integrated into the various situations in which students will be required to function but will not be isolated in a separate strand

Prerequisites

- FCH270

FCH303 Advanced Listening & Speaking (3 CH)

The goal of the course is to develop the competence in spoken French already gained in the course "Listening and Speaking" and to help students use this competence in working on different oral forms like conversations or interviews.

The work will consist of oral comprehension and expression in interaction (in the form of debates or dialogue) based on authentic audio documents.

Prerequisites

- FCH260 with a minimum grade D

FCH321 Reading & Writing I (3 CH)

The course is designed for students with limited knowledge of French (not absolute beginners). They will develop a written French competence by acquiring efficient reading and writing strategies, and using simple, correct, and appropriate vocabulary and grammar. The work will consist of comprehension of documents dealing with daily life and customs. Students are expected to master basic written communication with proper punctuation, language level, and a given form. Emphasis will also be placed on the mastering of French grammar.

Prerequisites

- FCH260 or FCH270

FCH401 Advanced Reading & Writing (3 CH)

The course aims to develop written French competence gained in "Reading and Writing". The work consists of comprehension and guided analysis of authentic texts, dealing with topics on France and the francophone world (work, studies, transports, institutions, daily life, cultural and artistic life). Students will also be trained to identify intentions and opinions expressed in a written document and to express in writing an attitude or a personal statement over a basic topic of discussion.

Prerequisites

- FCH321 with a minimum grade D

FCH411 Introduction to Translation FR (3 CH)

After the study of standard French, this course will introduce students to the basic theoretical principles of translation. Attention will be paid to vocabulary, intelligent use of a dictionary, and inferring word-meanings from context. The course provides practice for translating and proposes selected texts which provide a variety of subject matter and style, in addition to being relevant to the students' interests and needs.

FCH442 Translation of Texts from & to French (3 CH)

This course will develop students' translating ability by exposing them to a large range of texts. Topics for translation will become include economics, business, culture, sociology, literature, etc. Special emphasis will be laid on rhetorical/textual and stylistic differences between French and other languages. The course is designed to familiarize students with specific uses of French in different situations. This course will introduce students to the skills and technological competencies that will be required for future work in each area.

FIL240 Introduction to Film & Visual Studies TA (3 CH)

This course will introduce visual language, focusing on formal structures of film such as photography, framing, camera movement, staging, mise-en-scene, literary design, sound design, editing, acting, and scenic art design. It will also address the use of film as a conveyor of cultural information through genre, gender representation and film movements, using basic film theories.

FIL245 Film & Culture World Cinema TA (3 CH)

This course will provide an overview of national film traditions around the world and how they reflect the concerns of their respective societies on a social, political and cultural level. National cinemas will be viewed historically, theoretically and critically, and will focus on Third World Cinemas and the major film industries.

FIL312 Animation Filmmaking (3 CH)

This course studies the history of animated filmmaking, and trains students to create their own short animation movie. Sequences of images in temporal

succession can already be found in ancient Egyptian murals. Following the invention of the magic lantern, flip books and finally the cinematograph, early ‘trick films’ slowly developed into cartoons, such as Walt Disney interpretations of popular fairy tales. Distinctly different styles and themes have been popularized in other industries, for example in Japan. Computer-generated imagery was introduced by Toy Story in the early 90s and has since become widespread entertainment. Several web pages and specific software now assist in the production of animation movies. With a focus on practical application, students in this course learn about the main stages in the development of this unique genre.

Prerequisites

- ART201
- ART301

FIL340 Developing Ideas for Film (3 CH)

Students will learn to draw on personal experiences to create characters and stories. They will also analyze and apply the art of adaptation. The skills developed in the course will be utilized to generate short film scripts.

FIL345 Principles of Screenwriting TA (3 CH)

Students will apply the aesthetic and cultural principles previously covered and produce their own scripts. Emphasis will be on cultivating a creative identity, further developing story ideas and generating short scripts, completing the pre-production for future script filming.

FIL350 Cinema in the Arab World TA (3 CH)

This course, designed to be delivered in conjunction with the Program of Arabic Language and Literature, will provide an overview of Arab societies as they are reflected in their cinematic traditions historically, theoretically and critically.

GER100 German I for Beginners (3 CH)

The course is designed for students with no prior knowledge of German. Students will become familiar with German language and culture through short passages or dialogues related to standard situations encountered in Germany, using audiovisual material. The course does not only teach basic language skills, but also builds up vocabulary, conveys basic grammatical rules and concepts, and fosters communication skills. The attention paid to each of the four basic language skills, listening, speaking, reading, and writing, is carefully attuned to the goal of creating a balanced competence profile.

GER102 German II for Beginners (3 CH)

The course continues to build up the four basic language skills. Students will read language texts about Germany's language and culture faster and with more confidence. The course will adopt a communicative approach allowing students to formulate their own arguments about German culture, and document this in writing. While listening and speaking are at the centre of the curriculum, the course will also contain rigorous materials related to central grammatical properties of contemporary German.

GER202 Intermediate German (3 CH)

Moving beyond the basic acquisition stage, this course helps improve student competence and introduces them to more high-level registers of the language. Compound and complex sentences will be emphasized and grammatical categories of contemporary German will be discussed and related to materials acquired previously. In spite of a greater focus on complex syntax and textual materials, all four language skills, i.e. listening, speaking, reading, and writing, will continue to be developed in an integrated fashion.

Prerequisites

- GER100 with a minimum grade D
- GER102 with a minimum grade D

GER301 Advanced German (3 CH)

This course fosters active communication skills in order to further develop communicative competence in spoken German. Using authentic materials from a variety of sources, students analyze media audiovisual and text-based

reports in the target language, engage in discussion, and present written arguments in the target language. The work consists of oral comprehension based on authentic audio documents. Students will be introduced to key tools for vocabulary building and interacting with target-language texts.

Prerequisites

- GER202 with a minimum grade D

GER302 German Language and Culture (3 CH)

Unlike the previous courses, this course provides an introduction to contemporary German culture, which is explored in a comparative perspective. Germany's recent history, society and political system will receive adequate coverage, as will highlights of both its traditional and its contemporary cultural production in a narrower sense. On the basis of mass media sources, fiction, folklore, commercials, and promotional material, the students will gain authentic insights into what contemporary Germany is about, while further developing their language skills.

Prerequisites

- GER100 with a minimum grade D
- GER102 with a minimum grade D

GER401 Reading and Writing (GER) (3 CH)

The course aim to develop the written German competence and using it in different forms: text reformulation, text précis and document synthesis. The work consists of comprehension, guided analysis and reformulation of authentic texts, dealing with topics on Germany (work, studies, transports, institutions, daily life, cultural and artistic life). Various text types will be covered, including newspaper articles & reports, online resources and short stories. Students will exercise skills of discussion and presentation and express their views and make comparisons.

Prerequisites

- GER100 with a minimum grade D
- GER102 with a minimum grade D

GER411 Intro to Translation (GER) (3 CH)

After the study of standard German, this course will introduce students to the basic theoretical principles of translation, with particular attention paid to the pragmatic, syntactic and lexical peculiarities of the language. Attention will be paid to vocabulary, intelligent use of a dictionary, and inferring word-meanings from context. The course provides practice for translating and proposes selected texts which provide a variety of subject matter and style, in addition to being relevant to the students' interests and needs.

GER416 Trans of Texts from & in GER (3 CH)

This course is an extension of Introduction to Translation. It will develop students' translating ability by introducing them to a large range of texts. Topics for translation from and into German will become more varied and include economics, business, culture, sociology, without excluding literary texts. Special emphasis will be laid on the rhetorical, textual and stylistic differences between German and other languages.

KOR100 Korean I for Beginners (3 CH)

The course is designed for students with no prior knowledge of Korean. Students will be familiarized with the language and the culture through short passages or dialogues dealing with different topics related to the Korean daily life, using audiovisual material. It is designed to allow students to acquire, not only the basic language skills, but also the basic vocabulary, grammar, and communication skills. Complex sentences and grammar will be covered while the basics are reviewed. Balancing four language skills -- listening, speaking, reading, and writing is emphasized.

KOR102 Korean II for Beginners (3 CH)

The course is a continuation of KOR 100. It is designed to enhance the four basic skills acquired in the previous course. . Students will read texts about the Korean language and the culture faster and with more confidence. They will also be taught how to write and argue about different topics related to the Korean culture. Skills such as vocabulary, grammar, and communication skills will be emphasized. Emphasis will also be placed on the simple sentence, while balancing the listening and speaking aspects of the language.

Prerequisites

- KOR100 with a minimum grade D

KOR202 Intermediate Korean (3 CH)

After students learn the basic skills, this course is designed to help students improve their competence and move them into a higher level. Compound and complex sentences will be emphasized and the Korean grammatical categories will be discussed in the light of the basics they learned. While the focus will be on the compound and complete sentences along with the grammatical categories of the Korean language, emphasis will be placed on the four language skills, i.e. listening, speaking, reading, and writing.

Prerequisites

- KOR100 with a minimum grade D or KOR202 with a minimum grade D

KOR301 Advanced Korean (3 CH)

The course is designed to develop students' competence in spoken Korean language via active skills of conversation. Students work on various oral forms such as arguments, media reports, etc. The work consists of oral comprehension based on authentic audio documents. Students will be encouraged to build up their own vocabularies and master techniques of reporting and synthesizing a text.

Prerequisites

- KOR202 with a minimum grade D

KOR302 Korean Language and Culture (3 CH)

After students develop their listening, speaking and writing skills, they will be introduced to a higher level of reading and writing. Cultural concepts will be introduced. Students will be asked to write about different aspects of the Korean culture, compared to their own. Emphasis will be placed on a deeper level of understanding Korea and its people. Korean socio cultural issues will

be discussed such as mass media sources, fiction, folklore, commercials, promotional material, etc.

Prerequisites

- KOR100 with a minimum grade D

KOR401 Reading and Writing (Korean) (3 CH)

This course is to advance students' reading and writing skills to the higher level and to promote a better understanding of the Korean language, culture, society, and history. Emphasis will be placed on reading and understanding. Readings cover various types of texts such as newspaper articles, news reports, literary short stories, etc. Emphasis will also be placed on discussion and presentation skills in formal settings such as academic and professional settings.

Prerequisites

- KOR202 with a minimum grade D

KOR411 Introduction to Translation (Korean) (3 CH)

After the study of standard Korean, this course will introduce students to the basic theoretical principles of translation. Attention will be paid to vocabulary, intelligent use of a dictionary, and inferring word-meanings from context. The course provides practice for translating and proposes selected texts which provide a variety of subject matter and style, in addition to being relevant to the students’ interests and needs.

KOR416 Transation of Short Texts into Korean (3 CH)

This course is an extension of Introduction to Translation. It will develop students’ translating ability by introducing them to a large range of texts. Topics for translation from or into Korean will become more varied and include economics, business, culture, sociology, etc. (literary texts will not be excluded). Special emphasis will be laid on the rhetorical/textual and stylistic differences between Korean and other languages.

LIT150 Introduction to Literature (3 CH)

This course introduces beginners to the three major genres of literature: poetry, fiction, and drama. It acquaints them with the basic concepts and terms with which to discuss literature. The course covers a wide selection of texts from all periods.

LIT200 Writing About literature (3 CH)

This course emphasizes the techniques and methods essential to writing a thoughtful, carefully written, and well-designed essay. It comprises three main foci in terms of the principal structural states of the unified essay: the beginning, the body, and the conclusion.

LIT220 Survey of British Literature (3 CH)

This course is designed to introduce students to English literature from the Elizabethan period through the twentieth century and will focus on the development of various literary genres, as well as on the works of the most significant literary figures.

Prerequisites

- LIT150

LIT240 Survey of American Literature (3 CH)

This course is designed to introduce students to American literature from the 17th through the twentieth centuries, focusing on major figures, differing literary genres, and shifting definitions of national identity.

Prerequisites

- LIT150

LIT300 Methods of Research in Literary Study (3 CH)

This course is intended to make students knowledgeable and effective at using the computer and library resources for producing a complete research paper. The focus of this course is also on other areas of professional writing, such as descriptive and analytical bibliography, note-taking, editing and rewriting of manuscripts, literature reviewing, and the ethics of documenting a paper.

Prerequisites

- LIT220 with a minimum grade D or LIT240 with a minimum grade D

LIT320 Elizabethan & 17th Century Literature (3 CH)

This course acquaints students with the various forms of literature produced by the major dramatists (e.g. Shakespeare), poets (particularly the Metaphysical poets), and prose writers (e.g. Sidney and Bacon) as well as with the cultural background of Elizabeth Literature.

Prerequisites

- LIT150 with a minimum grade D
- LIT220

LIT330 Romantic & Victorian Literature (3 CH)

This course introduces students to the romantic Movement and the literature of the Victorian period, including poetry, fiction, and essays.

Prerequisites

- LIT150
- LIT220 with a minimum grade D

LIT335 20th Century British Literature (3 CH)

This course examines key writers of this century, with an emphasis on thematic and stylistic analysis and with an attempt to understand the ways in which

literature in the last century responded to critical cultural, economic and political forces.

Prerequisites

- LIT220
- LIT150 with a minimum grade D

LIT340 19th Century American Literature (3 CH)

This course examines key writers of this century, with an emphasis on thematic and stylistic analysis and with an attempt to understand the ways in which literature in the last century responded to critical cultural, economic and political forces.

Prerequisites

- LIT150 with a minimum grade D
- LIT240

LIT345 20th Century American Literature (3 CH)

This course focuses on major writers whose texts appeared in the Twentieth Century and on the genres and movements within which they worked.

Prerequisites

- LIT150 with a minimum grade D
- LIT240 with a minimum grade D

LIT355 Digital Humanities Basics (3 CH)

This course introduces students to current digital research and creative digital work. Students receive an introduction to trends in the expanding field of digital humanities and apply selected techniques in hands-on workshops and projects throughout the course. Students will also practice (and experiment with) the covered digital concepts and topics in creative ways in various kinds of assignments. The course encourages the exploration of a wide range of digital genres and venues, such as blogs, game narratives, and electronic literature.

LIT365 Modern World Literature (3 CH)

This course examines twentieth-century and contemporary literature originally produced in languages other than English. Students will have access to primary texts in English translations.

Prerequisites

- LIT220 with a minimum grade D
- LIT240 with a minimum grade D
- LIT150

LIT370 Anglophone Literature Outside UK & US (3 CH)

This course examines twentieth-century and contemporary literature produced in such locations as Ireland, India, the Caribbean, Canada, Africa, by writers who are both participating in and reacting against the conventions and assumptions of English and American literature.

Prerequisites

- LIT220 with a minimum grade D
- LIT240 with a minimum grade D
- LIT150

LIT385 Children's Literature (3 CH)

This course investigates the role of literature from early childhood to young adult readers. Analyses focus on classic children’s fiction, such as fairy- and folktales, as well as poetic texts, graphic novels, and screen representations of juvenile and adolescent storytelling.

LIT410 Criticism and Theory (3 CH)

This course introduces students to major issues in literary criticism and trains students in practical criticism of specific literary texts. Students will read a variety of short literary works , as well as critical responses to these works,

and will focus on writing critical essays of their own. Emphasis is on developing linguistic, critical, and analytic competencies.

Prerequisites

- LIT220 with a minimum grade D or LIT240 with a minimum grade D

LIT420 Senior Seminar Major writer (3 CH)

This course concentrates students' efforts on the work of one major British or American writer to be selected by the instructor each time the course is offered. The course is designed to enable students to do extensive research on a well-defined body of work and use that research to produce an extensive and original final paper.

Prerequisites

- LIT410 with a minimum grade D

LIT490 Internship (6 CH)

An internship in the English literature program consists of a collaboration between the English Literature Program (LAP) at the United Arab Emirates University (UAEU) and a professional contributor approved by the UAEU. The purpose of the internship is to provide a wide range of writing and analytical skills to prepare students for the job market. The internship experience focuses on writing-related skills such as analytical writing, editing, and developing professional communication, writing, and research skills, which are initially provided to the students in their major coursework and given ample opportunity to apply and practice during their internship period.

SPN100 Spanish (1) for Beginners (3 CH)

Spanish for Beginners equips students with a basic range of the most common expressions and basic grammar structures used in Spanish. The knowledge acquired in this course will allow students to satisfy immediate needs of a concrete type. All four skills will be covered, i.e. reading, writing, speaking and listening at varying levels throughout the course. This course is an introduction to the Spanish language and its basic grammar content, allowing students to learn certain writing and discourse strategies in Spanish as a foreign language.

SPN102 Spanish Language and Culture (1) (3 CH)

The purpose of this course is to deepen students' knowledge of Spanish grammar through a series of contents based on key features of Spanish-speaking countries' societies: their people, lifestyle and culture. Students will study these countries' diverse societies as well as some of their distinctive regions and ethnic groups. Students will not only study Spanish language from a grammatical perspective but will also be made aware of customs and social aspects which may differ from their own. This course includes readings and discussions on contemporary daily life, food, transportation, festivities, sports, and holiday destinations in Spain and Latin America.

SPN202 Spanish (2) for Beginners (3 CH)

Spanish (2) for Beginners is designed to improve students' language skills in a systematic way. This course will allow students to practice and strengthen their previously acquired knowledge, leading towards a secure and solid A1 level. Students will gain a holistic knowledge of all four skills in the target language, i.e. reading, writing, speaking and listening. Grammar and vocabulary contents are intensified through a series of adapted but genuine sources that allow students to have real access to the Spanish-speaking world.

Prerequisites

- SPN100 with a minimum grade D
- SPN102 with a minimum grade D

SPN301 Intermediate Spanish (3 CH)

The purpose of this course is to develop fundamental strategies in Spanish with regard to speaking, reading, writing and listening skills, while further developing grammar and vocabulary with a series of texts, audios, videos and discussions that will be becoming progressively more complex until reaching an A2.1 level. This course will allow students to become more confident with regard to their knowledge of grammar content and as well as their communication skills, and will prepare them for the two subsequent courses of this minor.

Prerequisites

- SPN202 with a minimum grade D

SPN311 Spanish Language and Culture (2) (3 CH)

As a continuation of Spanish Language and Culture (1), this course offers an insight to key features of the Spanish-speaking world. Based on media, fiction, commercials and promotional material, students will have the opportunity to gain knowledge of aspects that shape societies in Spain and Latin America. This course will allow students to continue developing their four language skills, i.e. speaking, listening, reading and writing through a series of activities that include reading and comprehension, oral presentations, dialogues, debates, summaries and compositions. Fundamental and new grammar contents as well as topical vocabulary will be embedded in each learning session. Students will also have the opportunity to work on their writing skills through the production of paragraphs and compositions on the Spanish-speaking world.

Prerequisites

- SPN202 with a minimum grade D

SPN401 Spanish Reading and Writing (3 CH)

This course aims to consolidate and further develop the proficiency gained in the Spanish Minor courses at the beginner and intermediate levels as well as enable students to acquire a better understanding of Iberian and Latin American societies, culture, life and traditions. Students will work with a series of adapted texts in the target language dealing with topics such as leisure, society, traveling, traditions, gastronomy, history, health, literature, and social relations. The work will consist of reading and comprehension activities, guided analysis of content, and further development of grammar knowledge, as well as summarization and reformulation strategies in written and oral format. Various types of texts will be covered, including blogs, magazines and newspaper articles, brochures and short stories. Students will also have the opportunity to work on their writing skills through the production of paragraphs and compositions on the Spanish-speaking world, and on their speaking skills through oral practice and a series of oral presentations.

Prerequisites

- SPN202 with a minimum grade D

TRS200 Introduction to Translation (3 CH)

This course introduces students to the basic principles of translation. It provides them with a solid foundation to develop their skills in translating between Arabic and English and to reflect on translation in its social context. Students practice translation in both directions: English-Arabic and Arabic-English. Special emphasis is placed on translation methodology, linguistic and cultural issues and difficulties in translation as well as the methods to deal with them.

TRS310 Contrastive Analysis of Arabic/English (3 CH)

While this course introduces students to different perspectives on linguistics, it focuses on the relationships or correspondences between one language and another. In other words, it attempts to highlight the differences and similarities between English and Arabic. Emphasis will also be placed on whether Arabic and English have common linguistic, grammatical and stylistic features and how the differences and similarities play out in the translation process.

TRS312 Community Interpreting (3 CH)

Old code/no. :TRS 342 This course examines translating in various community, commercial, and public contexts, such as offices, hospitals, courts and in situations such as political negotiations and press interviews. It prepares students for these interpreting situations by developing their ability to understand and analyze a message in the source language and convey it in the target language quickly, clearly, and correctly.

TRS331 Basic Issues in Translation-TA (3 CH)

This course covers the basic issues and principles in translation and the tools used to identify, analyze, and resolve translation problems. Students explore concepts including text and structural analysis, text-typology, language usage, contrastive stylistics, etc. and analyze language-specific problems of vocabulary. They will also be acquainted with basic translation concepts and methods and basic contrastive differences between English and Arabic, especially in respect of sentence structure and textual cohesion and coherence.

TRS340 Translating Literary Texts (3 CH)

This course is intended to familiarize students with the various genres of Arabic and English Literature. This course is also intended to provide students with the skills and tools of analyzing and then translating some literary genres such as poetry, prose, the essay, fiction, biography, etc. Emphasis will be placed on the various modes of literary expression in both Arabic and English. Students will be given ample opportunity to practice reading, analyzing and translating various genres from one language to another.

Prerequisites

- TRS200

TRS350 Translation of English Texts (3 CH)

This course helps students to gain a solid understanding of the translation process from English into Arabic. Students will learn to identify translation problems related to meaning, culture and discourse and to identify translation strategies required for different translation briefs and situations. Students will apply what they learn to various textual genres often translated into Arabic.

Prerequisites

- TRS200

TRS360 Translation of Arabic texts (3 CH)

This course helps students identify translation problems related to meaning, culture and discourse in Arabic texts on both micro and macro textual levels. It aims to enhance their understanding of the various text types they may encounter in their professional lives, and the impact of these differences on the translation strategies they may choose.

Prerequisites

- TRS350 or TRS200

TRS370 Modern Media Translation (3 CH)

This course introduces students to the basic concepts and theories of media translation. It provides them with a solid foundation to develop their skills in translating different types of texts in this field from Arabic into English and from English into Arabic. Emphasis will be placed on methods and techniques for solving linguistic and cultural problems related to media translation.

TRS412 Translation of Scientific/Legal Text (3 CH)

This course introduces students to the stylistic features and writing conventions of scientific and legal texts in Arabic and English. It is designed to train students on how to translate different scientific and legal genres (such as medical reports and leaflets, scientific articles, certificates, treaties and contracts). Emphasis will be placed on identifying translation problems in scientific and legal texts and the use of appropriate techniques for solving them.

Prerequisites

- TRS360
- TRS200

TRS430 Advanced Written Translation (3 CH)

The course is designed to culminate in the student's independent translation of a significant work from Arabic into English and from English into Arabic. It is intended to develop students' abilities to handle longer, complete works, applying the principles and techniques they learnt. Emphasis will be placed on how the translation is carried out and what outcomes are achieved out of this process, and the student's ability to choose appropriate translation techniques and justify their choices

Prerequisites

- TRS360
- TRS350

TRS433 Translation of Business Correspondence & Promotional Materials (3 CH)

This course examines the translation of business correspondence documents (such as business letters, faxes, e-mails, reports, and memoranda) and promotional material (such as advertisements, posters, leaflets, flyers, folders, brochures and promotion films).). In addition to translation skills, this course provides students with contrastive knowledge of the differences between Arabic and English with regard to the style and format of business correspondence documents and promotional material.

TRS452 Practicum / Oral (3 CH)

This course introduces students to the challenges and the pressures that the translator encounters in the professional world by undertaking internship in professional organizations (whether public or private) where translation is practiced as an essential activity. They will be supervised and assessed by supervisors in those organizations as well as by the faculty member assigned to them by the Department. (This course is conducted over a complete semester. No courses are allowed to be registered during this course).

TRS480 Practicum-TA- (3 CH)

This course covers the use of translation skills in the field of business. Students undertake an internship in professional business organizations where translation is practiced as an essential activity. They are supervised and assessed by specialists in those organizations and by faculty members assigned to them, and are exposed to the challenges and pressures that the translator encounters in the professional world.

TRS485 Integrated Capstone (3 CH)

This capstone course provides students with core knowledge, attitudes and skills to help them succeed in their lives and careers and to enhance their capacity for team work, leadership and innovation that will help them to successfully guide the economic, social and cultural development of the UAE.

Tourism and Heritage

HIS120 Arab & Islamic Civilization (3 CH)

This course covers the properties of Arabic and Islamic civilization and examines the difference between culture and civilization. It also explores the formation of the globalization on Islamic civilization and the relationship between different cultures.

HIS121 World History: Origins to 1500 (3 CH)

This course covers the development of world civilization and major cultures form the Neolithic Revolution until the eve of the European conquest of the Americas. The civilizations of the Ancient, Classical and Postclassical periods will be studied, emphasizing interaction between civilizations and major cultures. Topics will include: the origins and role of universal religions; the examination of political, social and gender structures in relation to economic and demographic development, and the diffusion of culture and technology via migration, commerce and the expansion of empires.

HIS122 Modern World History (3 CH)

This course surveys the origin and development of the modern world, tracing both regional histories and global interactions. Major themes include: economic aspects of globalization; intellectual and cultural adjustments to modernity; modern imperialism; resistance to empire and the birth of nations; and the historical origins of the contemporary world.

HIS125 Contemporary Civilization (3 CH)

This course examines the properties of contemporary civilization and Globalization, as well as the difference between culture and civilization. different cultures and respect the other cultures. It enables the students to understand the relationship between different cultures.

HIS130 Sheikh Zayed: History, Foundation and Development (3 CH)

This course introduces the values of UAE founding father sheikh Zayed bin Sultan Al-Nahyan to students' souls, and provides them with substantial knowledge about this cherished and inspiring character; his biography, ideals, beliefs, principles, politics and prominent status. This module exposes Zayed's endeavors in founding the United Arab Emirates, and the strategies he pursued in founding the state. It also focuses on the prominent manifestations of the development and outstanding progress achieved in the Emirati nation thanks to the rewarding efforts undertaken by the late Sheikh Zayed in political, social, cultural, economic and administrative aspects.

HIS132 Fundamentals of Archeology (3 CH)

This course examines how archaeological excavations are managed and sets them within the context of Cultural Resource Management. In particular the course will examine how sites are identified, recorded and protected within their natural environment and human contexts. The course is divided in two parts; theoretical and practical. The course covers the whole process of archaeological excavation - from discovery of a site to the presentation of results to the public. It also examines the wide variety of archaeological sites in the UAE and their unique value as records of human activity. There are three compulsory field trips within the course which will provide practical experience of how an archaeological excavation is run.

HIS133 Introduction to Art History (3 CH)

This course examines the visual arts in civilizations. It seeks to develop skills in perception, comprehension, and appreciation when dealing with a variety of visual art forms. It explores the range of questions and methods appropriate to the explication of a given work of art, and examines the intellectual structures basic to the systematic study of art.

HIS142 History of Islamic World: Origins 1500 (3 CH)

This course covers the history of the Islamic World from late antiquity and the rise of Islam to the 15th century, with an emphasis on the background and circumstances of the rise of Islam, the creation and development of the Islamic Empire, the expansion of Islam in the medieval period and the rise of dynastic successor states, European encounters and the rise of the Ottoman Empire.

HIS212 History of the UAE (3 CH)

This course discusses the origins of the U.A.E., and its internal relations. It covers the period of the British control, from the early nineteenth century up to the British withdrawal 1971. It also covers the Union negotiations, the birth of the state, and its achievements. This course incorporates the study of a selection of modern documents, written in English dealing with the history of the Arab Gulf and the UAE. It concentrates on translation and analysis of the documents in order to enable the student to understand and deduce the relevant historical information.

HIS215 Ancient History & Archaeology of Near East (3 CH)

This course focuses on the geographical and historical backgrounds of the Ancient Near East. It studies the civilizations of Egypt, Syria, Mesopotamia and Persia. It briefly deals with the commercial importance, political situation and cultural developments of the Ancient Near East during the period from ancient times to the 3rd century B.C.

HIS217 Material Culture of Islamic World (3 CH)

This course studies the cultural Islamic remains mainly the architecture, arts, coins and pottery etc. starting from the early Islamic Period up to the Ottoman period in the whole Islamic area, and the Arab countries in particular. The study will be focusing on different examples from different historical periods. (Note: if possible, students should be able to examine specimens of coins, pottery and other artifacts in local collections)

HIS310 Introduction to Archaeology & Museum Studies (3 CH)

This course covers archaeological surveying and archaeological excavation in the field, how to deal with the archaeological cultural remains in connection with documentation methods, preservation, classification and chronological presentation. The development of archeology as a discipline, ethical concerns and the impact of technology on archeological practice are also emphasized.

HIS312 Historical Preservation (3 CH)

TThis course covers historic preservation and preservation planning in the UAE. It emphasizes the tools and techniques used to integrate historic

preservation into the context of cultural resource management and the comprehensive planning process, including the legal and legislative framework for historic preservation, historic resources surveys and documentation, design review, economic incentives and revitalization processes. It also includes field trips to introduce students to historic preservation.

HIS318 History of the Arabian Gulf (3 CH)

This course provides students with the historical origins and developments of the Arab Gulf states. It deals with the social, political and economic changes in the Arab Gulf states in its modern and contemporary history.

HIS372 Arch. of UAE & A. Gulf States (3 CH)

The course focuses on the history of excavations and their outcomes and focuses on the social, economic and cultural life based on the archaeological cultural remains throughout ages from the Paleolithic through the Late Islamic Period.

Prerequisites

- HIS310 with a minimum grade D

HIS373 Hist. of Arab World from 1500 (3 CH)

Introduction to the history of Modern Arab History from 1500 to the present. Topics include the growth and decline of Islamic empires, European colonialism, nationalism, modernization, Islamic reform movements, social and economic change in the modern period. Emphasis on the Arab countries and the historical background of contemporary issues such as the Arab-Israeli conflict.

HIS381 UAE Architectural Heritage (3 CH)

This course examines the architectural heritage of the United Arab Emirates and concentrates on the traditional city and its various elements and the traditional planning concepts. It analyzes in depth the different types of traditional architecture and their classification as per construction materials illustrating various examples of traditional buildings around the U.A.E. It also

covers architectural heritage conservation methodologies and organizations and different trends of conservation in the U.A.E.

HIS440 Oral History (3 CH)

This course covers oral history, its techniques and methods and emphasizes the necessity of studying a cultural or historical issue in the light of information collected from an appropriate group of people. It also aims to train students how to design an oral history project and how to deal with and evaluate the oral history data. in the context of cultural resource management.

HIS471 Modern and Contemporary History of the Arab Gulf (3 CH)

This course examines the historical origins and developments of the Arab Gulf states. It deals with the social, political and economic changes in the Arab Gulf states in its modern and contemporary history.

TOR101 Introduction to Tourism (3 CH)

This course provides an introduction to the study of tourism. The course introduces students to key concepts in the tourism system and how the major industrial sectors of the system (e.g. accommodation, transport, attractions and intermediaries) combine to produce a complete tourism product. Students are also expected to understand the historical significance of tourism and place that in the context of its national and international significance today. The development and managerial issues that arise from the growth of tourism will also be considered.

TOR140 Introduction to Museology (3 CH)

This course introduces the student to the firm of museology, and for those who may be considering a career in the museum field and is interested in exploring some of the theoretical as well as practical aspects involved in operating a museum, or the student who would simply like to become better acquainted with the history of museums and the role of the museum as collector, guardian and interpreter of public history. The course will provide a general introduction to the history and development of various types of museums; to the cultural, legal, ethical and other issues facing museums today; and to some of the practical aspects relating to the basic museum functions of acquisition, preservation, exhibition, and education.

TOR202 Fundamentals of Heritage Management (3 CH)

This course covers the management and preservation of heritage resources, and offers a foundation for further studies in the contemporary heritage field. Topics include types of practices, current and emerging issues, as well as the social context, controversies, ethical questions and general concerns that characterize efforts in heritage preservation and the work carried out in museums, archives, historic places and interpretive centres. It also discusses the legal systems used in the UAE and other countries to protect such resources, and how governmental and non-governmental organizations preserve and use heritage resources.

TOR205 Introduction to Cultural Tourism (3 CH)

This course explores cultural tourism in international and Emirati contexts. It investigates practical and theoretical issues surrounding the topic of cultural tourism, exploring the theory and development of cultural tourism, and the role of cultural institutions such as museums and galleries, tangible and intangible heritage. Topics include cultural tourism products, cultural heritage performances, management, operational and marketing considerations in this field. The thematic interaction of tourism with hinterland districts in UAE context, festivals, heritage and indigenous culture is also investigated with the aim of developing and interpreting cultural tourism attractions.

TOR222 Principles of Tour Guidance (3 CH)

This course explores cultural tourism in international and Emirati contexts. It investigates practical and theoretical issues surrounding the topic of cultural tourism, exploring the theory and development of cultural tourism, and exploring the role of cultural institutions such as museums and galleries, tangible and intangible heritage and cultural tourism products, cultural heritage performance, management, operational and marketing considerations in this growing field. The thematic interaction of tourism with hinterland districts in UAE context, festivals, heritage and indigenous culture is also investigated with the aim of developing and interpreting cultural tourism attractions.

TOR263 Tourism Resources in the UAE (3 CH)

This course introduces students to tourism resources and potentials in Emirati contexts. Among others, the course highlights the cultural and heritage, social and political, natural and man-made resources that build up and substantiate the tourism and leisure business in the UAE. In addition, new developments and trends in the promotion of these tourism resources are discussed. Key features of the strategic tourism development plan are also considered.

TOR322 Gulf art and design (3 CH)

The course covers diverse traditional arts and folk crafts in UAE and the Gulf countries as important forms of material culture. It examines the significance of this material culture and the appropriate methods for its documentation. The course contextualizes the place of Art in culture, posing interesting questions and points of view in relation to links to country, diversity of indigenous societies and the use of art as a voice piece. The course will also examine the growth in the participation of artists in the marketplace as well as issues of copyright and intellectual property.

TOR350 Tourism and the Environment (3 CH)

This course examines the social, environmental and economic sustainability of tourism and evaluates tourism in UAE, cross-cultural and global contexts. It explores the role of ecotourism in promoting an environmental ethic that forms the foundation for a sustainable future. The course introduces key issues surrounding the economics and marketing of the environment as a tourism product within the wider context of debates on environmental sustainability in both International and Arab contexts. Techniques for quantifying negative and positive impacts of tourism are reviewed as are the social, political and economic impacts on regional communities.

TOR403 Tourism and Society (3 CH)

This course explores the interactive mutual relationship between tourism as a human activity, economic industry and social culture, and the local community as consuming, producing and hosting individuals, and groups. It explores theories and practices for the phenomenon of socio-cultural change, and investigates the role of tourism as dynamism for the interaction and assimilation of indigenous cultures, and the way this interface affects societies.

Prerequisites

- TOR101

TOR404 Sustainable Tourism Development & Planning (3 CH)

This course covers patterns of sustainable tourism product development and management and the contemporary role of planning for tourism. Key study areas cover both issues and methods in planning for tourism development from the perspective of sustainable development.

Prerequisites

- TOR202
- TOR263

TOR416 Travel Writing & New Technologies (3 CH)

This course covers the role and practice of a range of communication media important to the tourism industry. It explores the development and practice of travel publishing in diverse formats including journal articles, brochures, guidebooks and media releases. The course also introduces students to the applied use of new technologies in tourism. This includes text and web-page design and the implications of E-commerce for the travel industry.

Prerequisites

- TOR404

TOR421 Intensive Research in Tourism (3 CH)

This course covers the role and practice of a range of communication media important to the tourism industry. It explores the development and practice of travel publishing in diverse formats including journal articles, brochures, guidebooks and media releases. The course also introduces students to the applied use of new technologies in tourism. This includes text and web-page design and the implications of E-commerce for the travel industry.

TOR440 Internship in Tourism & Architecture (3 CH)

This course covers the foundations of tourism research, providing a broad explanation of key research terms, applications, uses, methodologies and other key research fundamentals, and develops a profound understanding of the value of research to the tourism industry. It also covers the development of research topics, questions, aims and hypotheses, and examines various sampling and research methods used in tourism research. (The course is conducted over a complete semester. No courses are allowed to be registered during this course)

TOR485 Integrated Capstone (3 CH)

This capstone course integrates learning from other courses in the Tourism Studies major with courses from the rest of the academic experience. It requires the application of that learning to projects which serve as instruments of evaluation. The course further provides students with core knowledge, attitudes and skills to help them succeed in their lives and careers and to enhance their capacity for team work, leadership and innovation. Students are expected to integrate the key concepts of their coursework by applying them to the development of projects.

Social Wellbeing

SWK200 Introduction to Social Welfare (3 CH)

This course is an introduction to the philosophy, purposes, history, values, sanctions, and organization of social welfare human service programs across different world cultures. Social welfare policy and practice in eastern and Arab countries are highlighted. Emphasis is placed on social welfare needs and services in the U.A.E.

SWK210 Introduction to Humanitarian Social Work (3 CH)

This course is an introduction to the philosophy, purposes, history, values, sanctions, and organization of social welfare human service programs across different world cultures. Social welfare policy and practice in eastern and Arab countries are highlighted. Emphasis is placed on social welfare needs and services in the U.A.E.

Prerequisites

- SWK200 with a minimum grade D

SWK220 Social Policy & Services (3 CH)

The history of the social work profession, its philosophies, values, and practice models are explored and reviewed using a humanitarian approach to social problems and crisis. Islamic principles of social solidarity, cooperation and mutual aid are presented. The purposes, roles, knowledge, ethics, and skills of the generalist social work practice model are presented within a multicultural perspective with focus on economic/social justice and quality of life issues. Students are required to complete 10 hours of volunteer work with a humanitarian agency of their own. A field journal is required in which students document their learning. Co-requisite SWK 200

SWK230 Human Behavior in Social Environments (3 CH)

Social Welfare policy introduces students with the concept of social policy and the welfare state. The importance of social welfare policy comes from the society ideology, values, and principals which lead to the consequences issuing legislations and programs. The welfare state as defined in the Gulf Cooperation Council member states is used to present social policy process, services and assessment

SWK240 Social Work Research Methods (4 CH)

This course is based on the developmental phases of the life span. Biological, psychological, sociological, cultural, spiritual and environmental (community, economy, and political), factors that influence human behavior. Emphasis is placed on theories that provide a knowledge base for generalist social work practice. Ecological and systems theories form the basis for developing awareness of the reciprocal relationship between behavior and the environment in the UAE and GCC

SWK250 Social Work Practice I: Individuals (3 CH)

This course prepares students to understand and apply research methods and statistical analyses common to social work research. Students formulate research questions, designs, and review research findings. Survey research, field (naturalistic and case study) research, single-subject designs, the problem solving method, and case study are presented. Research skills are applied using computer lab assignments

Prerequisites

- SWK200
- SWK210

Corequisites

- SWK251

SWK251 Social Work Practice I: Skills (1 CH)

Generalist social work with children & families is presented as a culturally relevant practice method using Islamic principles of social solidarity, cooperation and mutual aid are used to augment the Problem Solving Model. Behavior Modification and Cognitive Behavioral Therapy interventions will be presented within a culturally relevant perspective. This course continues the introduction the IFSW Code of Ethics and the ethical standards relevant to beginning professional practice.

Prerequisites

- SWK200
- SWK210

Corequisites

- SWK250

SWK320 Social Policy Research (3 CH)

This experiential skills lab provides students with the opportunity to develop their multicultural generalist practice skills (Interviewing, Assessment, Planning, Interventions, &Evaluation) with Individuals and children. Students learn to apply theory and skills through role play, field visits, and guest lecturers. Seminar is conducted in bilingual format to assist student comprehension of social work ethics, diversity, social justice and quality of life practice content.

Prerequisites

- SWK240 with a minimum grade D

SWK350 Social Work Practice II: Families (3 CH)

This is the second course in the research sequence and is designed to augment course materials presented in SWK 240. It provides opportunities for students to comprehend the importance of practice informed research and research informed practice using a social policy analysis approach. Students will develop, implement, analyze, and present research findings related to their policy of interest. Single systems design and the problem solving method and their use is discussed.

Prerequisites

- SWK250 with a minimum grade D
- SWK251 with a minimum grade D

Corequisites

- SWK351

SWK351 Social Work Practice II: Skills (1 CH)

This course uses the critical perspective to augment content presented in Social Work Practice I and builds on the multicultural practice perspective with individuals, families & groups using the problem solving model. Focus is on ethics and economic/social justice issues as they impact the diverse individuals, families and groups of the UAE, the Arab world and the

international community. Attention is given to Islamic principles of social solidarity, cooperation and mutual aid and their impact on service delivery. Mutual Aid Group Work Model is presented.

Prerequisites

- SWK250
- SWK251

Corequisites

- SWK350

SWK355 Social Work Leadership (3 CH)

This bilingual English/Arabic experiential skills lab provides students with opportunities to apply classroom knowledge values, skills, and ethical principles to actual practice case scenarios with diverse multicultural families and groups of the UAE, the GCC and the global community. Students continue to develop their critical thinking skills in the comprehension and application of the multicultural generalist perspective. Practice informed research and research informed practice is used.

SWK360 Social Work Practice III (3 CH)

This course examines the professional social work leadership and supervisory role in social service agency settings. Students are introduced to system and environmental influences, leadership roles, the use of oral and written communication, organization behavior, team development, organization design, program evaluation, productivity, supervision, and performance evaluation.

Prerequisites

- SWK350 with a minimum grade D
- SWK351 with a minimum grade D

Corequisites

- SWK361

SWK361 Social Work Practice III: Skills (1 CH)

This course is designed to be taken concurrently with SWK 361 Skills Lab to provide experiential learning opportunities for students to apply their knowledge, values and skills in working with communities and organizations. This course emphasizes the use of the critical perspective in the comprehension and application of the problem solving method to macro level social work. Special attention is given to social solidarity, cooperation, and mutual aid in the UAE, the GCC and global community. Social/economic justice and social work ethics and values are applied to affect social change.

Prerequisites

- SWK350
- SWK351

Corequisites

- SWK360

SWK365 Social Work & Humanitarian Relief (3 CH)

This bilingual English/Arabic experiential skills lab taken with SWK 360 provides students with opportunities to apply classroom knowledge, values and ethical principles to practice skills using actual practice case scenarios with diverse organizations of the UAE, the GCC and the global community. Students continue to develop their critical thinking skills in the comprehension and application of the multicultural generalist perspective.

SWK375 Social Work & Mental Health (3 CH)

Students are provided with the social work knowledge, values, ethical principles, and skills necessary for social work practice in manmade or natural disaster situations. Crisis interventions, Relief work, rapid response, and social work on multidisciplinary response teams is presented.

Prerequisites

- SWK210 with a minimum grade D

SWK376 Social Work and Special Populations (3 CH)

This course is designed to augment practice skills in mental and health care settings. A case management approach is used to provide services to people experiencing mental health problems that maybe associated with physical illness. It provides students with hands on experience in applying culturally competent mental health services within a Muslim/Arabic perspective

Prerequisites

- SWK210

SWK380 Social Work & Islam (3 CH)

Social Work Practice with special needs populations such as children with mental retardation, learning disabilities, physically challenged individuals, hearing and visual impairment and the elderly is the focus of this course. It discusses the nature of the needs of each of these categories, social work assessments, interventions, and the appropriate social welfare services that can be extended to them and to older people to improve their quality of life.

SWK385 Social Work & Substance Abuse (3 CH)

Examination of the principles of social work with Muslims is presented using the Islamic principles of social solidarity, cooperation and mutual aid. Students are encouraged to use self-reflection and grounded theory to formulate their professional practice with diverse Muslim populations of the UAE, the Middle East, and global communities.

SWK465 Social Work Practicum I (4 CH)

This course emphasizes the physical, emotional, psychological, and spiritual dimensions of addiction, interventions and the impact of substance abuse on the individual, the family, and the community. National and international drug policies are presented for discussion. (This course is conducted over 2 semesters. A maximum of 6 Cr. Hrs. of courses can be registered during each of the 2 semesters).

Prerequisites

- SWK360 with a minimum grade D
- SWK361 with a minimum grade D

Corequisites

- HSR400 with a minimum grade D

SWK466 Field Seminar (3 CH)

This is the first of two required field practicum experiences. The student is required to work 4 days per week in a field agency. Students are engaged in supervised, direct service activities that provide practice experience in the application of the theory, values, ethical principles and skills acquired in the foundation areas. The mechanism for supporting the integration of students' class and field learning is the field journal presented in the required field seminar taken concurrently with the field practicum.

SWK470 Field Practicum II (4 CH)

The basic principles of SWK 460 are continued using a bilingual English/Arabic format. Further integration of knowledge and values in a supportive yet evaluative agency setting is a primary focus. Major emphasis is placed on the enhancement of self-awareness and an appreciation of human diversity in the practice setting. More advanced use of the problem-solving process is required. Students present findings from their field agency to be staffed in class. (This course is conducted over 2 semesters. A maximum of 6 Cr. Hrs. of courses can be registered during each of the 2 semesters).

Prerequisites

- SWK465 with a minimum grade D
- SWK466

Corequisites

- HSR400 with a minimum grade D

SWK485 Capstone Integrated (3 CH)

In this course, the fourth-year student develops and refines their professional identity as a social worker by completing assignments, self-assessment, portfolio, and program evaluation questions. The course also prepares students for the social work job market in the UAE.

SWK499 Special Topics In Social Work (3 CH)

Students continue their field practicum experience 4 days per week in a field agency. They are expected to demonstrate professional social work behaviors in all aspects of their practicum. A field journal is required and data gathered will be used to develop a case study for presentation in HSR 400 Capstone Seminar, a college requirement.

SWK500 Social Welfare Policy and Services: A worldview (3 CH)

Course is designed to provide students with specialized courses of interest to the community. It is also designed to make students more aware of current issues and latest trends in Social Work. The goal of this special topics course is to introduce new course material that could be used to augment the curriculum.

SWK510 Human Behavior and Social Environments I (3 CH)

This course introduces students to the issues and problems associated with social welfare interventions. .The context and process of policy development will be presented in a global and Regional level with a focus on the welfare state in the UAE. Students are expected to learn and exercise skills in analyzing social policies, planning and designing interventions within an area of specialization.

SWK511 Human Behavior and Social Environments II (3 CH)

Overview of ecological systems theory used in the social work profession for clinical and policy-oriented assessments of human functioning and needs during infancy, childhood, and adolescence. Emphasis is on the reciprocal relationships between human behavior and the social environment as they impact on national and expatriate populations of the UAE.

SWK520 Research Methods for Social Work Practice (3 CH)

Overview of ecological model used in the social work profession for clinical and policy oriented assessments of human functioning and needs from young adulthood through old age. Emphasis is on the reciprocal relationships between human behavior and the social environment.

SWK534 Integrative Seminar (1 CH)

The focus is on single subject research methods for use in applied clinical and evaluative research with diverse populations of the UAE and GCC. The course covers specification and measurement of various practice and social science concepts, such as sampling methods, data collection strategies, and statistical and graphical approaches to data analysis. The IFSW code of ethics will be used to promote confidentiality, full and informed consent, and hold harmless (do no harm) ethical issues in research.

SWK540 Social Work Practice with Individuals and Families (3 CH)

This seminar focuses on the integration of the knowledge, value, and learning experiences of the total MSW program. It prepares and provides the framework for the student's completion of a major competency paper inclusive of content from all social work courses, and centering on the UAE and a specific population group in a family context. Students have the opportunity to dialogue on professional issues through topical discussions, and examination of students' research activities.

SWK541 Social Work Practice with Groups (3 CH)

In this foundation course Students have opportunities to further develop their critical thinking skills by analyzing theories for social work practice with the diverse Arab Muslim and Expatiate populations of the UAE. The problem solving process is applied to practice with families across the life span. Students will use critical thinking and self-reflection skills to critique issues of diversity, professional ethics, practice competency, and societal/practice values for use with the Arab Muslim and expatriate populations of the UAE and GCC.

SWK542 Social Work Practice with Communities and Organizations (3 CH)

A seminar format provides the venue for the integration and application of group work theories with the Arab Muslim and Expatriate Populations of the UAE. The focus will be on using Islamic principles of cooperation and social solidarity within the Mutual Aid Group Work format.

SWK590 Field Education I (8 CH)

Social development in the UAE requires the social worker to take on the roles of leader, advocate and educator. Within an area of specialization students will research, plan, apply and evaluate their intervention strategies to educate the society and advocate for social change and social development as per UAE Social Development Plan.

SWK640 Models and Methods of Social Work Practice (3 CH)

The goal is to further the application of advanced social work skills from the generalist perspective. The foundation practicum comprises 400 hours of supervised social work practice and is completed based on collaborations among the Field Coordinator, faculty liaison, the student and agency. The practicum provides Students with opportunities to incorporate further develop their competencies within a structured practice environment. A grade of 3.0 or better is required.

SWK642 Leadership & Supervision (3 CH)

Further deepens students' knowledge and skills essential for social work practice, including individual, family, group, community, and organizational interventions. Focus on cultural responsiveness, commitment to professional competence and ethics, professional development, social and economic justice, and client empowerment.

SWK645 Intermediate Social Work Research (3 CH)

This course examines the organizational context of social work practice. Focus will be organizational development and leadership roles at all levels in the organizational hierarchy. Issues of program evaluation, administrative functions, supervision and organizational change will be addressed. Topics will

be adapted to the specific needs of students within the context of their areas of interest in work with specific organizations that serve vulnerable populations in the UAE and GCC.

SWK671 Social Work Practice with At Risk Students (3 CH)

Evaluation, appraisal, and application of the concepts, design, and process of applied research in social work, focusing on foundation skills in conducting empirical research within the context of theory, literature review, research design and measurement, research ethics, and professional practice.

SWK680 Social Work in Criminal Justice Settings (3 CH)

This course provides students with the skills and techniques for providing cognitive therapy to adults, adolescents, and children. The course begins with grounding in the cognitive therapy diagnostic assessment process. Students will be instructed how to use the various cognitive therapies psychological testing scales. Emphasis is then placed on learning to use the cognitive therapy model to treat emotional and personality disorders. Students will be taught how to apply cognitive therapy techniques in both psychotherapy practice as well as in other social work settings such as child welfare, foster care, case management, aging, and hospital social work.

SWK681 Social Work & Addictions (3 CH)

Social workers have increasing opportunities to practice in forensic settings. Recognizing the growing trend toward community justice" which includes policing

SWK682 Techniques in Rehabilitation Counseling (3 CH)

The objectives of this course are to present theories and methods in the diagnosis and treatment of substance abuse disorders focusing on the role of social workers in the prevention/intervention of substance abusers and their families. Emphases on dual diagnoses, prenatal drug/alcohol exposure, and challenges for special group.

SWK690 Social Work & Traditional Help Seeking Behavior (3 CH)

Techniques and procedures used in the assessment process in rehabilitation, including assessments related to identification of issues of addiction, vocational assessments and situational assessments. Addresses the phases and processes used in the treatment of addiction. Covers a range of perspectives on treatment including emotional, cognitive, legal, social, family and systemic interventions as well as relapse prevention.

SWK691 Social Work in Behavioral Health Settings (3 CH)

This course provides students with an opportunity (1) to think through and emotionally experience the place of spirituality in medical social work practice; (2) to come to an understanding of the meaning and application of spirituality in each student's own social work practice, and (3) to explore the impact of religion and spirituality on traditional help seeking behaviors related to medical care. As social workers more and more encounter diverse belief systems, it is important that practitioners at all levels of practice have some understanding of how the adherence to different beliefs affects people's functioning in the UAE and global community.

SWK695 Field Practicum II (9 CH)

Mental health policies as well as ethical and diversity issues in mental health are examined. Current best practices for specific disorders of adults, children, and adolescents, which may be exhibited across fields of practice, are presented. Special issues of unique contexts and client types are addressed. Emerging best practices of recovery in mental health is the focus, which fits well with the empowerment of mental health consumers and their families, and with strengths-based practice in the UAE.

SWK699 Directed Readings (3 CH)

This second of two required field practicum allows the student to further develop their expertise in social work practice skills with in their chosen area of concentration. They are expected to apply ethical principles and demonstrate the knowledge and values of a professional social worker. The requirement is successful completion (3.5 GPA) 500 hours of supervised practice

Cognitive Sciences

HSC300 Introduction to Human Services & Counseling (3 CH)

This course covers counseling in families, business, mental health and community agency settings. Emphasis is on professional roles, current trends and legal/ethical issues.

LNG100 Introduction to Linguistics (3 CH)

The course introduces students to the scientific discovery of language. Students recognize the basic components of human language including phonetics, phonology, morphology, syntax, semantics, psycholinguistics, and neurolinguistics. Based on cross-linguistic data, students recognize common patterns and variation in languages and build the set of tools that are necessary for the construction of a theory of human language. The ultimate goal is to achieve a better analysis and understanding of language as an integral part of human cognition and the brain.

LNG110 Language, Society & Culture (3 CH)

This course focuses on the essential connections between language, society and culture, and the way in which language is used in different social and cultural contexts. The effects of regional variation, social variation, ethnicity, gender, age, style, register, and the status of the speaker's language on language use will be discussed and extensively illustrated during the course. In addition, topics such as pidgins and creoles, diglossia, lingua francas, bilingualism and language planning will be introduced.

LNG220 Phonetics (3 CH)

This course introduces students to the scientific study of speech sounds (or signs). Students will first be introduced to the theoretical foundations of phonetic theory and the mechanisms of human speech production. They will also be introduced to the International Phonetic Alphabet (IPA) and will be trained to detect speech sounds and use the IPA to transcribe such sounds, from individual sounds through to supra-segmental properties of connected speech such as stress, rhythm and intonation. Students will also be introduced

to the basics of acoustic analysis of human speech sounds using state of the art speech analysis hardware and software.

LNG231 Phonology I (3 CH)

This course is concerned with the investigation of sound patterns. Students are exposed to the basic principles of phonological analysis, including phonological alternations, rules and derivations. The main theoretical framework adopted in the course is that of generative phonology, which applies a rule-based system to the investigation of phonological processes. Based on cross-linguistic data students learn to identify phonological patterns and formally express them using formal phonological rules.

LNG241 Syntax I (3 CH)

This course introduces syntactic analysis within the generativist tradition. Students become familiar with the formal terminology used in syntactic work and apply this knowledge in the study of cross-linguistic data. The course covers topics on the position of syntax within cognitive science, categories and features, syntactic, binding theory and structural relations, X-Bar theory and how the lexicon constraints the application of syntactic rules. Assignments and discussions focus on several different languages in addition to English.

LNG250 Morphology (3 CH)

This course introduces students to the basic concepts in morphological theory and the necessary tools in conducting morphological analysis. While some emphasis will be on Arabic nonlinear morphology, morphological patterns from various languages from around the world will be studied. Concepts such as root, stem, morpheme, allomorph, derivation, inflection, word syntax, and morphological productivity are covered. The interface between morphology and other levels of analysis, such as phonology, syntax, and semantics is also discussed.

LNG290 Linguistic Structure of Arabic (3 CH)

This course studies the linguistic properties of Emirati Arabic including (i) the sound inventory of the dialect from an articulatory point of view; (ii) phonological processes that sounds in the dialect undergo; (iii) the morphological structure of the language including non-linear morphological

processes characteristic of Semitic languages; inflectional and derivational processes; borrowing; and so on; and finally (iv) the syntax of Emirati Arabic focusing on language specific properties, word order and key phrase structure rules.

Prerequisites

- LNG100 with a minimum grade D

LNG321 Language & Computer Technology (3 CH)

In this course, we look at the use of computers for everyday language tasks (e.g. spelling, computer-assisted language learning, machine translation). While there is no programming in this course, students investigate these systems in hands-on sessions. We also cover current social and ethical issues, as well as more philosophical ones about consciousness and machine intelligence.

LNG331 Phonology II (3 CH)

This course covers advanced topics in generative phonology. The focus will be on phonological representations and their role in phonological analysis. Topics to be covered include complex phonological alternations, phonological rules and rule ordering, distinctive feature theory, auto-segmental phonology, syllable theory, feature geometry, and prosodic morphology. Students may be asked to write a short phonological sketch of a language of their choice.

LNG341 Syntax II (3 CH)

This course builds on the material covered in Introduction to Syntax (LNG 241) and provides a more sophisticated treatment of modern approaches to the study of syntax in its narrow sense, as well as the interface between syntax and other linguistic components such as phonology, morphology, semantics and information structure. Additional advanced topics that are discussed include raising and control structures, and expanded verb phrases.

LNG342 Semantics (3 CH)

This course examines meaning from a variety of perspectives focusing on how it is encoded in words and sentences and how native speakers interpret language. It deals with the relation between language and thought; with the relations between morphemes in the word and words in a sentence (compositionality); and with the relations between words in the lexicon (synonymy, hyponymy, etc.). In addition, students are exposed to various aspects of pragmatics - the function of meaning in a communicative setting.

Prerequisites

- LNG241 with a minimum grade D
- ENG250 with a minimum grade D

LNG362 Contrastive Linguistics (3 CH)

The course is an introduction to the contrastive study of languages with respect to their phonetic, phonological, morphological, syntactic, semantic, pragmatic, stylistic, and socio-linguistic systems. Special emphasis is given to a foreign accent and accent reduction strategies and techniques as well as transfer and interference from the mother tongue. The course also discusses the importance of error analysis in language teaching and translation. The student is encouraged to bring examples from everyday life to class.

Prerequisites

- LNG220
- LNG250
- LNG331
- LNG341
- LNG342

LNG370 Historical Linguistics (3 CH)

Languages change over time. The English or the Arabic we speak today is very different from the English or Arabic spoken 1000 years ago. Some of the questions that will be addressed in this course include: Why do languages change? How do languages change? Which aspects of a language change? What do we know about older stages of languages? Are there regular patterns underlying change?

Prerequisites

- LNG220
- LNG250
- LNG331
- LNG341
- LNG342

LNG390 Arabic Syntax (3 CH)

This course introduces students to the basic concepts used in the description of the syntactic structure of Arabic. The content of the course will cover such issues as constituent structure and how it can be formally represented, embedding and secondary sentences such as sentential complements and relative clauses, dependency relations, transformations, including movement operations, passivization and other grammatical function changing operations.

Prerequisites

- LNG241 with a minimum grade D

LNG410 Sociolinguistics (3 CH)

This course focuses on the connections between language, culture and society, the way language is used in social contexts and how it reflects the culture of the speech community. Topics covered include the effects of regional variation, social variation, ethnicity, culture, gender, occupation, age, style, register, and the status of the speaker's language on language use. In addition, topics such as national identity as symbolized by language, pidgins and creoles, diglossia, lingua franca, bilingualism, language planning will be discussed.

Prerequisites

- LNG220
- LNG250
- LNG331
- LNG341
- LNG342

LNG415 Current Topics in Language Variation & Change (3 CH)

This course explores a range of topics in language variation and change. On a rotational basis, members of faculty suggest and teach topics related to their current work and/or research interests. Students are required to read literature that reports on research in which linguistic theories and models are being employed to accurately describe and explain patterns observed in various natural languages. Assessment includes assignments and tests, as well as a writing component based on the students' individual research projects.

Prerequisites

- LNG220
- LNG250
- LNG331
- LNG341
- LNG342

LNG420 Computational Linguistics (3 CH)

This course is an introduction to computational linguistics. It assumes some familiarity with linguistics concepts but no programming is required. It covers topics on automata and finite-state machines and transducers, context-free models of syntax, parsing, and semantic interpretation; corpus-based research including probabilistic methods; and some selection of application areas from among such topics as information retrieval or machine translation. Some of the concepts taught in class will be reinforced in practice by hands-on programming assignments using Prolog.

Prerequisites

- LNG220
- LNG250
- LNG331
- LNG341
- LNG342 with a minimum grade D

LNG450 Psycholinguistics (3 CH)

This course acquaints students with what is known about the representations, processes and architecture of language in the mind/brain. Topic areas include the history and methods of psycholinguistics, recognition and production processes, language in relation to other mental processes, and memory systems involved in language processing. It looks at how linguistic theory informs models of cognitive processing, and how processing phenomena inform linguistic theories. The first part of the course emphasizes how theories in linguistics inform processing models, and how processing phenomena inform linguistic theories in terms of the architecture of a speaker's internal grammar. The second part presents child language data from various languages and focuses on an examination of universals of language development and structure. Research methods in psycholinguistics are also addressed, that comprise at least one case-study including statistical analyses of the data. Psycholinguistic research in Arabic is rather scarce, and training students in this area will encourage them to pursue their graduate studies in it.

Prerequisites

- LNG250 with a minimum grade D
- LNG341 with a minimum grade D
- LNG342 with a minimum grade D

LNG455 Practicum (3 CH)

This practicum is held 4 days a week from 8:00 am to 1:50 pm. It is intended to provide students with basic hands-on clinical experience in speech/language disorders and an opportunity to consolidate their background in linguistics and language disorders and understand the relevance of theory to practice. Under the supervision of specialist speech-language pathologists, students are expected to develop skills in assessment and intervention in various clinical populations (children and adults). The practicum is also meant to allow the students to develop skills in teamwork and professional conduct.

LNG460 Linguistic Theory and Aphasia (3 CH)

This course examines the interaction between linguistics and the study (description, diagnosis and treatment) of aphasia. The study of aphasic phenomena (linguistic manifestations of language breakdown) allows linguists to refine their theoretical models of linguistic knowledge, and to choose between competing theories of such knowledge that would otherwise be

regarded as mere notational variants. Techniques of testing aphasic patients and collecting and analyzing aphasic speech error types will also be covered.

LNG465 Women and Language (3 CH)

This course is offered within the minor of ""Women Studies"". It provides students with insights into the role of language in defining people relative to each other. Students are encouraged to look critically at contexts they have been involved in on a regular basis and investigate how language reflects the changing roles of women and men in contemporary society. They further explore how language reveals and perpetuates attitudes and the kinds of roles language plays in empowerment and marginalization.

LNG470 Current Topics in Arabic Linguistics (3 CH)

This course explores a range of current topics in Arabic Linguistics. On a rotational basis, members of faculty suggest and teach topics related to their current work and/or research interests. Students are required to read literature that reports on research in which linguistic theories and models are being employed to accurately describe and explain patterns observed in various Arabic dialects. Assessment includes assignments and tests, as well as a writing component based on the students' individual research projects.

Prerequisites

- LNG231
- LNG241

LNG475 Current Topics in Language Rept Meaning & Mind (3 CH)

This course explores current topics in representation, meaning and mind. On a rotational basis, members of faculty suggest and teach topics related to their current work and/or research interests. Students are required to read literature that reports on research in which linguistic theories and models are being employed to accurately describe and explain patterns observed in various natural languages. Assessment includes assignments and tests, as well as a writing component based on the students' individual research projects.

Prerequisites

- LNG250
- LNG341
- LNG342

LNG480 Field Methods in Linguistics (3 CH)

The course investigates the grammatical properties of a lesser-studied language through consultation with a native speaker, including descriptions of its sound system, phonology, morphology and syntax. Students are introduced to the basic tools for conducting linguistic fieldwork, including ethical issues, use of equipment and software, data elicitation techniques and database construction. They hold class, group, and individual sessions with a language consultant, working towards developing a description of a particular phenomenon within a chosen grammatical component of the target language..

LNG485 Neuroscience of Arabic (3 CH)

This course examines the imaging and behavioural research methods used in the study of the neuroscience of language with emphasis on Arabic. It investigates language processing and representation by the brain, how to design a behavioural experiment and the techniques used, how to design imaging experiments, and when to use EEG/MEG or fMRI and TMS. The course introduces these techniques in the context of Arabic offering insights into neurocognitive issues that cannot be studied in Indo-European languages.

Prerequisites

- LNG231
- LNG241

LNG489 Integrated Capstone (3 CH)

This is an undergraduate course offered as a requirement of the Faculty of Humanities and Social Sciences. This course is intended to provide students with the opportunity to integrate and synthesize the material covered during their studies in Linguistics. The students are expected to expand upon the covered material, provide constructive critique of different theoretical approaches in the field, apply their knowledge to solving problems, address specific issues raised in introductory courses, explore key arguments in the field, make connections with general education, apply specific comparisons with other fields and finally extend their critical thinking in general. This course

results in the completion of a project related to the student's academic or professional practice. An account of the proposed projects topic including limited reference to the principal sources informing it must be submitted to the course instructor. The project must reflect a synthesis of skills and knowledge from the student's core course work in Linguistics. It must include a substantial written component but additional presentation formats will also be used (i.e., class presentations). Projects need to be relevant to the student's academic or professional goals and must incorporate significant content from a number of courses in the student's program.

LNG490 Senior Capstone (3 CH)

This course cultivates student skills in writing and presenting orally original research in a chosen field of linguistics. The course is offered in the form of lectures and student presentation/round-table discussions. Lectures discuss linguistic abstracts, book and journal reviews, and the stages of completing an original research paper. Particular attention is paid to the methodology, analysis, and argumentation of selected publications. Discussions strengthen the presentation and debate skills of the students.

Prerequisites

- LNG220
- ENG250
- LNG331
- LNG341
- LNG342

PHI101 Introduction to Philosophy (3 CH)

This course covers fundamental theories in the history of philosophy and examines what philosophers do, the role philosophy has played throughout the history of human thought and its ongoing importance in the contemporary world. It will introduce students to the core areas of logic, metaphysics, epistemology and value theory. It will examine specific topics such as the structure of valid arguments, the ultimate nature of reality, the relations between knowledge, truth and belief, and free will and determinism.

PHI121 Fundamentals of Environmental Ethics (3 CH)

This course covers the fundamental issues of Environmental Ethics and the most essential problems of environmental concern today. The course will focus on the ethical relationship between human beings and the natural environment, definitions of nature and wilderness, distributive justice and sustainability in the use of resources, global versus local responsibilities, the rights of future generations, and the relationship between environmental ethics and environmental politics.

PHI122 International Ethics (3 CH)

This course critically examines how ethical theory is applied in international situations and how ethics is the basis of, and is connected, to international law. Topics include, but are not limited to, critical analysis of global, transnational environmental duties, just war theory, women's rights, children's rights, human rights, animal rights, globalization, international justice, distributive justice, cultural relativism, and the ethics of tolerance and multiculturalism.

PHI180 Critical Thinking (3 CH)

Students will learn to recognize logical arguments in ordinary language contexts, to analyze those arguments into their constituent parts, and to test arguments for logical validity and soundness. Students will learn to recognize various sorts of fallacies and learn to distinguish different types of inference. Students will also learn how to draw argument diagrams, identify inference indicators and to construct logically valid arguments.

PHI200 Logic (3 CH)

This course examines the logical structure of reasoned argument, focusing primarily on propositional symbolic analysis of arguments. Topics include how to differentiate between valid and invalid argument, inductive and deductive inference, and sound and unsound argument. Special emphasis will be given to applications of propositional logic by translating arguments in ordinary language into symbolic language in order to evaluate their soundness, together with the identification of fallacies.

PHI211 Ancient Philosophy (3 CH)

This course examines the main problems of Ancient Greek and Classical philosophy and its most important figures. It covers the emergence of humanistic philosophical thought and its development throughout antiquity by investigating such thinkers as the Pre-Socratics, Sophists, Socrates, Plato, Aristotle, and the different Hellenistic Philosophical Schools and such topics as the ultimate nature of reality, philosophical method, theory of knowledge, political philosophy, ethics and aesthetics.

PHI212 Modern Philosophy (3 CH)

This course covers Western Philosophy from the 17th to the 19th centuries including Rationalism (including Descartes, Leibniz and Spinoza), Empiricism (including Locke, Berkeley and Hume), and German Idealism (including Kant, Fichte, Hegel and Schelling). It focuses on the metaphysics, epistemology, philosophy of science, philosophy of religion and ethics in each of these philosophical movements as well as the critical relations between them.

PHI225 Citizenship & Civil Society (3 CH)

This course examines the concepts of citizenship, rights, responsibilities and obligations. Students will learn how the concepts of citizenship and rights arose and developed and how they are understood in contemporary terms. Students will also learn how citizenship and rights affect the everyday lives of people in terms of immigration, security, patriotic duties, and the relationship of citizens to government.

PHI226 Human Rights Theory (3 CH)

This course examines the nature and origin of the concept of human rights and the applications of the concept in all levels of contemporary society and political structures. Various concepts and their implications for implementation for human rights will be reviewed. A philosophical framework will be used to examine, interpret, and explain the relevance of human rights to today's issues in a global framework.

PHI231 Aesthetics (3 CH)

This course examines the basic themes in aesthetic studies. The course will provide students with specific methods to analyze and evaluate works of art and literature. The course deals with various definitions of beauty, fine arts, criteria of aesthetic experience, creativity, criticism, and the relation between art and society. It also looks at the history of the development of aesthetic discourse, especially in antiquity, modernity and postmodernity.

PHI270 Philosophy of Education (3 CH)

This course critically examines philosophies of education and the conceptual relations between knowledge, truth, experience, culture and human values. It examines what can be taught, how it can be learned, and the philosophical psychology of education. Students will develop critical skills regarding education, teaching, learning and self-education, and will examine the development of education in contemporary society to achieve a greater understanding of the philosophical problems that underlie differing philosophical views of education.

PHI271 History and Philosophy of Science (3 CH)

This course deals with the most important methodological, metaphysical and epistemological problems connected to the rise of the natural sciences and their development. It also examines these issues with respect to the social sciences to see whether the natural sciences are their most appropriate methodological model. Topics include: the problems of contemporary scientific method, scientific realism, scientific antirealism, the development of scientific knowledge, confirmation, explanation, paradigms, scientific revolutions, laws and theories.

PHI310 Ethics (3 CH)

This course deals with the main problems of moral philosophy and its connection with practical life. It covers philosophical approaches to the nature of right and wrong, moral obligation, the source of moral rights and duties, teleological ethics, and moral values. It familiarizes students with metaethical perspectives on normative ethical theories and introduces students to the application of normative ethics to real life situations.

PHI312 Political & Social Philosophy (3 CH)

This course examines some of the main theories and concepts in the history of political and social philosophy in the western tradition. Figures examined include Plato, Aristotle, Hobbes, Locke, Rousseau, Hegel, Marx, Mill, Rawls and Foucault. Concepts discussed include: goals, purposes, guiding principles and moral principles underlying social and political philosophy, the state of nature, the social contract, the nature of justice, pluralism, the separation of powers.

PHI314 Contemporary Islamic Political Philosophy (3 CH)

This course examines Islamic political thought in the modern period by examining the works of a range of contemporary Muslim political thinkers: liberals, fundamentalists, moderates, revolutionaries, advocates of theocracy, and internationalists. Themes include: the development of classical Islamic political thought, concepts of society, authority, law, justice, international relations, the relation between religious and political institutions, and Islamic politics in a global context.

PHI315 Technology and Culture (3 CH)

This course explores basic concepts of technology and examines its specific approaches: from Aristotle in antiquity, Bacon and Descartes in early modern times, to 19th and 20th century approaches, including materialistic, idealistic, and phenomenological traditions, Critical Theory, Systems Theory and the recent visions of Techno-Science. It examines questions about the consitutive role of technology in the production of knowledge, the impact of technology on human identity and ethical questions about recent applications of technology in bioscience and nanotechnology.

PHI320 Ethics in Business Governance (3 CH)

This course examines issues in Business Ethics specifically designed for Management and related fields. Major topics covered include: Corporate Social Responsibility, Resource Management and Structural Efficiency, Organizational Diversity, Boards and Value Creation and Business Intelligence Practices. It places these topics in the context of contemporary global economics, international law, and theories of power, while also providing historical and humanistic perspectives on value theory.

PHI322 Epistemology (3 CH)

This course examines various theories of knowledge, both from an historical perspective and an analytical perspective. Topics covered include: the meaning of knowledge, theories of justification, types of knowledge, skepticism, and sources of knowledge. The course also investigates the institutional production of knowledge and the link between knowledge and power, and the processes for the authorization, production, reproduction and preservation of what counts as knowledge in the sciences and social sciences.

PHI323 Philosophy of Mind (3 CH)

This course explores various views on the problems of mind, such as the issues of consciousness, personal identity, mind/brain interaction, physicalism, functionalism, the relationship between computation and mind, and various architectures of the mind such as the modular, the multiple drafts and the theatre of the mind models. Of principle importance will be the relationship between abstract objects (such as mathematical and physical theories, logic and arguments) and the mind.

PHI331 Philosophical Problems (3 CH)

This course examines the philosophical dimensions of some topic of interest, or the work of a particular philosopher or philosophical movement. It will be tailored to the students' philosophical interests and the instructor's expertise to provide an opportunity to explore in depth some topic or topics that are not otherwise available. It enables students to refine and develop their research skills at the same time as acquiring specific knowledge about the chosen topics.

PHI332 Metaphysics (3 CH)

This course explores issues in metaphysics and philosophy of mind. Topics include causation, determinism, free will, the nature of consciousness, the nature of being and existence, space and time, identity, universals, the relation between mind and body and the relation of language to thought and the world. The course examines these topics both analytically and through the history of philosophy.

PHI333 Philosophy of Language (3 CH)

This course surveys traditional and contemporary problems related to language. Topics include: the nature of language, the relationship between semantic theory and philosophy of language, how language refers to the world, how thoughts receive mental content, the difference between what is said and what is communicated, truth, demonstratives, indexicals, and self-reference. The course examines these topics both analytically and by reference to the history of philosophy.

PHI362 Islamic Phliosophy (3 CH)

This course analyzes the sources, problems and trends of Islamic Philosophy. It deals with the factors that led to the historical rise of Islamic Philosophy, and also with the doctrines, concepts and arguments of Muslim philosophers. It analyzes the main problems of Islamic Philosophy, the connection between religion and philosophy, and Islamic perceptions of the relations between human beings and the universe.

PHI440 Cognitive Science (3 CH)

This course covers current theories and debates in cognitive science, the interdisciplinary study of mind, drawing on philosophy, psychology, linguistics, computer science, logic and neuroscience on the premise that the concept of information and computation are the key explanatory tools. Topics cover such issues as perception, reasoning, emotion, language, imagination, embodied cognition and extended cognition. The course draws on research in all the component disciplines to raise philosophical issues and to apply philosophical critique.

PHIL120 Principles of Professional Ethics (3 CH)

Students will examine various ethical theories and how they are applied to specific issues within business and professional life. Students will learn to develop their own professional ethics and to reason ethically about professional life. Students will learn key terminology, theories and problematic cases for professional ethics. Students will also learn how to research about professional ethics and how to propose and present rational, ethical justifications for their professional decisions.

TSL230 Development of Second Language Literacy (3 CH)

This course is especially designed to meet the needs of future middle/high-school English teachers and places an emphasis on effective techniques for instruction of the English language. It will acquaint students with the main facts of the pedagogical structure of English pronunciation, vocabulary, and grammar. It will also cover how to teach and test grammar and how not to teach grammar, including usage problems associated with contemporary grammar issues. Students will be introduced to fundamental issues underlying errors of grammatical usage. As each topic is considered, insights from linguistics that have important implications for teaching (such as preferred teaching methods and theories) will be introduced.

Media and Creative Industries

ART101 Arts and Society I (3 CH)

The course is an introductory survey of the methodical and practical integration of various research designs and methodologies in the arts, humanities and social sciences. It sustains and develops students abilities and interests and offers an opportunity for close engagement with fine art study, theory and practice. Students examine art as a social process and social context/s in which art is made, circulated and engaged, and what art can tell them about their own social and spiritual issues and institutions.

ART102 Arts and Society II (3 CH)

This course examines the interface between Islamic art, law and society from early Islam to the modern period through a series of themes and debates in Islamic discourse. Topics explored are the socio-legal definition of the 'artist': how market demands informed intellectual property; the formation of the city and urban space.

ART201 Drawing I (3 CH)

This course is concerned with the materials, techniques and subject matter of observational drawing and demonstrates how a variety of materials and production techniques in drawing can promote strong perceptual and conceptual development.

ART301 Painting I (3 CH)

This course is concerned with the foundational construction and design of painting and investigates the character and actions of various paints and techniques, both traditional and contemporary, on a variety of surfaces.

ART302 3-D Design (3 CH)

This course is the foundational study of fundamental 3-D design principles and techniques. Within its framework, students will complete a series of design projects in clay, plaster, wood and metal.

Prerequisites

- ART201 with a minimum grade D

ART303 Digital Photography (3 CH)

This digital photography course covers rules of composition, light, exposure, colors, etc. and demonstrates the use of Adobe PhotoShop CS, Lightroom, and other editing software. Students will create a portfolio with ten photos including detailed descriptions of their work.

ART382 Introduction to Art Criticism (3 CH)

This lecture course will introduce students to the fundamental, theoretical, and practical questions related to art as a significant part of society and culture. Students will consider their and others' aesthetic interpretations as a means to understanding art, and to promote an attitude of cross-cultural understanding. They will think about the roles of the maker, the object, and the viewer while interpreting a work of art. Students will also consider the context in which art is viewed, and how that influences a viewer's understanding of it. The course will include combination of lectures, discussions, and Power Points.

MASC605 Quantitative Research Methods (3 CH)

This is a three credit hour course designed to introduce students to quantitative research methods. Students will not only learn how to use research methods and statistical procedures but when to use them. Learning both is critical to understanding how to examine mass communications problems and issues. We will conduct a research study in this class from start to finish. Among the topics the course covers are: sampling, research design, observation and measurement, content analysis, statistical data analyses, documentation/reporting, and execution strategies and tools.

MASC624 Comparative Media Systems (3 CH)

Readings for MSC 624 will focus on the underlying cultural, political, economic, and social factors that determine the character of media systems in different parts of the world. The course will offer a conceptual roadmap to the evolution of the different media cultures we see around the world. Assignment of readings will be issued with an eye toward allowing the student to develop greater expertise in a couple of world regions of his/her research interest. The student will therefore be required to develop skills for an empirical examination of media systems in a sample of national contexts drawn from those regions.

MASC640 Qualitative Research Methods (3 CH)

This course introduces students to qualitative approaches and methods in mass communication research. Students will also be introduced to issues in the intellectual traditions in communication research such as positivism, critical realism, semiotics and structural analysis, discourse analysis etc. The course will also acquaint students with historical developments and ferment in mass communication research over the years. Students will be acquainted with empirical research methodologies such as ethnography, survey and qualitative textual analyses etc. The course will impart practical skills and competence required for qualitative research.

MASC712 Media Management (3 CH)

The course provides a critical look at key areas of responsibility for managers of media organizations namely, leadership, motivation, planning, marketing, and strategic management. Research may focus narrowly on one or more of these areas – depending on preset goals and outcomes of study plan.

MASC715 Seminar in UAE Media (3 CH)

Seminar presentation is on political, economic, social, cultural and technological conditions related to the history of UAE Mass Media (Journalism, TV, Radio , ..). The course focuses on the role of these media on social and political development in the UAE and media's role in nation-building. The student should prepare a study focus on the changes of modern media systems and its impact on social change.

MASC718 Seminar in New Media Studies (3 CH)

Seminar presentation on contemporary issues related to New Media and interactive technology in a critical and theoretical context. The course focus on issues related to the revolution of communication & information technology, digital media, Internet and social networks and future challenges facing traditional journalism.

MASC720 Communication & Social Change (3 CH)

This course will consider how journalism and the general practice of media professionals reflect as well as influence modern society. The course will commence with a discussion of the history of media and social transformation – going back to the Industrial Revolution. It will then move on to develop an in-depth theoretical analysis of the pervasive nature of media products in modern societies through an examination of both psychological and sociological theories touching on the role of media. The student will be expected to analyze mass media content within the framework of some of the salient media social functions and characteristics, including: ownership, business and control elements; ratings and readership studies; the functions of news dissemination; the entertainment function; the persuasive modalities of advertising, public relations and marketing; and the role of the media in the electoral process. International perspectives are also gained to enhance student understanding of the relationship of the citizenry to media around the world, as well as the function of media as an agent in public opinion and global public debate.

MASC736 Media & National Development (3 CH)

Readings for this course will focus on examining the role of mass media in national development. The student will develop a firm grasp of the evolution of theory and research in development-oriented communication, which can be traced only to WWII. Readings will also cover Western and non-Western

concepts of human development and how various media influence the processes of national transformation or modernization.

MASC743 Modern Communication Technologies in the Arab World (3 CH)

Readings for this course will focus on Communication Technologies and Arab civilization with emphasis on the role of communication technology in UAE. Readings will also cover the impact of communication technology on public and private institutions and on the social, cultural, and political environment.

MASC800 Comprehensive Examination (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student's knowledge of his or her discipline, as well as the student's scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. It must be taken before the start of the student's fifth semester in the program. Students taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end of the student's fifth semester. A second unsuccessful attempt leads to immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

MASC888 Research Proposal (0 CH)

Student prepares a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The Research Proposal course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Corequisites

- MASC800

MASC900 Dissertation Research (30 CH)

Student conducts high quality academic research under the direction of his/her supervisor. Student and supervisor shall meet on regular basis and discuss progress and issues related to the student's dissertation research. Furthermore, the student writes an annual report based on a meeting with supervisor and Advisory Committee, in which a review is conducted to determine progress, identify problems, and project dates for completion of various tasks. The research shall represent original contribution to human knowledge in the particular academic field and is presented in a written research dissertation of a publishable standard. The document shall also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the College of Graduate Studies.

MASC910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based on two main parts: (1) the Committee's evaluation of the dissertation document and (2) the Committee's evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal. The Dissertation Defense course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

MSC200 Introduction to Mass Media (3 CH)

This course provides students with a comprehensive view of the science of communication, including interpersonal and mass communication processes and their functions in modern societies. It provides a historical background to the emergence of the press, radio, television, cinema and news agencies, and the development and characteristics of these media. In addition, it gives overview of advertising, public relations, public opinion, and propaganda. .

MSC203 Principles of Visual Communication (3 CH)

Visual Communication is a course designed to explore several questions: What are your personal responses toward a particular visual presentation? How can you relate what you see with history of the medium of presentation? What do you know about the technology that makes possible the presentation of the information displayed? Are you aware of the ethical responsibility that producers of visual messages have in creating images that are compelling and yet do not stereotype individuals?

MSC211 Principles of Oral Communication (3 CH)

This course covers the basics of oral communication, with special focus on public speaking, interpersonal communication, small group communication, and the principles and contexts of oral communication. The course involves communicating with different audiences (in the UAE) that use both languages (English and Arabic) in communication.

MSC235 Principles of the Writing for Media (3 CH)

This course covers the gathering, organizing, and writing of news in a clear, concise and readable manner. The course will focus on developing students' writing and research skills as well as specialty skills needed to write different types of stories. It will examine the variations of writing associated with different media. Ethical dimensions of news writing is also addressed.

MSC240 World and Arab Media (3 CH)

Understanding the dynamics of the Arab media requires and understanding of general developments and trends in world media. This course therefore provides students with understanding of the Arab media including the historical, cultural and economic forces that shape their development. In doing this the course will address theoretical and conceptual issues in world media that have implications for media development in the Arab world.

MSC243 Public Relations & Advertising Principles (3 CH)

This public relations and advertising course covers definitions and functions of PR & advertising, the PR process, the marketing and promotional approaches

to advertising, the PR & advertising agencies, the societal role of advertising, as well as the emerging emphasis in integrated marketing communications.

MSC250 Photojournalism (3 CH)

This course covers the camera and its accessories, lenses, shutters and shutter speeds, printing paper, film varieties, and the darkroom. It also focuses on the picture as a means of non-linear visual communication, characteristics of a good photojournalist, and the press photograph, including its varieties and sources. Practical exercises in photojournalism are provided.

MSC257 Television Production I (3 CH)

This course covers the fundamentals, theories and aesthetics of television production, focusing primarily on studio production techniques, including camera training, lighting, sound recording, storyboard designing, script writing of different format of TV programs and post-production basics. The course prepares the students with hands on experience in the studio and field , getting them ready for entering the TV industry.

MSC264 News Writing (3 CH)

This course covers the fundamentals of news writing and fact-gathering for the mass media, including discussion and laboratory practice in advanced news writing techniques, including various story types and deadline pressure. Heavy emphasis is placed on meeting professional standards of journalism writing, writing the straight (objective) news story and writing for deadlines.

MSC270 Writing for the Media (3 CH)

This course focuses on improving the preparation and writing of the common trait across differing media types if the story line itself. It takes a holistic approach, focusing not on the process of writing alone, but on every element important to the story writing process, from finding the story and credible sources (as important to media writing as to academic writing), to anticipating and even shaping audience response through the completed product and follow-up coverage.

MSC316 Broadcast Management (3 CH)

This course covers the management aspects of television and radio organizations, including programming, sales, organizational structures, and personnel. It aims to help the student acquire management skills and an understanding of management theory. It will relate the management and communicative process to an individual's success within the organization.

MSC342 Writing for Public Relations (3 CH)

The course covers all forms of writing for public relations, including press releases, public service announcements, magazine queries, securing television and radio interviews, coverage memos, media alerts, features, trade press releases, newsletters, backgrounders, and public relations presentations. Successful students will be able to go to job interviews with the assurance that they have had professional exposure to the writing required for a PR career.

MSC352 Writing for Broadcast (3 CH)

Four major topics are covered in this course: (1) writing for broadcast: emphasis on developing the student's understanding of grammar and style in the construction of effective news stories; (2) newsroom structure: understanding who does what in today's broadcast newsroom and how economics affects the flow of information; (3) journalism ethics: analysis of personal values, ethical principles, and journalistic duties that influence newsroom decisions; and (4) legal considerations in news gathering with special attention paid to libel laws and invasion of privacy.

MSC355 Television Production II (3 CH)

The focus of this course is producing and directing television programs at the intermediate and advanced level. The course is a continuation of Television Production I, designed to build on basic video production principles learned in that course. This course will incorporate both studio and field production techniques using both analog and digital technology. Using lectures, screenings and hands-on labs, students will gain a more in-depth understanding of video production and the business of video production.

Prerequisites

- MSC257

MSC356 News Reporting (3 CH)

This course explores the development of information-gathering skills for presentation through mass media with emphasis on interviewing and reporting, developing sources, research and accuracy. The process of reporting from collecting information, interviewing and writing involves in the practical setting the use of both languages

Prerequisites

- MSC264

MSC370 Communication Theories (3 CH)

This course examines communication theories in the context of available empirical and qualitative research findings and discusses models of interpersonal and mass communication processes. The course reviews and analyzes the 'effects' theories and hypotheses, including the 'gatekeeper' theory, the 'two-step flow of information' theory, the 'agenda-setting' theory and the 'uses and gratification' theory, together with more recent theories of communication.

MSC381 Translation for Communication (3 CH)

This course focuses on journalistic translation from English to Arabic. Extensive exercises are provided for translating simple and complex news material dealing with local, Arab, and international events and issues. The course aims at enhancing students' skills in translating media texts.

MSC390 News Editing (lab) (3 CH)

The course is considered an Introduction to news writing including, the techniques of news gathering, reporting, and interviewing; the use of library and online database research methods; and other related skills. The course provides practice in the skills needed in the electronic newsroom, using the desktop publishing lab facilities. It also focuses on the Fundamentals of copy editing, headline writing, and newspaper layout .Students write basic stories under real time constraints

MSC391 Communication in Modern Societies (3 CH)

The course is an introduction to the roles and functions of print, film, electronic and digital media . It investigates the roles of mass media in the diffusion of knowledge and solving the problems associated with personal and collective uses of modern media outlets. Moreover, it introduces the vast changes in the technology, practice, and business of mass communication that have accompanied the diffusion of digital devices, the development of the World Wide Web.

MSC396 Communication Research Methods (3 CH)

This course involves a discussion of the theoretical and administrative research methods in communication. Methods include the survey, the case study, the historical method, the experimental method, the anthropological method and content analysis, with an emphasis on mass communication research applications.

MSC401 Computer Assisted Reporting (3 CH)

This course introduces the techniques of computer-assisted reporting. Building upon your basic reporting and critical thinking skills, the course will show you how to use the computer as a tool in news gathering and data analysis. You will learn how to find and critically evaluate information from the Internet, principally the World Wide Web. . Your training will include how to use a basic computer programming language to ask questions of your data. Additionally, you will learn about the legal aspects of computer-assisted reporting..

Prerequisites

- MSC356

MSC411 Case Studies in Public Relations (3 CH)

This course analyzes selected case studies in public relations in public and private organizations in the United Arab Emirates and in the GCC states. Students will also prepare further cases in public relations and discuss them in terms of problems and challenges facing PR practitioners.

MSC412 Public Opinion (3 CH)

This course deals with public opinion, the factors affecting its formation, its measurement techniques, and its interactive nature. Public opinion in international and national issues is presented and discussed The course focuses on the uses and effects of political communication on individual citizens and the formation of public opinion. The influence of media use on citizens' political attitudes, opinions and behavior will be a central topic of this course. Case studies of political propaganda and psychological warfare are presented.

MSC420 Radio Production I (3 CH)

This course introduces the fundamentals of radio broadcasting and radio production techniques. It begins with an overview of the history of radio industry and development, studio, program structures and formats, followed by techniques that will set students in great stead for their radio careers: from interview strategies, news-reading and broadcasting outdoors, to audio editing and creating podcasts.

MSC422 Organizational Communication (3 CH)

This course discusses the concept of organizational communication as an important aspect of internal practices at public and private organizations. It focuses on the channels, types, and directions of communication within organizations as well as the parties involved in it.

MSC435 Intensive Research/Writing (3 CH)

This course is designed to acquaint students with research, writing strategies and the vast array of information sources available in communication. The Course describes the strategies involved in selecting, refining, and researching communication topics. It is a guide to the literature, explaining the content and utility of significant and representative research sources. It is also a research tool, and provides an opportunity for students to use and become familiar with research materials.

MSC450 Newspaper& Magazine Production (3 CH)

This course presents a theoretical introduction to the role of the managing editor and his functions in the Arab press, printing technology, functions, and impact of newspaper and magazine production, headlines and photographs, design and layout of the front page and magazine design. A practical workshop for these skills is offered using manual as well as computer software programs.

Prerequisites

- MSC390

MSC452 Public Relations & Advertising Campaigns (3 CH)

This course provides integrated and comprehensive experience in advertising and public relations decision making. Students are trained to use the experiences gained in executing a comprehensive and integrated public relations and advertising campaigns region in particular will be the main focus.

Prerequisites

- MSC243

MSC460 Radio Production II (3 CH)

This advanced course in audio production takes off from the assumption that there is a difference between the public and the commercial models in broadcasting and, while the course will study production in both strands the emphasis will clearly be on imparting skills and competencies in commercial radio production including programming and promotion etc. Given that the course is production inclined students will be encouraged to spend a lot of time on practical studio assignments.

Prerequisites

- MSC420

MSC462 Designing Media Messages (3 CH)

This course provides students with the conceptual and practical experiences of visual communication in the modern world as it aims to produce students fully versed in both the theory and application of visual communication principles in different settings. Through lectures and practical projects the course will cover the application of effective, targeted visual communication through production of graphics and desktop publishing and accounts for both the conceptual and the technical aspects of graphic design.

Prerequisites

- MSC243

MSC480 Contemporary Issues in Mass Communications (3 CH)

This course investigates contemporary issues in Mass Communication and major issues and developments affecting journalism, public relations and advertising, radio, TV, and related fields, including social issues, international issues, and issues related to media in the Gulf region. Students explore ethical considerations related to coverage of social upheavals including wars. They analyze how media coverage frames problems and the search for solutions

MSC484 Integrated Capstone (3 CH)

This course fulfills your senior year requirement of the College of Humanities and Social Sciences at the United Arab Emirates University. We will explore topics related to your major areas, i.e. public relations, advertising, journalism, media, and the liberal arts in general. The purpose of this course it to help you transition from your undergraduate education to the wide world, either in the working arena or towards graduate education. MSC 400 attempts to link communication skills, knowledge, and competencies with your knowledge is mass communication and liberal arts and sciences as you contemplate major issues facing society both in the UAE and at a global level.

MSC485 Practicum in Digital Production (3 CH)

This course provides students with skills training in a variety of media production areas. Topics include non-linear editing, digital post production, location sound production, location lighting techniques, and cinematography. Students with some background in film, video, and/or audio gain an

understanding of the professional model of media production by assisting in the planning and shooting of a dramatic film.

Prerequisites

- FIL345 with a minimum grade D

MSC487 Women and Media (3 CH)

This course focuses on Women and the Media and examines women who influence community development, concentrating on the role of Mass Media in building cultural images. Readings will emphasize theories on how media shape public attitudes about gender issues and the role of women in modern society. Students will explore historic evolution of feminist thought in various cultural contexts – with a special focus on Arab and Islamic regions..

MSC490 Practicum (6 CH)

This course comprises a minimum of 300 hours of supervised field experience in a professional setting, on campus or in a communication organization, for students completing their academic preparation. The purpose of this course is to give students work experience under the supervision of professionally – qualified mentors. This supervised work experience helps to bridge the gap between the academic program at the University and the actual world of the working professional. (The internship is conducted over a complete semester. No courses are allowed to be registered during the internship)

Geography and Urban Sustainability

GEO200 World Regional Geography (3 CH)

This course provides an introduction to world geography, emphasizing a regional approach, and comparing characteristics such as social, political, economic, and environmental aspects that contribute to the diversity in world regions. The course examines a broad range of geographical perspectives covering all of the major regions of the world. Each region is reviewed in a similar structure so that students can clearly examine similarities and differences between the regions of the world.

GEO201 Physical Geography (3 CH)

This course examines the spatial patterns and interrelationships among physical elements at the earth's surface. Emphasis is given to developing an integrative view of how atmospheric, hydrologic, geomorphic, and biotic processes control the patterns of climate, water, landforms, soils, and ecosystems across local, regional and global scales. It concentrates on the terrestrial landscape, the atmosphere, hydrosphere, lithosphere, and biosphere and the human interactions with their natural world.

GEO210 Human Geography (3 CH)

This course focuses on the discussion of the human impacts on the environment, pollution, population explosion and movements, and the benefits of geography to society. The course objective is to introduce the study of human geography by providing not only a body of knowledge about the creation of places and regions, but also an understanding of the interdependence of places and regions in a globalizing world.

GEO211 Remote Sensing (3 CH)

This is a lecture/lab course that provides a foundation in the theory and techniques of remote sensing and geospatial data, characteristics of remote sensors, and remote sensing environmental applications. Topics will include the electromagnetic radiation spectrum from the ultraviolet to microwave and interactions with terrestrial surfaces, optics and sensor design, image processing and data visualization. The course and lab exercises are designed to provide students with an overview of the remote sensing process and information extraction.

GEO220 Principles of Cartography (3 CH)

The course provides an introduction to the history of cartography and the new automated mapping techniques. Topics include a brief introduction to basic cartographic principles such as map projections, map scale, coordinate systems, raster and vector data structures, data sources and accuracy, cartographic design (graphic communication, scale, color, typography and lettering the map), and statistical surfaces (dot map, profiles, land-surface form, contours).

GEO221 Geographic Information Systems I (3 CH)

This is a lecture/lab course designed to introduce students to the fundamentals of GIS. The lecture part of the class focuses on the history of GIS, major components of a GIS, geographic data sources, vector and raster models, database development and management techniques, and spatial analysis. The lab portion is hands-on, where students use GIS software to apply the principles and methods discussed in the lectures towards solving real world problems.

GEO231 Economic Geography (3 CH)

This course deals with the economic activity of human societies within the global economy. It describes the structure of the global economy and the various approaches used to understand the global arrangement of economic activities. It explores elements of investments as production, consumption, distribution, foreign exchange, and current economical problems. It concentrates on macro and public sector economics, revenue generation, finance of public infrastructure, operating budgets for urban areas and micro concepts as utility maximization and rational decision making.

GEO232 Urban Economics (3 CH)

This course emphasizes the use of economic theory in urban planning, evaluation and role of urban planning in market economies, theories of regional development and economic growth, balanced and unbalanced growth, income distribution, theories of urban growth, urban location theories. As this course studies the functions of the urban economy: it concentrate on macro, public sector economics: revenue generation, financing of major public infrastructure, operating budgets for urban areas and introduce micro concepts.

Prerequisites

- GEO210 with a minimum grade D

GEO334 Spatial Analysis (3 CH)

The course covers basic statistical concepts, non-spatial and spatial measures of central tendency and dispersion, basic probability, spatial data analysis,

statistical theories, methods and problems in spatial data sampling (random, systematic, stratified, clustered). It also introduces students to statistical hypothesis tests (normal distribution, Pearson's chi-squared test (X2), t-test), and geographical dimension of attribute (thematic and distribution maps). Moreover, this course covers ANOVA analysis, correlation analysis between geographical phenomena, regression model and collinearity diagnostics.

GEO341 Geography of Population (3 CH)

This course examines population and all related aspects such as distribution, composition, demography, explosion, migration, income, disease, projection, and future trends of a population of a geographical space. The study of population deals literally with life and death. For this reason alone, the subject occupies a place of importance in a wide variety of academic disciplines, as well as in government, service organizations, business, and industry.

Prerequisites

- GEO210

GEO345 Urban Demography (3 CH)

This course addresses the role of population in urban policy and planning, and the impact of a changing population and their activities on cities. It uses census data in deriving measurements and conducting analysis on population distribution segregation in urban centers. The course concerns with the study of population growth (migration and natural increase) to determine infrastructure and service's needs. Urban demography stresses also on the study of population characteristics and its role in changing the landscape of urban centers.

Prerequisites

- GEO210 with a minimum grade D

GEO351 Computer Maps (3 CH)

The course focuses on using computers in map-making, map design, data structure, thematic mapping, and enhancement of communication and visualization. Topics covered include use of GPS for mapping, 3-Dimension,

new means of map communication such as on-line maps, mobile maps, animated maps, virtual reality, and multi-media. The course includes a laboratory portion that provides students with hands-on ArcGIS and 3D Analyst.

Prerequisites

- GEO220 with a minimum grade D

GEO370 Transit Oriented Development (TOD) (3 CH)

This course provides an introduction to TOD and covers the historical development of transit, organizational structure, ridership trends, and performance measures. Special attention is also paid to the fundamental strategies and tools for TOD implementation, and how it operates within the existing built environment. It also examines TOD's benefits, impacts, barriers, practice from different transit oriented projects implanted in the world including: USA, Singapore, Italy, Netherlands, Tokyo, and UAE (Dubai).

Prerequisites

- GEO210 with a minimum grade D

GEO372 Planning Theory and Practice (3 CH)

This course focuses on the development of contemporary planning concepts and principles; the nature, purpose and scope of urban planning. It gives an historical overview of the theory of planning and discusses the role of the state, the private economy and the civil society in different planning theories. A range of development planning tools is introduced as: SWOT Analysis, economic and demographic trend analysis, private/public/NGO partnerships, sustainable development planning indicators, and outcome evaluation.

Prerequisites

- GEO210 with a minimum grade D

GEO382 Geography of Industry (3 CH)

This course explains the location of industrial activities from the perspective of regional and local development. It focuses on explanations of factory location, the role of location in corporate strategies and the geographical structure of production systems, including industrial districts. Emphasis is on the organizational structure of the economy, especially the dominant role played by multinational firms (MNCs). Topics covered include: importance of the geography of industry, theories and rules of industry, relationship between industry, mineral resources, transportation, and urbanization.

Prerequisites

- GEO221

GEO400 Practicum (3 CH)

This course is designed to expose students to real world practices in governmental departments such as municipalities, town planning, telecommunications, police, and environment. The student will be engaged in real world projects at the governmental or private departments and supposed to adhere to the departments' rules and gain some skills such as project management, technical skills, and personal development. By the end of the course a student has to prepare a report and make a presentation about his/her experience. (This course should be taken over a complete semester. No courses are allowed to be registered with it)

GEO402 Land Use (3 CH)

The course provides an introduction to land use planning in urban areas, land use theories, planning processes, and decision making. Special attention is paid to different types of land uses in urban areas: residential, open space, commercial, industrial, and interconnections between different types of land use. Students will understand the importance of land use tools in the planning process and its impact on cities and the welfare of urban residents. The course also covers zoning and growth management strategies.

Prerequisites

- GEO221 with a minimum grade D

GEO410 Research Seminar in Geography (3 CH)

Research is the basic focus of this subject. At its most fundamental level research is simply a consistent way of asking questions and finding answers to them . The course covers diverse topics related to research methodology in geography. For example, research methods/approaches, types of research, sources of data for research (geographical, statistical), field survey, geographical techniques for research, steps for producing geographical research, and factors controlling good quality research. (This course should be taken over a complete semester. Other courses can be registered with with it).

GEO411 Oceanography (3 CH)

This course presents an integrated overview of the principles and concepts of the geology, chemistry, physics, and biology of the world's oceans and seas. This includes the study of the origin of seas and oceans, physical and chemical characteristics of ocean water, waves, topography and biotic life in oceans and seas. The importance of gulfs and canals and international sea boundaries is analyzed as well from an economic and political point of view.

Prerequisites

- GEO201 with a minimum grade D

GEO412 Geography of Arid Lands (3 CH)

The course focuses on studies of arid zones, causes of aridity, topography, climate, soil, vegetation cover, animals, and human life in arid zones. Special attention is paid to activities and problems in arid zones such as agriculture, grazing and water. Unique physical environments of arid lands and human interactions with these environments over space and time as well as the physical and environmental issues of the arid lands in the region are also considered.

GEO413 Geomorphology (3 CH)

This course involves the study of the characteristics, origin and development of landforms and examines the processes operating within the Earth's surface systems that shape, modify and lead to the genesis of the surface landforms.

From the perspective of landscape management, the course places emphasis on the understanding the processes of weathering, slope development, fluvial systems, desert features, glacial landforms, coasts and shorelines. Topical issues in geomorphology in the UAE are discussed in detail.

Prerequisites

- GEO201 with a minimum grade D

GEO420 Cartography II (3 CH)

This course involves the study and application of advanced aspects of thematic cartography to the design and production of innovative maps and atlases. As well as it provides the chance to produce a cartographic portfolio of well-designed, professional grade maps. It covers theoretical concepts, advanced techniques of data presentation and cartographic production about visual communication, perception and cognition; map reading, analysis and interpretation activities and tasks.

Prerequisites

- GEO220

GEO422 Geographic Information Systems II (3 CH)

This course is intended for students who have the desire to advance their understanding and research of geographic information systems and technology. Emphasis is placed on the development, integration, and visualization of spatial data for characterizing environmental systems. Application and evaluation of spatial analytical methods to environmental systems and databases of interest to the student are emphasized. Finally, student projects are presented in a “conference” setting during the last two week of class.

Prerequisites

- GEO221 with a minimum grade D

GEO430 GIS for Transportation (3 CH)

This course explores the spatial aspects of regional transportation systems including the description of network structure and flows. Topics include an introduction to models for analyzing multi-modal transportation flows and congestion over urban road and transit networks. These models include trip generation, trip distribution, modal split, and trip assignment and routing algorithms. Applications are developed in a Geographical Information Systems environment. Models are extended to urban land use, spatial safety analysis, pavement management system and air quality applications.

Prerequisites

- GEO221 with a minimum grade D

GEO431 Natural Hazards (3 CH)

This course examines the causes, physical processes and geographic distribution of natural hazards. The aim of the course is to examine the occurrence of particular types of natural hazards, their causes and resulting social impacts. Emphasis is placed on the geographical distribution of natural hazards, the risks that they present and various response methods. Details of the systems for predicting these events and attempts made to reduce the severity of the impacts generated are also examined.

Prerequisites

- GEO201 with a minimum grade D

GEO432 Geography of the UAE (3 CH)

This course covers the geography of the United Arab Emirates (UAE) with a focus on the different geographical concepts. The entire human and physical geography of the UAE is covered in details within the course. Topics include history of the UAE as a country (from when the country was established), the landscape and geomorphology, climate and weather systems, and natural resources.

GEO438 Regional & Urban Planning (3 CH)

This course focuses on the relationships between urban and regional planning and the geography of regions and cities. It lays out a foundation for the planning of cities and regions, requirements for planning, models of planning, planning principles, geographical dimension of planning, major stakeholders of planning and land use, what factors impact planning decisions making process, and samples of planning entities from UAE.

Prerequisites

- GEO210 with a minimum grade D

GEO440 GIS for Urban & Regional Planning (3 CH)

This GIS course focuses on the application of geographic information systems in the practice of urban and regional planning, with a focus on land use and environmental issues. Topics covered include GIS in decision support, GIS workflow strategies, and GIS for Decision Support in Land, Transportation, and Water Resource Management. The central component is a class project covering the collection, formatting, analysis, and presentation of land use data for a GIS application.

Prerequisites

- GEO221 with a minimum grade D

GEO443 Geography of Transportation (3 CH)

This course introduces the main concepts and methods of transport geography, as well as provides an overview of the historical evolution of transport systems and urban form. Moreover, this course examines transportation modes (land-sea-air), transportation terminals, spatial interactions, urban transportation and environmental impacts. It also investigates the relationship between transportation, economy, transportation networks, and planning. This course also outlines current transportation issues, such as congestion, air quality and sustainable transport.

Prerequisites

- GEO210 with a minimum grade D

GEO450 GIS for Coastal Management (3 CH)

The course provides an introduction to the fundamentals of GIS and coastal management. It focuses on how to manage and monitor characteristics of the marine environment, marine resources, organisms and economic importance, hazards of pollution, conservation laws, maritime boundaries, and legal aspects through remote sensing and GIS. The laboratory portion provides students with hands-on contact with GIS and remote sensing information products and their applications in coastal management.

Prerequisites

- GEO221 with a minimum grade D

GEO451 Digital Imaging Analysis (3 CH)

This course covers various advanced techniques of image processing and analysis of remotely sensed digital data. Topics include radiometric correction, geometric correction, atmospheric and ground effects, image enhancement, spectral analysis, color processing, image filtering, supervised and unsupervised image classification, fuzzy classification, post-classification, accuracy assessment, change detection, and image compression. Practical exercises based on satellite datasets using image processing software such as ERDAS/ENVI/IDRISI is an integral part of the course.

Prerequisites

- GEO211

GEO452 Climatology (3 CH)

This course examines climatological processes to arrive at an understanding of how and why climates vary spatially and temporally. The course is an introduction to the science of climatology and provides an overview of the physical processes that determine global and regional climate, including: radiative energy transfer; general atmospheric circulation patterns; atmospheric moisture and clouds formation, forms of condensation and precipitation; and global warming and climate change. The emphasis is on the processes that control the Earth's climate.

Prerequisites

- GEO201 with a minimum grade D

GEO460 GIS for Petroleum (3 CH)

This course explores spatial analysis, 3D modeling in GIS, remote sensing, GPS, and GIS data used for conducting optimum oil exploration operations, production, marketing, and environmental impact of petroleum. It covers advanced applications of multi spectral imagery for oil industry environments, locating optimal position of a new outlet, and thematic mapping of petrol stations. The course further develops hands-on skills with industry-standard GIS software for application in geologic and geophysical analysis.

GEO461 Geography of Tourism (3 CH)

This course examines the nature of tourism, associated economic, environmental and socio-cultural consequences. It considers the functional system of tourism; impacts of tourism on regions, communities and landscapes; tourism-resources management and planning. It introduces the basic concepts and practices associated with tourism research, development and planning from the economic geography perspective. It will explore the complex nature of tourism focusing on the spatial interactions between location, the development of tourism activities and their impact on the physical and human landscape.

GEO462 Current Environmental Issues (3 CH)

The course addresses current environmental issues. Topics covered in this course include: the natural environment (atmosphere, hydrosphere, lithosphere, biosphere), the environment as interrelated systems, human impact on the environment (urbanization, pollution, global warming), environmental management methods, environmental conservation, environmental impact assessment, and environmental issues related to the UAE and the Gulf. Student has to complete a short report in one of the environmental problems.

Prerequisites

- GEO201

GEO463 Tourism Policy and Planning (3 CH)

This course integrates the social, cultural, environmental, economic and political perspectives on tourism. It consider theory; delivery of services; spatial aspects; economic dimensions and impact; planning; policy; future dimensions; and current research. Topics covered in this course include the relationship between tourism development and urban planning and other geographical phenomena, global tourism, factors affecting tourism (beaches, archeology, historical sites), local tourism and its impact on development, scenic sites in the world, and tourism in the UAE.

Prerequisites

- GEO210 with a minimum grade D

GEO470 GIS for Environment (3 CH)

The objective of this course is to explore and use GIS and remote sensing in managing the environment, pollution, preserving cultural heritage through restoration and preservation projects and through participation in municipal planning and development decisions. The GIS will help inventory and analyze pollution, cultural, historical, and environmental resources. For example, integrating historical information with the current data to create a computerized model of the life processes that have sustained the community over time.

GEO472 Politics and Planning (3 CH)

This course addresses the ways in which local citizens and officials influence the physical shape of the city, government operations, resources available, and opportunities for people to enjoy lives of quality. Urban Politics analyzes the forces that shape the city and emphasizes on how people engage with urban problems and participate in community and economic development. The course selects different countries in the Middle East and the West to make a comparison in the nature of political authority.

Prerequisites

- GEO210 or GEO200 with a minimum grade D

GEO480 GIS for Project Management (3 CH)

The course covers the skills essential for project success in the GIS business environment including a best-practice approach to planning and managing remote sensing and GIS projects of any size. The course focuses on better management of people, tools, and processes to accomplish a GIS project within time, budget, and according to specifications. The course also highlights areas of spatial data policy institutional frames and copy rights.

GEO481 Urban Planning Internship (3 CH)

This course helps the students make the transition into the professional world. It seeks to expose students to real world practices and enhance their learning experience by participating in a professional planning environment including private business sector and public service sector (e.g., municipalities, town planning, urban planning council, telecommunications, police, department of transportation, private planning consulting firms, and environment agencies). (The course is conducted over a complete semester. No courses are allowed to be registered during this course).

GEO485 Integrated Capstone (3 CH)

A capstone is designed to provide opportunities for students to integrate knowledge from their core and concentration courses, to gain insight into the meanings of professionalism and professional practice, and to reflect on the norms of a discipline or profession. It has been designed to give students exposure to the policy and planning process through projects, critical thinking work, and other assignments, with emphases on integrating aspects of research, policy-making, management, science, and technology. Capstone courses involve projects writing of original geographic research done for real clients. All registered students are required to choose and concentrate on a geographic topic of their interest.

GEO490 SIS for Planetary Surfaces (3 CH)

This course will introduce students to planetary and solar system, space planetary missions, planets geological and atmospheric processes, as well as planets composition and physical properties. This course is based on the application of SIS for studying and modelling planetary surfaces and their atmospheric conditions with more focus on planet Mars, which is one of the

UAE government priorities. Students taking the course will be able to map different atmospheric and topographic features in different planets, particularly Mars using ArcGIS and JMARS software. Vector and raster datasets will be discussed with more emphasis put on raster datasets as applied remote sensing which is more suitable to model the planets' surface processes and related phenomena. The students will be able to analyze space remote sensing data and develop research projects. The course is designed to introduce students to the techniques of remote sensing measurements of environmental parameters from satellite and space platforms. This course will provide the students with the needed technological and analytical skills in the space science field.

Prerequisites

- GEO221 with a minimum grade C

GEO610 Social Impact Assessment (2 CH)

This course assesses the impact of humans and social activities on the local, regional and global environments. It introduces the basics of environmental science, human activities and environmental problems, discusses issues of ecological sustainability and environmentally sustainable societies. It discusses possible solutions for human induced environmental problems, and how to sustain different ecosystems, biodiversity and societies natural resources. Students are expected to produce a short research paper on an environmental topic of their interest.

GEOG601 Topics in Urban Geography (3 CH)

This course provides a comparative study of the location, function, and internal spatial structure of urban area. Special attention is given to the impact of transportation, residential, commercial, and industrial activity on the changing form of cities and suburbs. The course also examines contemporary patterns of urban and economic growth and urban-based development the changing trends in urban organization at the regional, national and global scale. New systems of world cities are critically analyzed.

GEOG602 Special Topics in Physical Geography (3 CH)

This course involves an investigation of special topics in Physical Geography and may include coursework under headings of climate, soils, water,

vegetation, biogeography, coastal resources or geomorphology. The course is designed to provide for instructors an option to address a topic in physical geography with which they are especially concerned; usually more restricted than the subject matter of a regular lecture course. Content vary and depends on instructor.

GEOG603 Advanced Topics in Remote Sensing (3 CH)

This course is devoted to understanding the physical processes involved in remote sensing. Emphasis is based on topics of radiative transfer in the atmosphere, at the surface, and in sensors. Atmospheric correction of satellite data, reflectance modeling, advanced sensor systems, and geometric effects.

GEOG604 Advances in Environmental Change Studies (3 CH)

This course introduces the changes in the global pattern of climate, landforms, vegetation, and soils. It discusses the relative importance of natural and human-induced ecological changes, and introduces the use of satellite data for detecting and monitoring, global warming, forest clearance, accelerated soil erosion, climate change and its consequences.

GEOG605 Topics in Economic Geography (3 CH)

This course focuses on industrialization, urbanization and regional development. It examines the location effects of developments in manufacturing, services, trade, and finance. Topics as the dynamics of technical change, labor relations, industrial organization, and industrial restructuring will be examined. The course also addresses employment and the social fabric of cities and regions. It critically analyses the competition and national rivalries in the global economy. Emphasis is on the U.A.E.

GEOG606 Topics in Climatology (3 CH)

The course is offered in form of lecture series on topics of major importance in climatology. Discussions include issues such as the causes, evidence, future projections, societal and environmental impacts, and potential solutions to climate change. Lectures and directed discussions on global warming with a focus on scientific issues, the nature of the global climate system, factors influencing climate including interactions among the atmosphere, oceans, solid earth, and biosphere form part of the course.

GEOG650 Remote Sensing of Terrestrial and Planetary Surfaces (3 CH)

This course explores the principles and techniques for remote sensing of terrestrial and planetary surface properties including composition, morphology and thermo-physical properties. It presents the theoretical foundations of various techniques and their applications to a range of problems that can be addressed using remote sensing. Students will get hands-on experience obtaining, processing and interpreting remote sensing data. They will be able to identify and use appropriate types of data and techniques for answering particular scientific questions.

Prerequisites

- PHYS105 with a minimum grade C
- PHYS110 with a minimum grade C
- MATH105 with a minimum grade C
- MATH110 with a minimum grade C

GEOG660 GIS for Planetary Surfaces (3 CH)

This course will introduce students to planetary and solar system, space planetary missions, planets geological and atmospheric processes, as well as planets composition and physical properties. This course is based on the application of GIS for studying and modelling planetary surfaces and their atmospheric conditions with more focus on planet Mars, which is one of the UAE government priorities. Students taking the course will be able to map different atmospheric and topographic features in different planets, particularly Mars using ArcGIS and JMARS software. Vector and raster GIS datasets will be discussed with more emphasis put on raster GIS as applied remote sensing which is more suitable to model the planets' surface processes and related phenomena. The students will be able to analyze space remote sensing data and develop research projects. The course is designed to introduce students to the techniques of remote sensing measurements of environmental parameters from satellite and space platforms. This course will provide the students with the needed technological and analytical skills in the space science field.

Prerequisites

- PHYS105 with a minimum grade D

- PHYS110 with a minimum grade D
- MATH105 with a minimum grade D
- MATH110 with a minimum grade D

GEOG670 Planetary Atmospheres (3 CH)

This course is an introduction on the physics and chemistry of planetary atmospheres. Both the Earth atmosphere and the atmospheres of other Planets (Venus, Mars, Jupiter, Saturn, etc.) will be part of the course, starting off with the origin and evolution of planetary atmospheres. Students will be introduced to the physical laws that form the basis for our understanding of atmospheric processes. This knowledge will be utilized to explain atmospheric phenomena. In particular, the course will cover the structure and chemical composition of atmospheres. Radiation laws and radiative energy balance. The radiative transfer of scattering, absorption, and emission processes of atmospheres. The role of aerosol particles and formation of clouds. Basic concepts of atmospheric circulation/meteorology. As thus, the course is similarly relevant to aspects of Earth and Environmental Science such as the ozone layer, the greenhouse effect, and air quality.

Prerequisites

- PHYS105 with a minimum grade D
- PHYS110 with a minimum grade D
- MATH105 with a minimum grade D
- MATH110 with a minimum grade D

GEOG703 Geographic Information Systems (3 CH)

This course addresses theoretical concepts in Geographic Information Systems (GIS) and its applications in various fields. Stress will be made on Strength Weakness Opportunities and Threats (SWOT) of applying GIS for certain research problems related to students domains. Students are expected to conduct real GIS research project and debate the pros and cons of GIS applications, ethical/legal issues, and social aspects related to GIS implementation.

GEOG708 GIS Modeling (3 CH)

This course introduces advance vector and raster analysis modeling, and multi-criteria decision analysis. Topics include network analysis, Digital Elevation

Model (DEM), 3D interpolation, and cartographic modeling. Students are expected to apply the theory in finding solution to real world problems such as optimum path in transportation, site selection, visibility analysis, and hazard assessment. Emphasis will be put on real study cases and sharing the output of projects with other students. Critical thinking skills, GIS skills, and ability to convince others with GIS approaches for diagnosing real problems and proposing solutions utilizing various tools such as high quality maps, virtual reality, simulation, and fly-through will be key outcomes of this course.

GEOG709 Internet and Mobile GIS (3 CH)

This course introduces how spatial data are served on the Internet and mobile devices (tablets, mobiles). Topics that will be discussed include interactive and real time mapping, spatial databases, cloud, Big Data, problems and social impact of Internet mapping. Students will be asked to assess web-based GIS services such as in Google Earth, BING, Mapquest, HERE, and OpenStreetMap, write report about their department online GIS services, and propose new one if there is no one exists (objective, user requirements, data needed, criteria for selection hardware/software, testing the site, publishing). PHP, Google API, and MyMap freely available tools will be used in the course in addition to ArcWeb.

GEOG710 GIS & Accuracy Assessment (3 CH)

This course focuses on GIS accuracy related to spatial component (vector, raster, GPS, Satellite images, Aerial photographs) and the attribute. Topics include Positional accuracy of GPS/maps, remote sensing images accuracy (confusion matrix, User's/Producer's accuracy), and Quality Assurance/Quality Control (QA/QC) for GIS projects. Accuracy standards adopted by various organizations such as the USGS, UK Ordnance Survey, and American Society for Photogrammetry and Remote Sensing will be discussed and the rationale behind each standard will be highlighted. Students will be asked to write reports about the current QA/QC adopted in their departments and why.

GEOG800 Comprehensive Examination (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student's knowledge of his or her discipline, as well as the student's scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. It must be taken before the start of the student's fifth semester in the program. Students

taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end of the student's fifth semester. A second unsuccessful attempt leads to immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

GEOG810 Research Proposal (0 CH)

Student prepares a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The Research Proposal course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Corequisites

- GEOG800

GEOG900 Dissertation Research (30 CH)

Student conducts high quality academic research under the direction of his/her supervisor. Student and supervisor shall meet on regular basis and discuss progress and issues related to the student's dissertation research. Furthermore, the student writes an annual report based on a meeting with supervisor and Advisory Committee, in which a review is conducted to determine progress, identify problems, and project dates for completion of various tasks. The research shall represent original contribution to human knowledge in the particular academic field and is presented in a written research dissertation of a publishable standard. The document shall also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the College of Graduate Studies.

GEOG910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based on two main parts: (1) the Committee's evaluation of the dissertation document and (2) the Committee's evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal. The Dissertation Defense course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

RGIS601 Principles of Remote Sensing (2 CH)

This course explores the techniques by which the surface of the Earth is remotely imaged. It presents the theoretical foundations of remote sensing: electromagnetic radiation, aerial photography, sensors (optical, thermal, microwave), visual interpretation of imagery, and applications. It also includes a practical component that exposes the students to a wide range of remote sensing data types and their uses.

RGIS602 Fundamentals of GIS (3 CH)

This course presents a brief history of GIS development, discusses maps and map projections and reviews the concepts and technologies used in developing GIS and in its application. The course has a lab component that offers students a practical introduction to the creation, query, analysis and visualization of spatial data using an industry standard GIS software

RGIS603 Digital Image Processing in RS (3 CH)

This course presents a brief history of GIS development, discusses maps and map projections and reviews the concepts and technologies used in developing GIS and in its application. The course has a lab component that offers students a practical introduction to the creation, query, analysis and visualization of spatial data using an industry standard GIS software

Prerequisites

- RGIS601

RGIS604 Spatial Analysis Using GIS (3 CH)

This course covers the different methods used in the analysis of spatial data and reviews the concepts spatial statistics, geographic analysis and cartographic modeling. It provides the students with a set of specialized techniques used in exploring and interpreting spatial data such as point patterns, spatial interpolation, overlay and network analysis. The course has a lab component where students practice applying the analysis methods using a GIS software.

Prerequisites

- RGIS602

RGIS605 Local & Web Based Services GIS (2 CH)

This course focuses on the new techniques linking telecommunication (mobile equipment, network), Global Positioning Systems (GPS), and GIS. It provides an overview of network standards and implementation and principles of spatial data sharing. It discusses the deployment of spatial data on the Internet and methods to access it and use it in practical applications.

Prerequisites

- RGIS602

RGIS606 Database Management Systems (2 CH)

This course provides a background about Data Base Management System (DBMS) as an integral and essential part of GIS. The course presents data models, DB languages, normalization, views, implementation and the relational, hierarchical, and network approaches to database management systems.

RGIS607 Seminar on Management Issues in RS&GIS (1 CH)

This course focuses on the issues encountered in the management of a remote sensing and GIS projects. It discusses topics such as open GIS, social, legal, economic, and standardization issues related to remote sensing and GIS. Students are encouraged to relate issues raised in this course to their research project and are asked to present their approach, findings and issues to their classmates.

RGIS610 Spatial Data Collection (2 CH)

This course covers methods of field data collection in a manner suitable for spatial analysis. It focuses on the collection and acquisition of remote sensing data and on surveying using Global Positioning System (GPS). Topics covered by the course will also include preparation of data for conversion to a digital format, map generation from surveying field data, accuracy, and quality of spatial data. This course has lab component where students collect data in the field and integrate it in a GIS application.

Prerequisites

- RGIS602

RGIS611 Advanced Remote Sensing (2 CH)

This course provides the students with theoretical and practical aspects of biophysical quantitative remote sensing. The course covers a set of practical environmental applications of remote sensing that include: Land cover/Land use change detection, vegetation monitoring and biomass inventory, and water monitoring and bathymetry. This course has a lab component where students complete mini-projects related to the topics of the course.

Prerequisites

- RGIS603

RGIS612 Satellite Positioning (2 CH)

This course provides theoretical and practical training in satellite positioning. It covers the topics of satellite geodesy, reference frames, coordinate

transformations, GPS , static and real-time positioning, and GPS augmentation. This course has a practical component where student acquire, process and use GPS data.

RGIS613 Software Engineering for GIS (2 CH)

This course presents the methods used in software system design, development, and maintenance. It covers topics such as: formal models of structured programming and program correctness, software engineering methods and tools, functional and object-oriented design, software documentation, version tracking and testing. This course has a hands-on component.

RGIS614 Selected Topics (2 CH)

This course is designed to give students an in-depth knowledge on the applications of remote sensing or GIS in their area of specialization. Topics covered must not be covered by other courses in the program and are selected at the beginning of the semester. Examples of suitable topics: developing a GIS application for utilities (water, gas, electricity), transportation (fleet management, finding the best route, monitoring of transportation network), or applying remote sensing for coastal monitoring. This course may be pursued in the forum of individually supervised projects linked to studies in the program.

RGIS615 Project Management (2 CH)

The course provides students with the skills essential for project success in today's GIS business environment. It presents a streamlined, best-practices approach to planning and managing remote sensing and GIS projects of any size. The course focuses on better management of people, tools, and processes to accomplish a GIS project within time, budget, and according to specifications.

RGIS616 Transport Applications of GIS (2 CH)

This course explores the spatial aspects of regional transportation systems including the description of network structure and flows. Topics include an introduction to models for analyzing multi-modal transportation flows and congestion over urban road and transit networks. These models include trip generation, trip distribution, modal split, and trip assignment and routing

algorithms. Applications are developed in a Geographical Information Systems environment. Models are extended to urban land use, spatial safety analysis, pavement management system and air quality applications.

Prerequisites

- RGIS604

RGIS617 Urban and Environmental Applications of Remote sensing and GIS (2 CH)

This course focuses on the application of remote sensing and GIS techniques to solving real-world urban and environmental problems. Applications discussed in the course include analyses of urban and suburban landscapes, land use and land cover, vegetation and forestry, population estimates and energy consumption estimates.

Prerequisites

- RGIS603
- RGIS604

RGIS618 Remote Sensing and GIS for Petroleum (2 CH)

This course presents the different uses of remote sensing and GIS in the oil industry. It reviews the different types of remote sensing data types and details their uses in oil exploration. It explores algorithms for spatial analysis and 3D modeling in GIS and discusses their use in exploration operations, production, marketing, and environmental impact of petroleum.

Prerequisites

- RGIS603
- RGIS604

RGIS620 Capstone (4 CH)

Students who opt for the 'non-thesis' track must register for this course in the last semester of their study plan. The student must complete, under the guidance of his graduation project supervisor, a remote sensing and/or GIS related project including defining requirements, methodology, implementation, and presenting results. The student is required to produce a project report and to present his work to an examining committee that grades it.

RGIS630 Thesis (6 CH)

Students who opt for the 'thesis' track must register for this course starting in the third semester of their study plan.The student must complete a remote sensing and/or GIS related research study or project that culminates in writing a dissertation. An advisor guides the student throughout the semester. The student is required to defend his work in front of an examining committee that includes an external reviewer

Government and Society

PSG110 Fundamentals of Political Science (3 CH)

This course introduces students to the study of politics and its main sub-division: political philosophy, comparative politics, and international relations. It examines different important concepts like the state, government and its branches, political system, democracy, and political ideology. By the conclusion of this course, students will understand the basic political concepts, the purposes and functions of government, the types of political systems, the contributions and influences of major political thinkers and ideologies, and the structure, methodology and research tools of political science.

PSG120 Government & Politics of UAE (3 CH)

The course analyzes the government and politics of the United Arab Emirates. It concentrates on the constitution and other authorities in the state, including political institutions, the federal political structure and the internal decision making process. Furthermore, the relationships among the three branches of government are studied, as well as the relationship between the federal authority and the local authorities.

PSG130 Introduction to Public Administration (3 CH)

Public administration is concerned with the management of public programs. This course examines the work of public administrators in different kinds of organizations. It seeks to provide a clear understanding of the political and historical context in which public organizations operate. It also examines the many technical functions such as planning, organizing, budgeting, personnel, decision making process, leadership and evaluation, with which public administrators must be familiar.

PSG242 Methods of Research in PSG (3 CH)

This course introduces students to the logic and practice of systematic research within political science. Topics include the philosophy of social science, research design, measurement principles, probability sampling, data collection methods, data analysis, hypothesis testing, and data presentation.

Prerequisites

- PSG110

PSG250 Principles of International Relations (3 CH)

The course is designed to acquaint students with the core concepts, processes, and issues of international relations. The course deals with the concept and definitions of international relations, examines the actors in international relations and how the foreign policy is made. The course examines major forms of interaction between states, and focuses on contemporary and future problems in the international system.

Prerequisites

- PSG110

PSG261 Political Thought (3 CH)

The course covers examples of Western political thought from ancient times to the present. It also deals with the evolution of modern political thought through

the study of some basic philosophical concepts such as natural law, the social contract, individualism, liberalism, conservatism, and socialism, etc.

Prerequisites

- PSG110

PSG270 Comparative Political Systems (3 CH)

The course introduces a comprehensive theoretical and comparative basis for the study of contemporary political systems. This includes an analysis of the specific nature and the salient characteristics of each system, as well as the main variables that influence its evolution. The range of comparative analysis extends to include Western, Eastern, and Third World countries.

Prerequisites

- PSG110

PSG301 International Organizations (3 CH)

The course analyzes international and regional organizations, examining their history, charters, infrastructure, and operations focusing on the United Nations, the Arab League and the Gulf Cooperation Council. The influential role that international organizations play in consolidating interdependence and integration among nations under the umbrella of the new world order is also discussed and evaluated.

PSG302 Diplomatic Systems (3 CH)

The course analyzes the general basis and the roles that guide and control the close relationship between foreign policy and diplomacy. Studying diplomacy is accomplished in accordance with legal procedures, diplomatic and strategic objectives of the state system. The course focuses on studying the theoretical as well as the practical dimensions of diplomacy.

Prerequisites

- PSG250

PSG312 Foreign Policy of Arab States (3 CH)

The course analyzes the political, economic, social, and constitutional factors that influence the making and implementation of the foreign policies of a number of Arab states. Emphasis is given to the comparative analysis of patterns of interactions, functions, and performance. Some current vital issues such as: Arabs and the new international order, the Arab regional system since the eruption of the second Gulf crisis, the evolution of the peace process in the Middle East, the Arab spring, national quarrels over the division of water resources in the region are all introduced and analyzed.

Prerequisites

- PSG250

PSG315 International Political Economy (3 CH)

The course examines the theoretical and practical aspects of international political economy, such as liberal economic policies, mercantilism and protectionism, critical theories of international political economy, economic cooperation, wealth and power, and structures of international political economy including security, finance, production, and knowledge structures. The course also explores state public policies dealing with migration, poverty, and remittances.

Prerequisites

- PSG250

PSG321 Gulf & Arabic Peninsula Affairs (3 CH)

The course studies the geopolitical and economic importance of the Arabian Gulf region and Arabian Peninsula. It focuses on the analysis of the behavior of the states of the region towards those regional and national issues that affect their national interests. Special emphasis is placed on security considerations. Attention is also given to the role of oil, challenges of development, expatriate labor force, and prospects of integration.

Prerequisites

- PSG270

PSG331 Local Governments & Local Administrations (3 CH)

This course covers the concepts of centralization and decentralization in public administration and governance by exploring local government, its theoretical and practical principles. The course examines the functions of local governments, comparison of different systems of local government and administration with emphasis on the U.A.E., the management of cities and city councils, the political, economic, and legal relationship between local and central governments, challenges and opportunities of local government, and the role of local government in sustaining development.

PSG332 Europe & The United States (3 CH)

This course analyzes historical and contemporary trends pertaining to evolution of the political institutions and processes in Western democracies. European integration is dealt with through studying the political institutions and processes of the European Union. It also examines the interactions between the domestic politics of the EU member-states and the United States.

Prerequisites

- PSG270

PSG352 Governmental Budgeting (3 CH)

The course focuses on public budgeting and finance and demonstrates its role as an instrument in managing development and economic stability. It also explains managerial functions provided by the management of public budgeting and finance in the area of planning, follow-up and evaluation, with the presentation of budgeting organization steps from classical methods to modern ones, such as planning and programming budgeting, performance budgeting and zero base budgeting. The course explores taxes, foreign debt, budget deficit, budget surplus, and role of public finance in economic and social development.

Prerequisites

- PSG130

PSG415 Public Governance (3 CH)

The purpose of this course is to take a broad view of governance in the UAE, and international context. First, the concept and characteristics of governance are examined. Second, the course will undertake a depth analysis of the impact of good governance on variety of contemporary issues like transparency, accountability, e-management, administrative reform, and administrative corruption.

Prerequisites

- PSG130

PSG422 Foreign Policy of Great Powers (3 CH)

A survey of the basic principles and factors that affect the process of making the foreign policies of the great powers, with emphasis on their objectives and dimensions within the context of a rapidly changing world. Special attention is given to the analysis of bilateral relations between each great power and developing countries, particularly Arab and Islamic states.

Prerequisites

- PSG250

PSG425 Public Policy (3 CH)

This course identifies wider governmental system and analyses the basic principles of public policy. The course is to appreciate a full life cycle of public policy. Students are required to formulate policy proposals with recommendations for policy responses, including comparisons of possible instruments, and the essentials for possible implementation, delivery, compliance and evaluation.

Prerequisites

- PSG110

PSG430 Special Topics (3 CH)

The course deals with topics in the fields of specialization that are not ordinarily offered through courses in the curriculum. It is intended to provide students with the most up-to-date and latest developments in the discipline of Political Science, on the one hand, and make use of the various fields of specialization, knowledge, experiences, and interests of the department staff and visiting scholars, on the other hand.

Prerequisites

- PSG250
- PSG270

PSG440 Internship (3 CH)

Students are placed an appropriate institution where they can apply their curricular knowledge in a practical setting. The student should spend a minimum of 150 hours at the internship site. An alternative module is for internship students to function as undergraduate research assistants within the Department of Political Science and possibly across the CHSS, through the mentorship of a researching faculty member. (This course is conducted over a complete semester. No courses are allowed to be registered during this course).

PSG485 Integrated Capstone (3 CH)

This course uses the interdisciplinary approach of “Policy Analysis” to integrate the knowledge acquired by the student in the program of political science. For this purpose it adopts a professional focus on policy. It attempts to integrate the knowledge acquired by the student from other theoretical courses in political science program and other disciplines to enable him to apply them to practical issues in international and public management fields. To that end, the course uses the tools of social sciences and research methodology to design policy programs and evaluate their outcomes at local, national and international levels. In this capacity it is designed to enable the student to provide policy makers with relevant advice on his area of specialty. It also concentrates on applying the concepts of “political feasibility” as well as “economic feasibility” to recommend realistic and implementable policies. The course also concentrates on the principles of governance and their relevance to successful public policy implementation.

PSG501 Public Policy Analysis Theory & Practice (3 CH)

This course identifies wider governmental system and analyses the basic principles of public policy. The course examines how issues emerge, ideas are framed, priorities are established, and policy agenda are set and managed, and considers factors like the political and bureaucratic actors, the non-state actors (organizations and networks), emerging models of stakeholder analyses and engagement, etc.

PSG504 New Public Man & Governments (3 CH)

This course goes beyond examining the aspects of 'new public management' (corporatization, privatization, managerialism, strategic planning and program management, etc.) focusing on a comprehensive analysis of the state-of-the-art of public management. The course will focus (following Osborne 2010) on theoretical perspectives on public governance, governance of inter-organizational partnerships, governance of contractual relationships, governance of inter-organizational networks, and governance of policy networks. The course will examine the issues related to meta-governance.

PSG505 Research Methods for Political Analysis (3 CH)

The course will examine the practical applications of empirical methods to real-world public policy issues focusing on designing research, collecting, analyzing, and making sense of information and data. The main objective of the course will be to help the participants comprehend the types of research that can lead to convincing policy analyses and to become proficient in dealing with (and make sense of) small as well as large sets of data. The participants will be exposed to issues likely to rise while establishing relationships among different social phenomena. The course may concentrate primarily on public program evaluation research techniques, design, and implementation.

PSG513 Globalization, International Agencies & Public Policy (3 CH)

The course will examine the implications of globalization and international political economy on the substantive and procedural aspects of policy making. It introduces the participants to a range of theoretical perspectives on international political economy, globalization and development. The course will examine the growth and respective impacts of international and supranational organizations on domestic public policy. The course will study the impacts of

major global issues on domestic public policy, the ‘internationalization’ of domestic issues, and influence of the international and supranational organizations. Finally, the course will deal with global public policies and its making and influences on domestic public policies.

PSG517 Government, Leadership, & Pubic Management (3 CH)

The main objective of this course is to examine organizational leadership issues, and organization architecture in the context of a dynamic policy environment in a globalized world in the management of the public sector. The course introduces the participants to the main functions and responsibilities of managers and leaders in public organizations, and how organizations and leadership are structured within the context of their larger social, political, and economic environments. One major objective of the course is to examine the importance of meeting the needs of the organization and that of productivity while ensuring high performance through motivated and satisfied employees.

PSG518 Public Policy Design and Tools (3 CH)

Modern governments use varied instruments and tools to influence or control actions, events, objects, persons or relationships to achieve identified policy goals. The objective of this course is to equip students with the knowhow of designing public policies and the instruments and tools employed in the process. The course is divided into two parts. The first part addresses the process by which policies are designed both through technical analyses and through political and administrative processes. The second part allows students scope to learn why and how to use certain policy instruments and tools in given cases.

PSG521 Environmental Policy & Sustainable Development Management (3 CH)

The course is to deal with the fundamentals of environmental policy and theories of sustainable development imparting essential knowledge and skills for environmental policy making and management. Topics may include national and international regulations related to mining and petroleum, nature conservation and protected areas, water management, environmental pollution, climate change, etc. Resources from the UAE Ministry of Environment and Water and the Environment Agency Abu Dhabi (and the other emirates, as and when available) will be used for professional development of the participants.

PSG522 Implementation, Evaluation & Monitoring of Strategic Issues (3 CH)

This course will deal with contemporary frameworks and techniques essential for implementing and evaluating public policy by maintaining organizational performance to achieve policy objectives. The course will enhance knowledge and skills of strategic planning, performance measurement and management, organizational structure, project management, and organizational change. The course will be studied on a comparative basis including examples, as possible, from different political entities and socio-economic contexts.

PSG526 Comparative Political Institutions (3 CH)

Public policy does not function in vacuum, and is bound by political institutions, law, and the governmental procedures. The prime objective of the course is to provide a comprehensive and comparative understanding of the structure and relationships of the above using examples from different Western and Eastern countries. The way in which the political institutions (in a broad sense) influences and are dealt with for public sector ethics, different forms of accountability mechanisms, transparency, etc. will also be the focus of the course.

PSG527 Seminar in Government & Public Policy in the UAE (3 CH)

This course is to give the students opportunity to pursue a supervised study and analysis of any policy area or policy related topic (approved by the instructor) and prepare seminar presentations. The course may be based on case study of one (or many) public policy arena(s) in the UAE following the basic theoretical foundation. The case study may be substituted by reviews of case study/studies or other literature (e.g. peer reviewed publications) related to UAE public policy or public service analyses.

PSG600 Research Project (3 CH)

The Master of Governance and Public Policy (MGPP) has two options of thesis and non-thesis project. This course is directed to MGPP students who opt for the non-thesis project option. The student will be required to write a research project related to the theme of one of the core courses in the in the MGPP program to be completed within last spring semester of the program. All students, at first, must work on a policy research design (based on the PSG

505: Research Methods for Policy Analysis) and prepare a research proposal to be approved by the student's advisory committee (as per the Departmental/Faculty guides, as developed in future). The research project must adhere to the minimum criteria (of length and quality) as stipulated by the program regulations.

PSG620 Public Policy Theory & Practice (3 CH)

This course is designed to provide doctoral students a detailed familiarity with the context of public policy studies, including both institutions and practices. It will provide an overview of the core literature, including: intellectual bases of public policy studies, the history of public policy studies, analysis of institutional structure, and other topics.

PSG630 Public Finance & Budgeting (3 CH)

This course provides academic immersion into public budgeting theory and research. The course requires exploration of the scholarly foundations of finance and governmental budgeting as well as past and current reform efforts. The state of the practice in public budgeting is examined for evidence of its intersection with theoretical perspective. The course presents normative and descriptive considerations of public budgeting, the scholarly bases behind various orientations to process, and the knowledge base regarding enduring issues surrounding this vital governmental process.

PSG635 Global Public Policy Issues (3 CH)

This course will introduce students to the contemporary study of international political economy, or how politics and economics interact at the global, regional and national levels. The course will highlight the major analytical frameworks in the field of International Political Economy and how these can be applied to empirical questions concerning the structure of the global public policy issues, the sources and implications of globalization, the nature of international institutions, and national economic policy choices.

PSG640 Research Methods in Public Policy (3 CH)

This research methods course on the fundamentals of qualitative and quantitative analysis that will enable students to interpret findings of social research found in leading public administration and public affairs journals.

Students will be introduced to the real world of methods with assignments which reflect the true challenges of doing research: constructing a survey methods instrument, conducting ethnography in the field, learning to analyze census data, reading a Ph.D. dissertation and so on.

PSG645 Seminar in Public Policy Issues in the UAE (3 CH)

This course will examine some of the foundational policy frameworks of the Emirati Social Contract, including Health and Education policy, to determine how well they continue to achieve their stated policy objectives and identify how UAE could achieve better alignment between policy objective frameworks and outcomes.

PSG699 Master Degree Thesis (6 CH)

The students will be required to work on primary research to complete a thesis working over two semesters. All students, at first, will have to work on a policy research design (based on the PSG 505: Research Methods for Policy Analysis) and prepare a research proposal to be approved by the student's advisory committee (as per the Departmental/Faculty guides, as developed in future). The thesis must adhere to the minimum criteria (of length and quality) to be adopted by the Department/Faculty in future.

SOC101 Introduction to Sociology (3 CH)

The course provides students with the key concepts of sociology, the beginnings and development of sociology, and its relationship with other disciplines in the social sciences. It also deals with other issues like social policy and its relation to social problems and the influence of change and development in generating social problems.

SOC190 Social Problems (3 CH)

The course provides students with the definition of social problems, the main theoretical approaches related to studying social problems, and the difficulties of solving them. Selected contemporary - social problems will be studied and analyzed such as drug addiction, crime, population density, computer crimes, Internet, and environment. Some social problems facing the Arab Gulf societies in general, and the United Arab Emirates society in particular are also discussed and solutions are suggested.

SOC260 Folklore (3 CH)

This course deals with the popular heritage as a significant source of popular culture sources in the Arabic-Islamic society in general and UAE society in particular. The course seeks to introduce the concept of popular heritage, its meaning, major fields and its usage in everyday life. Illustrations from UAE & various Arabic societies will be introduced.

SOC307 Human Development (3 CH)

This course deals with the fundamental and scientific basics of human development in relation to the dynamic forces in the society. It also concerns itself with the factors affecting human development, and the importance of these factors with regard to labor force policies. The course emphasizes the significance of human capital in society's progress. In addition, the course explains how to enable the labor force to take an active role in development programs.

Prerequisites

- SOC101

SOC313 Sociology of the Family (3 CH)

This course explores the formation of the family, marriage, and kinship as a social system. It highlights the transformations that have occurred in the structure of the Arab family in general, and in the Gulf family in particular. It outlines the problems that face the family as an institution as a result of the socio-economic transformations experienced by Arab societies as well as in different foreign societies.

Prerequisites

- SOC101 with a minimum grade D

SOC314 Political Sociology (3 CH)

The course provides an introduction to sociological explanations of political behavior. It examines socio-political factors that underlie the emergence of modern politics. The course provides an outline and empirical critique of the principal alternative models of political functioning in societies. It focuses on

the history of political struggles and institutions in societies providing a empirical analysis of elite and mass political behavior.

Prerequisites

- SOC101

SOC315 Sociology of Education (3 CH)

The course is concerned with education as a social system. It deals with its history and development, and its relationship to social conditions and social change. It also deals with the organizational nature of educational institutions as well as the economical, social & cultural aspects of education.

Prerequisites

- SOC101

SOC316 Folklore in UAE Society (3 CH)

This course provides the student with the basic knowledge of folk traditions such as folk literature, material culture, folk performing arts, customs, and traditions. Such topics will be illustrated by examples from United Arab Emirates society, and through studying uses of folk tradition in public life and learn how to implement it in development process in general & human development in particular. It also examines the role played by the state in preserving cultural heritage in UAE society.

SOC318 Crime & Juvenile Delinquency (3 CH)

This course studies the development of the phenomena of crime and juvenile delinquency. It analyzes crime and juvenile delinquency, its consequences and motivating factors. It analyzes the changes of criminal styles and juvenile delinquency in the world In general and in the Arab world in particular with emphasis on the most recent as well as classical theories in criminology. In addition, this course provides skills for planning suitable programs to combat problems related to crime and juvenile delinquency.

Prerequisites

- SOC202

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ECBP614 Mobile Commerce (3 CH)

This course provides a coverage of mobile commerce (m-commerce) including frameworks, applications, requirements, location-based services, group-oriented services, transaction management, content and pricing, business model and emerging m-commerce services. The proposed course brings together challenges and solutions in mobile commerce including multi-layer frameworks, current and emerging mobile commerce services such as mobile financial services and mobile entertainment services. Management of mobile commerce services, business models and revenue management are also included. As m-commerce is going through many advances, many near and long-term issues such as the role of emerging wireless LANs and 3G/4G wireless networks, personalized content management, implementation challenges in m-commerce and futuristic m-commerce services will also be discussed.

ISBP631 Information Systems Management (3 CH)

IT is broadly encompassing the information that business creates and uses, as well as a wide spectrum of increasingly convergent and interlinked technologies that process information. Topics include: Information Systems in organizations; organizing data and information; enterprises and their organization; overview of Electronic Commerce; transaction processing and Enterprise-Wide Systems; information and Decision Support Systems; systems analysis, design, implementation and maintenance; Database Management Systems, Current trends in the development of information systems, and Creating and sustaining competitive advantage with IT.

ISBP632 Applied Data Mining (3 CH)

Due to advances in IT, the amount of modern data comprises huge files of diverse types, resulting in data rich but information poor organizations. To facilitate discovery of information patterns and trends, new approaches are required. Data mining techniques can help companies discover information and acquire business intelligence from these massive datasets. This course covers data mining for business intelligence. Data mining refers to extracting or “mining” knowledge from large amounts of data and consists of techniques that aim at discovering patterns that can bring value or “business intelligence” to organizations, for example consumer behavior. The course covers salient data

mining techniques including classification, clustering, association rule mining, visualization and prediction.

ISBP633 Managing the IT Venture (3 CH)

Digital firms are distinguished from traditional firms because of their near total reliance on a set of information technologies to organize and manage their operations. This course focuses on starting-up a such a new Information Technology (IT) venture; Identifying IT venture opportunities; Drafting an agenda for a successful IT venture; Risks and returns management; Business planning; Operational planning; Organizational development and management; Financing entrepreneurial ventures.

ISBP634 Enterprise Computing (3 CH)

Enterprise computing involves the use of computers in networks, such as LANs and WANs, or a series of interconnected networks that encompass a variety of different operating systems, protocols, network architectures, and enterprise applications. This course introduces the concept of enterprise computing and covers various enterprise technologies including architectural frameworks (.Net, CORBA, EJB), business process modeling tools, integration frameworks (EAI, SOA and web services), and applications such as ERP and CRM. In this course, students carry out a research project on future directions and challenges of enterprise applications and technologies.

ISBP635 Knowledge Management (3 CH)

Knowledge Management (KM) is a discipline that promotes an integrated approach to identifying, capturing, sharing and evaluating an enterprise's information and knowledge assets. This course reviews and discusses existing technologies in KM and new, emerging KM technologies and practices. The course evaluates the computer representation, access, and utilization of knowledge versus information within a human context. It provides an essential preparation for managerial roles in today's modern knowledge-based economy.

ISBP636 IT Legislation (3 CH)

This course provides a broad spectrum and analysis of the legal issues confronted in today’s information technology (IT). It describes the foundation of intellectual property concepts upon which IT activities and transactions are

based. The course also explains the licensing issues of software or information resources, the outsourcing or hosting of services or information, the allocation of software or websites development rights. It also addresses existing legislations and regulations impacting the use of IT systems in the UAE, including electronic privacy and security, and commercial laws related to IT

ISBP637 E-Governance (3 CH)

This course introduces Internet technologies that are affecting people's interactions with government. The course shows the means by which governments use and manage these technologies to provide better information and services to the public. The course content is divided into three categories: Overview and assessment of development techniques, key policy issues relevant to e-government implementation programs and the broader use of information technology in modern societies. Case studies, which explore the skills and concepts needed to manage e-government projects and programs effectively, are also discussed in this course.

ISBP669 Computation and Data Science (3 CH)

This course will introduce the students to the main concepts and tools of computation for data science. There are two main components to this course, namely, conceptual component and practical component. The conceptual part will start with an overview of data, information, and computational techniques that data analysts and data scientists work with. It will follow a description of different types of data analytics, including data extraction, cleaning, statistical inference from data, regression models, and an overview of machine learning. The second part will be a hands on experience with the state-of-the art computational tools for data science, including R, python and java based libraries and tools. This part will also include real case studies. The course will be concluded with relevant contemporary challenges and research problems related to data science.

Prerequisites

- PHYS105 with a minimum grade D
- PHYS110 with a minimum grade D
- MATH105 with a minimum grade D
- MATH110 with a minimum grade D

ISEC311 Network Security I (3 CH)

This course provides the basic fundamental theoretical concepts of network traffic and services filtering. In addition, this course provides concepts of stateless and stateful firewalls. Topics include: TCP/IP protocols, network packet filtering, common Internet services (HTTP, FTP, SMTP, POP3, DNS, etc.) filtering, stateless and stateful firewalls, firewall filtering rules consistency and efficiency verification, VPNs, secure network architectures, network attacks on firewalls.

Prerequisites

- ITBP301 with a minimum grade D

ISEC312 Cryptography (3 CH)

The students in this course will be introduced to various encryption techniques and their applications. The main encryption techniques the students will learn and apply in this course are Symmetric encryption, Public-key encryption, and hash functions. These techniques will be used for digital signatures, certificate generation and verification. The performance of the various encryption techniques used will be analyzed based on certain criteria and design needs.

Prerequisites

- ITBP301 with a minimum grade D
- CENG202 with a minimum grade D

ISEC321 Network Security II (3 CH)

This course covers basic fundamental theoretical concepts, mechanisms and techniques for network intrusion detection and prevention both in wired and wireless networks. In addition, the course provides students with hands-on skills on configuring intrusion prevention systems (IPS) as well as on generating common network attacks. Topics covered include: overview on network attack types, attack signatures generation, denial of services (DoS) attacks, distributed DoS attacks, buffer overflow attack, Man-in-the-Middle attacks, ARP cache poisoning attacks, common mobile and wireless network attacks, IP spoofing based attacks, sniffing attacks, covert channels, steganography, operating systems fingerprinting, system and network vulnerability assessment.

Prerequisites

- ISEC311 with a minimum grade D
- Pre/Co ISEC414 with a minimum grade D

ISEC322 Design and Analysis of Security Protocols (3 CH)

This course provides the students with the necessary knowledge in the design, analysis, and evaluation of various security protocols and mechanisms, including but not limited to: basic symmetric and asymmetric cryptography protocols, SSL/TLS, WEP/WPA, IPSec, S/MIME, PGP, SSH, X.509 and Kerberos. A security protocol may fail in three ways: the protocol design may be flawed, the cryptography may be inadequate, or the implementation may be buggy. This course focuses on discussing the pros and cons of various security trade-offs involved in the design of internet protocols, identifies and describes vulnerabilities associated with such protocols, and describes the mitigations for these vulnerabilities.

Prerequisites

- ISEC312 with a minimum grade D
- Pre/Co ISEC324 with a minimum grade D

ISEC323 Secure Software Design and Engineering (3 CH)

This course takes a close look at software as a mechanism for attack, as a tool for protecting resources, and as a resource to be defended. The course covers how poor software design and engineering can be the root causes of most security vulnerabilities in deployed systems, web technologies and digital rights management. Topics covered include: secure software design and development process, common software and web vulnerabilities such as buffer overflows and cross site scripting, program and code auditing and analysis using static, dynamic, and hybrid analysis, software watermarking and code obfuscation, and software testing for vulnerability.

Prerequisites

- CSBP219 with a minimum grade D
- ITBP301 with a minimum grade D

ISEC324 Cryptography Lab (1 CH)

This laboratory course provides hands-on experience that covers the concepts of symmetric and asymmetric cryptographic algorithms, hash functions, and its real-world security applications. Main topics include: classical cryptography, encryption algorithms including DES, RC4, AES and RSA, Diffie-Hellman key exchange, hash functions, cryptographic-based security protocols including SSL, SSH, PGP, and IPSec.

Prerequisites

- Pre/Co ISEC322 with a minimum grade D

ISEC411 Privacy and Anonymity (3 CH)

This course prepares students to recognize, analyze, and manage privacy challenges. Students learn concepts and methods for creating technologies and related policies with provable guarantees of privacy protection. Students will draw on work from data mining, information retrieval, web technology, computer security, cryptography, relational databases, statistics and political philosophy. Students are not expected to have these backgrounds; relevant material is introduced as needed. Main topics include: Privacy concepts and challenges, policies, and regulations; identity, anonymity and confidentiality; private data analysis and database sanitization; privacy-preserving data mining techniques including k-anonymity and secure function evaluation, and finally, some case studies from different domains are presented.

Prerequisites

- CSBP320 with a minimum grade D
- ISEC311 with a minimum grade D

ISEC412 Digital Forensics (3 CH)

This course is designed to equip students with the skills needed to safely locate and secure computer evidence at the search site as well as to conduct subsequent off-site analysis. The course aims to equip future Forensics Investigators and Lawful Enforcement Offices with sufficient knowledge on conducting investigation on Internet based or Cyber based crime. It provides knowledge on implementing the right solution for collecting, analyzing,

correlating the Internet data and report them as valid and legal evidence in the court. Topics include evidence handling and disk imaging (restore evidence drive, system backup imaging), DOS/Windows forensics utilities (DOS analysis tools, Access Data's forensics tool kit, Xway's WinHex Disk Editor), hidden data and encryption, steganography, covert channel, erased file recovery, Internet investigations, Hacker profile analysis, and Email header analysis.

Prerequisites

- CSBP315 with a minimum grade D
- ISEC321 with a minimum grade D
- ISEC323 with a minimum grade D

ISEC413 Security Architecture and Mechanisms (3 CH)

This course is intended to provide students with an understanding of the OM-AM framework, security architectures and mechanisms, system security infrastructures, access control multilevel security models, and biometric authentication and authorization architecture models. Also, the course provides analysis and evaluation of the security related functions of various systems including: monitoring systems, telecommunication systems, smart grid systems, and physical tamper resistant and proof systems.

Prerequisites

- ISEC322 with a minimum grade D
- Pre/Co ISEC423 with a minimum grade D

ISEC414 Network Security Lab (1 CH)

This laboratory course provides hands-on experience that covers a broad spectrum of state-of-the-art network security practical solutions, their implementation details, verification steps, and testing procedures. Main topics include: security features of network devices such as routers and switches; authentication, authorization, and auditing models; best practices of access control security policies; stateful and application firewalls; intrusion detection, prevention, and response systems; network threats and attacks.

Corequisites

- ISEC321

ISEC416 Information Security Management (3 CH)

This course will cover a variety of topics to develop students' skills in information security management. The course examines the fundamental principles of computer security management as applied to information technology. Course topics include: Security Management Practices: Business Continuity Planning (BCP), Disaster Recovery Planning (DRP), Law, Investigations, and Ethics. Business Needs: Commercial and legal implications. Introduction to ISMS standards: History, development, current situation. Certification: process and maintenance. Accreditation: Current developments, options, designing and implementing a management system. Policy and risk assessment: Statement of applicability, risk management, critical success factors, auditing.

Prerequisites

- ITBP301 with a minimum grade D
- ITBP370 with a minimum grade D

ISEC417 Database Security (3 CH)

This course is concerned with the study of principles and practices of implementing computer database security. The course discusses the following security features of the database: database security principles, database auditing, security implementation and database reliability, database enumeration (authenticated and unauthenticated), identifying database vulnerabilities, exploiting flaws to gain control, developing an assessment methodology, database assessment flag challenge, and virtual private database. The course provides also suggested architectures for common security problems. Students will learn how to secure their database and how to use the database features that enhance security. The student will be provided with the tools, techniques and industry accepted methodologies so that upon completion of the course the student will be able to describe key concepts of database security and how to apply those concepts to securing database management systems within their organizations.

Prerequisites

- CSBP320 with a minimum grade D

- ITBP301 with a minimum grade D

ISEC421 Risk Analysis and Management (2 CH)

This course provides students with an introduction to the field of information security risk assessment. Students will learn how to design systems that are secure, how to measure risk, and how to ensure that proper levels of security are maintained for individual technology users, businesses, government, and other organizations. This course will cover different approaches for risk assessment and risk mitigation. Students will learn how to apply NIST standards in conducting risk assessments. The course will incorporate cases in risk analysis derived from actual state and law enforcement agencies or private firms. Students will learn how to use a risk analysis matrix for performing both quantitative and qualitative risk analysis. As a part of the course, students learn the different threats that they need to incorporate in their risk analysis matrices. Course topics include: Threat Vulnerability Analysis (TVA), Risk Management Identification and Assessment, Strategies (Avoidance, Transference, Mitigation, Acceptance), Counter-Measures, Cyber Warfare (Technical and People), Vulnerability Testing and Penetration Testing, Contingency Planning (Business Impact Analysis, Disaster Recover, Business Continuity), SETA: Security, Education, Training and Awareness Initiatives, Cost Benefit Analysis of Info Security investments

Prerequisites

- STAT210 with a minimum grade D
- ITBP301 with a minimum grade D

ISEC422 Security Policy, Laws, and Governance (3 CH)

This course provides students with an introduction to information security policies and standards, as per the ISO/IEC 27001-2013 guidelines. In this course, students will be introduced to sociological and legal issues in policy implementation in general (such as Sarbanes Oxley, HIPAA, Gramm, Leach, Bliley Act, etc.) and will be provided with a focused dialogue on information security specific policies. The course also discusses the entire lifecycle of policy creation and enactment and presents students with issues specific policies in different domains of security. The structure of policy is also discussed to assist the students in the design and modification of policies. Moreover, Students will learn how to allocate the appropriate security techniques needed to satisfy a specific security policy. Several examples from

different domains are incorporated in the curriculum to assist students to learn in context of real life situations

Prerequisites

- ITBP370 with a minimum grade D
- ISEC421 with a minimum grade D

ISEC423 Systems Security Lab (1 CH)

This laboratory course provides practical training and hands-on experience on the basic Computer Systems Security concepts as it pertains to the logical and physical security. It will expose the students to various security principles of trusted computing bases. Main topics include Operating System Security, Access Control Models, Password Cracking, Computer Viruses, Windows Registry Hacks, Computer Viruses, Web Security, Biometrics Solutions, and Digital Forensics.

Corequisites

- ISEC413 with a minimum grade D

ISEC424 Hardware-Oriented Security and Trust (3 CH)

This course will investigate recent technology developments for the design and evaluation of secure and trustworthy hardware. It also teaches the concepts of tamper-proof, tamper-resistance, and trusted platform modules. Topics covered mainly include: Smart cards, RFIDs, cryptographic processor and processing overhead analysis, physical and invasive attacks, side-channel attacks, physically unclonable functions, hardware-based true random number generators, watermarking of Intellectual Property (IP) blocks, FPGA security, passive and active metering for prevention of piracy, access control, hardware Trojan detection and isolation

Prerequisites

- ISEC413 with a minimum grade D

ISEC428 Special Topics in Information Security (3 CH)

The course focuses on selected topics pertained to current information security solutions and methodologies. The course represents an in-depth approach to specific areas in information security which are of interest to undergraduate students in the program. It covers topics in computer, network, and systems security and privacy which are not covered as part of required courses. Students will learn to apply existing security techniques and methodologies to emerging systems and networks, derive and enumerate best practices for the selected topics and evaluate chosen security schemes.

Prerequisites

- ITBP301 with a minimum grade D
- ISEC322 with a minimum grade D

ISEC755 Advanced Systems and Data Security. (3 CH)

The goal of this course is to introduce students to the computational technologies for ensuring systems and data security. The main topics include security architecture, operating systems security, security issues in database systems, privacy preserving data mining, secure computations on distributed data, and secure data outsourcing. The foundations are drawn from a number of sub-disciplines of Computer Science including: database systems, data mining, algorithms, cryptography, and computer security.

ITBP280 Information Technology Project Management Exhibition (3 CH)

This course provides concepts, tools and models built along the IT project management life cycle. It covers detailed topics of IT project management, including project planning, project governance, project procurement management, project time management, project cost management, project risk management, project quality management, leadership and ethics, project closure and evaluation. Application of IT project management skills for an IT project is an important part of this course.

Prerequisites

- CSBP219 with a minimum grade D

ITBP301 Security Principles & Practice (3 CH)

This course provides an overview of information security. It is designed to help students understand this important priority in society today. The content of the course gives a broad overview of essential concepts and methods for providing and evaluating security in information processing systems (e.g. operating systems and applications, networks, protocols). The course will be organized around a few themes: foundations (security mindset, essential concepts: e.g. policy, CIA), authentication and access control, software security (e.g. vulnerabilities and protections, malware, program analysis), practical cryptography (e.g. encryption, authentication, hashing, symmetric and asymmetric crypto), networks (e.g. wired and wireless networks, protocols, attacks and countermeasures).

Prerequisites

- CENG210 with a minimum grade D

ITBP321 Web Application Development Lab (1 CH)

The objective of this lab is to provide a hands-on approach to the creation of a Web based application while ensuring the participants are involved in the different stages of a software project lifecycle. The lab formally introduces the fundamentals of using SQL to create a database back-end and tie it to a Web front-end using HTML, JSP and Servlets. The lab also includes a project where students use the acquired Web development knowledge to design and implement a functional Web application. Students work in teams to collaborate in developing the assigned software project

Prerequisites

- Pre/Co CSBP340 with a minimum grade D

ITBP322 Web and Mobile Systems (3 CH)

This course introduces the concepts, practices, and technologies to design, develop, and manage web and mobile applications. It covers different technologies related to the Web such as HTML5, Cascade Style Sheets (CSS), and Java Script Pages (JSP). The course establishes mobile development foundation, which includes mobile layouts, handlers, and views. It also covers

Mobile Development and relevant Internet development approaches and architectures such as Model-View-Controller (MVC), relational databases and restful services. Students develop web/mobile-enabled databases in project-based assignments

Prerequisites

- CSBP219 with a minimum grade D

ITBP323 Systems Integration and Administration (3 CH)

This course will provide students with the knowledge and tools needed to plan, manage and administer network systems hardware and software resources of an enterprise. Topics include, approaches to system integration, performance monitoring and backup strategy, active directories, control users' access and privileges, troubleshooting for errors and misuse, network services and management, server management, Virtual Machines, user/client administration and services, heterogeneous operating system environment (Linux, Windows ...ect.).

Prerequisites

- CSBP315 with a minimum grade D

ITBP324 Cloud Computing Fundamentals (3 CH)

This course introduces the concepts, practices and technologies to develop, deploy and manage Cloud computing applications, allows the students to learn and practice the web as the portal to Cloud, including a detailed overview of Web protocols, to learn and practice virtualization and its use and benefits for cloud computing, scheduling of cloud computing loads where issues related to execution time versus bandwidth and load balancing will be examined, distributed data center file systems and technologies, as well as security and privacy issues.

Prerequisites

- CSBP219 with a minimum grade D

ITBP370 Professional Responsibility in Information Technology (3 CH)

A coverage of ethical issues and solutions in IT; code of ethics; ethical decision making; computer crimes and security; freedom of expression; electronic privacy protection; intellectual property protection; computing in the workplace and its implications on workers and organizations; online communities, the digital divide, and their social and economic implications; professional communication and team work; examples of laws and regulations; case studies.

Prerequisites

- ESPU1082 with a minimum grade D

ITBP410 The Internet of Things (3 CH)

The course covers the significance of Internet of Things (IoT) in society, the common components IoT devices and the future trends. Design considerations for IoT devices and systems and the constraints are also discussed. The interfacing among the IoT devices and the physical world are covered. The course also covers operating systems for IoT. Additionally, the course goes over the major components of networking from the IoT perspective, i.e., Internet-connectivity, mobile adhoc networks, etc. Other topics as they related to IoT are: big data and analytics, edge and cloud computing, and security and privacy. Practical implementation of core IoT concepts is included in the course.

Prerequisites

- CENG530 with a minimum grade D

ITBP418 Entrepreneurship in Information Technology (3 CH)

This course discusses starting-up a new Information Technology (IT) venture; Identifying IT venture opportunities; Drafting an agenda for a successful IT venture; Risks and returns management; Business planning; Operational planning; Organizational development and management; Financing entrepreneurial ventures.

Prerequisites

- ITBP280 with a minimum grade D or ITBP307 with a minimum grade D

ITBP420 Data Analytics (3 CH)

This course will introduce the students to the main tools and ideas of data analytics. The course will give an overview of the data, questions, and tools that data analysts and data scientists work with. There are two components to this course. The first is a conceptual introduction to the ideas behind turning data into actionable knowledge, which includes exploratory data analysis, statistical inference, regression models, and overview of machine learning. The second is a practical introduction to the tools that will be used in the program like R, and RStudio

Prerequisites

- CSBP320 with a minimum grade D

ITBP421 Big Data Analytics (3 CH)

This course will enrich knowledge of data science by understanding the challenges of Big Data in Analytics. It will introduce the core concepts behind big data problems, applications, and systems. It will provide an introduction to one of the most common frameworks, Hadoop. This course will give an overview architectural components and programming models used for scalable big data analysis. It will also introduce concepts of big data management systems and machine learning with big data.

Prerequisites

- ITBP420 with a minimum grade D

ITBP430 Mobile Computing (3 CH)

Mobile computing devices have become omnipresent in our daily activities. This course will introduce students to mobile computing and mobile application development. Mobile computing will be discussed from three perspectives: mobile technology, application development, and user interaction. The course will first overview various mobile computing applications, technologies and wireless communication. Next, students will be introduced to and use mobile application frameworks and development environments. User interface and

user experience will be discussed and application development guidelines from various vendors will be discussed and analyzed. Students will be expected to learn at least one mobile application development framework and use it to implement their assignments and course project.

Prerequisites

- ITBP322 with a minimum grade D

ITBP480 Senior Graduation Project I (3 CH)

Supervised students in small groups undertake full end-to-end development of a substantial project plan, taking it from initial concept through the final delivery. Topics range from applied IT development to assignment on applied research. Students are expected to: complete literature survey; develop a project plan; analyze requirements and acquire the necessary material and steps for their intended project.

Prerequisites

- STAT210 with a minimum grade D

ITBP481 Senior Graduation Project II (3 CH)

Students work in teams under the supervision of a faculty member on the implementation, testing and analysis of the results of a project based on the design and schedule completed by the same group of students during the ITBP 480 course

Prerequisites

- ITBP480 with a minimum grade D

ITBP495 Internship (12 CH)

Students are required to spend one full semester as interns in an approved internship program. The internship provides students with practical experience, which allows them to integrate theory with “real world” situations. During the internship students work under the supervision of a qualified professional in

industry or government fulfill various assignments to acquire first-hand knowledge of a working environment. In addition to this professional supervision, each student is assigned an academic advisor to ensure that an appropriate level of support from and contact with the university is given to the student during the training period. Students are required to write a final formal report, that documents and details the technical aspects of the work undertaken during their internship, and give a final presentation at the end of the internship period.

ITCO601 Current Emerging Trends in Information Technology (3 CH)

The course enables future IT leaders and researchers to look ahead on both existing and emerging technologies and consider how these could be applied within their enterprise environments. Topics include: Cloud computing, Big data analytics, Mobility to increase the pace of information absorption and decision making, Social networking, Green computing, Internet of Things, Smart cities, Privacy, Security and ICT Ethics.

ITCO602 Management and Leadership in Information Technology (3 CH)

This course provides students with essential strategic skills and knowledge required to lead the assessment and management of Information Technology (IT) projects in organizations. Topics include: strategic IT integration, organizational and managerial issues that impact IT projects, the business case and feasibility studies, project planning and control and risk assessment, leadership and management practices and change management.

ITCO603 System Analysis, Modeling & Design (3 CH)

This course provides students with in-depth knowledge of object oriented systems analysis and design procedures. The course covers system development life cycle models, with emphasis on Risk Management methodologies. Emphasis is on the specification of system’s logical and physical analysis and design from a management perspective. Software project management techniques are introduced. The course also addresses team organization and communication.

ITPG602 Research Methods in Information Technology (3 CH)

Techniques and conventions in research methods, evaluation approaches, Ethics, and presentation of results, how to choose a research topic, how to write a thesis proposal or a research proposal, common research methods in IT, research outcomes presentation, research evaluation, research papers review.

ITPG690 Practicum Project (3 CH)

This course gives students the opportunity to develop in-depth competency in one or more advanced IT disciplines as well as soft skills that are needed in major IT projects. Students are expected to undertake a structured problem identification and formulation, devise solutions, generate and analyze results, and effectively communicate their results.

ITPG698 Special Topics in Information Technology (3 CH)

The content of this course is customized on every offering depending on current trends and interests.

ITPG699 Research Thesis (6 CH)

This individual research exploration work allows each student to perform real investigation work in the state-of-the-art in a particular domain. Methodology includes theoretical research methods, theoretical analysis methods, origination of an idea, literature review, experiment design, data collection and analysis, and report writing. The course involves a substantive piece of experimental work conducted by the student under supervision of a faculty member, and presented in the form of a thesis.

ITPG701 Advanced Design & Analysis of Algorithms (3 CH)

The course starts by reviewing asymptotic notations and growth of Functions (?, O, ? notations), recursion and recurrences. Study of various algorithm design paradigms (divide & conquer, greedy, and dynamic programming); Advanced data structures (B-Trees; Binomial Heaps; Fibonacci Heaps; Data Structures for Disjoint Sets). Complexity Analysis (Polynomial Time; Polynomial Time Verification; NP-Completeness and Reducibility; NP-Completeness Proofs; NP-Complete Problems); Study of some advanced

algorithms (selected from the following: Sorting Networks; Algorithms for Parallel Computers; Matrix Operations; Polynomials and FFT; Number-Theoretic Algorithms; String Matching; Computational Geometry; Approximation Algorithms).

ITPG708 Foundations of Computational Science and Informatics (3 CH)

This course covers advanced topics of computational science and informatics such as modeling processes, system dynamics problems, system dynamics models with interactions, simulation techniques, empirical models, cellular automaton random walk simulations, cellular automaton diffusion simulations, high-performance computing. Students will investigate the foundations of computational science models. They will analyze the effectiveness and impact of these models in different domains. State of the art implementations will be used to assess the quality of these systems. Students are required to collaborate on a team project to develop computational model prototypes.

ITPG709 Modeling, Simulation & Performance Evaluation (3 CH)

Computer simulation concepts and modeling theory, probability distributions and queuing theory, random number generation, probability distribution generation, data collection and input analysis, discrete modeling and simulation concepts, Monte Carlo" Simulation

ITPG713 Data Mining & Statistical Analysis (3 CH)

Data modeling and database design, univariate and multivariate analysis, linear and logistic regression, distributed and object-oriented databases, web clickstream analysis, uncertainty measures and inference, linear models, evaluation of data mining models, XML data models, cluster analysis, classification, association, multilayer perceptron models, OLAP.

ITPG720 Numerical Optimization Methods (3 CH)

This course intends to provide the students with a thorough understanding of numerical optimization methods. This course will cover topics related to unconstrained and constrained optimization, convex optimization and non-convex optimization. The course will also cover derivative-free optimization algorithms and discrete optimization algorithms. Heuristic strategies for

optimization will also be covered. Topics include line-search method, trust-region method, conjugate gradient methods, linear programming, the simplex method, duality, interior point methods, quadratic programming, active set methods, gradient projection methods, non-convex stochastic gradient descent, random stochastic gradient descent, discrete optimization algorithms, global search methods and local search methods for derivative-free optimization.

ITPG760 Special Topics in Informatics and Computing (3 CH)

This course covers special topics on various advanced or specialized topics in Informatics and Computing. Its content is customized on every offering depending on current trends and expression of mutual interest by students and faculty

ITPG797 Special Topics in IT (3 CH)

The content of this course is customized on every offering depending on current trends and interests.

ITPG800 Comprehensive Exam (0 CH)

Every PhD student must pass a Comprehensive Examination designed to evaluate the breadth and depth of the student's knowledge of his or her discipline, as well as the student's scholarly potential. The comprehensive exam consists of an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. Students taking the comprehensive exam must be in good academic standing after completion of the required coursework.

ITPG810 Research Proposal (0 CH)

Upon passing the comprehensive examination, a PhD student is required to prepare a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology that the student plans to follow. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. Research Proposals are examined by a committee composed of the student's advisor, and two other Internal examiners in the field of the student research.

Prerequisites

- ITPG800

ITPG900 Dissertation Research (30 CH)

The dissertation research is intended to assist doctoral students in the preparation of a dissertation and facilitate the transition from course work to dissertation. It has a set of definite milestones that students have to meet as they progress through the dissertation process. These include building the research plan, reviewing the existing literature, developing the proposal component, with particular emphasis on research design and development, and finally conducting substantive piece of experimental work. Student will be working under the supervision of thesis advisors, and committee members, he/she will report all in the form of thesis and defend it through a presentation.

ITPG910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based on two main parts: (1) the Committee's evaluation of the dissertation document and (2) the Committee's evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal.

SECB621 Information Security Fundamentals (3 CH)

This course covers the main information security concepts. It provides students with an in-depth-knowledge of the main security issues, and solutions, that face IT Systems today. The course will cover topics that include but not limited to: cryptography and cryptographic protocols, public key infrastructure, operating systems security, authentication and access control technologies and models. Network security and internet security protocols, database security, wireless network vulnerabilities and countermeasures, firewalls, VPN, and intrusion detection/prevention systems.

SECB622 Advanced Network Security (3 CH)

This course provides an understanding of advanced network security theoretical concepts, mechanisms, and solutions with emphasis on wired and wireless network architectures, using firewalls, intrusion prevention systems, virtual private networks (VPN), access control lists and protocols. Topics include also anomalies, analysis of network filtering rules, advanced attack signature generation, common attacks mechanisms, covert channels and steganography concepts, operating system fingerprinting, viruses, and malicious codes

SECB623 Cryptography and Secure Communications (3 CH)

The students in this course will be introduced to various encryption techniques, their applications and weaknesses. The main encryption techniques the students will learn and apply in this course are Symmetric encryption, Public-key encryption, and hash functions. These techniques will be used for digital signatures, certificate generation and verification. In addition, the required mathematical concepts for information security will be discussed. The performance of the various encryption techniques used will be analyzed based on certain criteria and design needs.

SECB624 Software Security (3 CH)

This course provides deep understanding of security vulnerabilities of software, operating systems, and web applications. Common cases of vulnerability exploitations followed by mitigation techniques of these exploitations are discussed. Topics include common security vulnerabilities in software (e.g. buffer overflow, format string bug) and web application (e.g. SQL injection, cross-site scripting), vulnerability databases, malicious code analysis (virus, worm, rootkit), social engineering attacks, and vulnerability detection in software and web applications (security testing, static analysis, penetration testing, web scanner). Additional topics discussed include fundamental security concepts present in operating systems (access control, process, memory), examples of security breach mitigation techniques in operating systems (system log analysis, memory randomization, malicious code monitor).

SECB626 Secure Electronic Commerce (3 CH)

This course investigates theoretical security problems related to protocols and applications of the Internet and electronic commerce and provides contemporary solutions to these problems. The focus of this course is on

architectures and the implementations of security protocols that are used on the Internet today. Topics include: cryptography techniques; Authentication applications; Public-key Infrastructure and Digital Certificates; Email Security: PGP, S/MIME; Web security: SSL/TLS, SET; IPSec; Digital Cash. The course also includes case studies in application of security technology in electronic commerce.

SECB627 Ethics, Law and Policy in Cyberspace (3 CH)

This course provides students with the information needed for the creation, selection and implementation of cyber security policies, and audit and control functions to ensure compliance and efficacy. In this course, students will be exposed to the national and international policy and legal considerations related to cybersecurity such as privacy, intellectual property, cybercrime., homeland security and cyberwarfare. Broader technology issues such as system evolution standards (ISO & Common Criteria) also are discussed to ensure compliance and to demonstrate the interdisciplinary influences and concerns that must be addressed in developing or implementing effective national cybersecurity laws and policies.

SECB628 Computer Crimes and Forensics (3 CH)

This course is designed to equip students with the theoretical knowledge and practical skills needed to safely locate and secure computer evidence at the search site as well as to conduct subsequent off-site analysis. The course aims to equip future Forensics Investigators and Lawful Enforcement Officers with sufficient theoretical and practical knowledge on conducting investigation on Internet based or Cyber based crime. It provides knowledge on implementing the right solution for collecting, analyzing, correlating the Internet data and report them as valid and legal evidence in the court. Topics include evidence handling and disk imaging (restore evidence drive, system backup imaging), Windows forensics utilities, Access Data’s forensics tool kit, hidden data and encryption, steganography, covert channel, erased file recovery, Internet investigations, Hacker profile analysis, and Email header analysis.

SECB701 Policy Criteria and Evaluations of IT Systems (3 CH)

This course starts by reviewing the major concepts related to assurance, assurance versus trust, and functionality versus assurance. Evaluating IT Systems Security: goal of formal evaluation and historical perspective of evaluation methodologies, knowledge of the formal evaluation methodologies used for evaluating IT systems. Trusted Computer System Evaluation Criteria

(TCSEC). This course then covers Common Criteria: understanding the major processes, steps, activities, concepts, terminologies, and how the methodology is used throughout the life of the system, Functionality requirements, Assurance requirement, etc. Finally, this course utilizes the above mentioned evaluation methodologies to evaluate the different authentication and access control models and IT systems.

SECB702 Computer and Network Systems Security (3 CH)

This course provides in-depth study of computer and network systems attack techniques and methods to defend against them. Topics include tracing the source of attacks; traffic analysis; wired and wireless network security architectures; authentication/key management in wireless networks; trust establishment and secure routing in MANET; dealing with rogue wireless devices; key distribution in mobile wireless networks; secure data aggregation in wireless networks.

Prerequisites

- SECB621

SECB703 Privacy and Database Systems Security (3 CH)

Topics in this course cover privacy concerns raised by tracking techniques and data mining in new emerging IT based paradigms such as social media, e-health systems, cloud computing; risks caused by privacy violations; privacy enhancing technologies and anonymous protocols methods of protecting data; secure database design, secure transaction processing, privacy protection mechanisms in distributed databases such as statistical disclosure limitation, private query release, and inference controls; privacy mechanisms for location privacy and web privacy; algorithmic foundations of data privacy; privacy policies and their enforcement.

Prerequisites

- ITPG713
- SECB621

SECB704 Cybersecurity and Critical Infrastructure (3 CH)

This course focuses on critical cyber physical information infrastructure security and resilience, including policies, industry standards and cyber security risk management. Topics include cyber security analysis of control systems for power and water grid (SCADA), nuclear, financial, transportation and oil distribution systems; security of advance metering infrastructure in Smart grid, security metrics, attack and defense strategies, scalable key exchange and encryption protocols; risk assessment and mitigation of coordinated cyber-attacks.

Prerequisites

- SECB621

SECB705 Advanced Topics in Software Security (3 CH)

This course provides in depth analysis of software as a mechanism for attack and as a tool for protecting resources. Topics include common software vulnerabilities; vulnerabilities in source code; secure software design processes and components; security by construction; code mobility, auditing software platforms; software and data watermarking; code obfuscation; virtual system and cloud computing security.

Prerequisites

- SECB624

SECB797 Special Topics in Information Security (3 CH)

The content of this course is customized on every offering depending on current trends and interests.

Prerequisites

- SECB621

Computer and Network Engineering

CENG201 Circuits Fundamentals (3 CH)

This course will introduce students to circuit analysis techniques including nodal analysis, mesh analysis, source transformation, Thevenin's and Norton theorems, and superposition. The course will also cover transient response topics, such as first order RC & RL circuits, step response & time constants, second order RLC circuits, and resonance & quality factor. Phasor representation of sinusoids, impedance & admittance, and circuit analysis using phasors will be also discussed. Average power and RMS values. Finally, operational amplifiers (Op Amp) topics such as ideal Op Amp operation, circuit analysis of Op Amp inverting configuration, applications of inverting configuration, and circuit analysis of Op Amp non-inverting configuration are discussed in detail.

Prerequisites

- PHYS105 with a minimum grade D

CENG202 Discrete Mathematics (3 CH)

The objective of this course is to introduce the concepts of discrete mathematics which includes sets, sequences, summations, functions, matrices, graphs and trees. It also introduces logical reasoning which includes the logic of compound statements (simple statements joined by logical connectives), logic of quantified statements which is in fact the symbolic analysis of ordinary compound statements (sometimes called statement calculus or propositional calculus), and different proof techniques, such as direct proof technique, contradiction proof technique, contrapositive proof technique, induction and recursion proof technique. Finally, the course introduces the concepts of elementary number theory and counting techniques.

Prerequisites

- MATH105 with a minimum grade D

CENG205 Digital Design & Computer Organization (3 CH)

This course introduces students to the basic concepts of digital systems, including binary systems and codes, digital logic gates, combinational and sequential logic circuits. It also introduces students to the basic concepts of computers, their design and how they work. It encompasses the definition of the machine's instruction set architecture, its use in creating a program, and its implementation in hardware. The course addresses the bridge between gate logic and executable software,

CENG210 Communication & Networks Fundamentals (3 CH)

This course introduces students to the basic concepts of data communication system, computer networks and TCP/IP layer model. It provides students with an overview of the functionalities, processes and operations of physical layer, data layer, network layer and transport layer. This overview will include basics on signals, analog and digital transmission, multiplexing, modulation, data encoding, medium access control, error control, IP addressing, and flow/congestion control mechanisms.

Prerequisites

- PHYS105 with a minimum grade D
- Pre/Co CENG205 with a minimum grade D

CENG221 Computer Architecture (3 CH)

The course covers primary building blocks of general-purpose computing systems. The course topics include MIPS Instruction Set Architecture and corresponding assembly language. Other covered topics include: digital building blocks of processor micro-architecture, ALU design, and single-cycle processor design. Memory hierarchy and cache micro-architectures are also covered. Additionally, the students learn how to measure performance and how to improve it using pipe-lining. They also learn the structural optimization for preventing data and control hazards. Overall, the course encompasses the core principles of the classical Von Neumann architecture.

Prerequisites

- CENG205 with a minimum grade D

CENG231 Circuits Lab (1 CH)

This course consists of a set of laboratory experiments designed to provide students with hands-on experience in electrical and electronic circuits. Students will learn how to design, simulate, hardware implementation and take measurement on basic AC and DC circuits including electronic components such as BJT and op-amp circuits. Students will become familiar with circuit simulation, safety and grounding considerations and instrumentation. They will also gain hands-on experience on how to use oscilloscopes, signal sources, multimeters, and signal analyzers.

Prerequisites

- Pre/Co CENG201 with a minimum grade D

CENG320 Signals and Systems I (3 CH)

This course introduces students to continuous-time and discrete-time signals and systems. The course covers linear time invariant (LTI) systems in terms of system properties, convolution sum, and convolution integral representations. LTI systems are also described using differential and difference equations. Throughout this course, topics such as Fourier series, Fourier transform and Laplace Transform will be discussed in detail. All signals and systems manipulations will be done through MATLAB.

Prerequisites

- MATH275 with a minimum grade D

CENG324 Digital System Design (3 CH)

This course introduces students to hardware design techniques using a Hardware Description Language (HDL). The course covers concepts of designing, modeling, simulating, and synthesizing digital systems at different abstraction levels including structural, data-flow and behavioral levels. It also introduces HDL-based simulations and testing environments for functional verification and debugging. The course also discusses important HDL features, modeling techniques and finite state machine design.

Prerequisites

- CENG205 with a minimum grade D

CENG325 Digital Design lab (1 CH)

This lab provides intensive hand-on experiments in digital circuits design and implementation using Verilog as an HDL language. In this lab students will learn the full custom design process using Verilog structural modeling, and Verilog behavioral and logic synthesis. This lab covers the design of both combinational and sequential logic circuits, simulation tools will be used to simulate and debug designs. FPGA boards will be used for implementing simulated error-free design

Prerequisites

- Pre/Co CENG324

CENG328 Introduction to Embedded Systems (3 CH)

This course covers various aspects of embedded system design using micro-controllers. Equipped with the CPU design background from the prerequisite course, in this course, students are expected to comprehend and apply various techniques to build a working embedded system. The topics covered in this course include: mechanism of interfacing peripheral input/output (I/O), timer and Pulse Width Modulation (PWM), analog-digital conversions (ADC and DAC), communication ports, interrupt principles, real-time design issues, and system design methods. In addition to theoretical topics, this course also fosters students' hands-on and communication skills by working on cutting-edge embedded prototype devices through group projects.

Prerequisites

- CENG221

CENG329 Introduction to Embedded Systems Lab (1 CH)

This course consists of laboratory experiments on practical implementation of the microcontroller building blocks including timers, counters, PWM, interrupts, I/O techniques and requirements, A/D and D/A conversion and serial communications. Students will learn how to code control softwarefor I/O devices and use system design process to implement embedded systems.

Prerequisites

- Pre/Co CENG328

CENG513 Hardware Testing and Fault Tolerance (3 CH)

The course covers fault tolerance and hardware testing techniques for circuits and systems. The course topics include: reliability, faults and fault models, and metrics such as availability, mean time to failure (MTTF) and mean time between failures (MTBF). The students learn how to derive reliability using reliability block diagrams and Markov chains. The other covered topics are: error detection and correction in digital circuits and systems. The students also learn the techniques for testing digital circuits, for example, built-in self-testing (BIST).

Prerequisites

- CENG324

CENG518 VLSI Design (3 CH)

This course covers the topics of VLSI design and fabrication based on CMOS technology. The models for MOS transistors, resistance and capacitance are covered. The layout rules for simple circuits as well as full-/semi-custom layout topologies are included. Other topics include the designs of arithmetic circuits and memories, and chip-level physical designs requirements. Logic verification and timing simulations are also discussed. The issues related to circuit's low-power operation and the effects of process variations on the circuits are also introduced.

Prerequisites

- ELEC370

CENG521 Hardware/Software Integration (3 CH)

This course takes the knowledge from a number of prerequisite courses and integrates them into the basis of a hardware and software co-designed embedded systems. The topics covered in this course include: concept of hardware and software, application modeling and analysis, hardware/software communication, performance and trade-offs, state-of-the-art System-on-Chip (SoC), and interfacing and on-chip buses. Hardware implementation techniques using HDL are employed to demonstrate the taught concepts.

Prerequisites

- CENG324
- CENG328
- SWEB300

CENG529 Networking Lab (1 CH)

This laboratory provides students with a series of hands-on experiments in introductory network topics. It covers the design, configuration and troubleshooting of wired and wireless network as well as implementing basic security mechanisms. Students will gain an understanding of the layered approach to networks and examine the OSI and TCP/IP models to understand their function and services. The lab provides also experimental activities on inter-networking and routing concepts and protocols to develop an understanding on how networks are linked together.

Prerequisites

- CENG210 with a minimum grade DPre/Co CENG530

CENG530 Computer Network Protocols (3 CH)

This course exposes students to the details of the TCP/IP protocols. Students will learn the IP addressing and sub-netting schemes, data packets delivery and routing techniques. The course covers protocols at various layers with a deep explanation of address resolution protocol (ARP), IP protocol, and transport protocols: UDP and TCP. Students will also learn network troubleshooting using ICMP and routing protocols such as RIP and OSPF. The

course also includes an introduction to Internet of Things (IoT), its standards, and protocols.

Prerequisites

- CENG210 with a minimum grade D

CENG531 Wireless Communication and Sensor Networks (3 CH)

The objective of this course is to give an introduction to the fundamentals of wireless and mobile communications. The course will cover topics such as RF spectrum, transmission fundamentals, principles of radio communication systems, signal encoding and modulation techniques. It will also cover wireless network architectures, technologies, protocols, and applications. The course will introduce topics related to wireless sensor networks (WSNs) such as WSN architecture and design, routing and transport layer techniques.

Prerequisites

- CENG210

CENG532 Network Security (3 CH)

This course introduces students to the principles of network security with emphasis on network security architectures and mechanisms. Students will learn about network security threats and their countermeasures, types of firewalls, and firewall implementations. The course also covers concepts in Virtual Private Networks and Web security, including IPSEC, L2TP, SSL and SET protocols.

Prerequisites

- CENG530
- ITBP301

CENG533 Advanced Network Services (3 CH)

Converged network technologies for voice, video and data with emphasis on application layer VoIP protocols (H.323 and SIP); Media gateway controller

protocols (MGCP) and the transport of VoIP, and RTP/RTCP; Further topics include:- quality of service (QoS) issues and dimensioning a VoIP network, MPLS, design of VoIP networks, and voice compression standards (G.721, G.729).

Prerequisites

- CENG530

CENG580 Selected Topics in Computer Engineering (3 CH)

Special topics in computer engineering is a unique course, which covers advanced and emerging topics of special interest to undergraduates. The topics are selected from recent developments and trends in computer engineering. The course may introduce new or emerging aspects in the field, contemporary applications and theory in computer engineering, or assesses the state-of-the-art through readings, discussions, and critiquing current literature. (Pre-requisites: Senior standing)

CENG601 Embedded Systems Design (3 CH)

One of the primary reasons behind the emergence of IoT is the rise of embedded platforms (low cost, small form factor devices with significant processing power) which are powering a number of IoT applications in a wide variety of domains. This course aims to cover trends and challenges in embedded systems design understanding the hardware-software trade-offs, introduce microcontrollers, interfacing these with digital/analog systems and the ability to program these systems. The focus of this course will be on the following topics: Micro-controllers (MCUs) and computer interfacing with analog and digital systems; Real-time control issues; Assembly language programming methods for control; Design of control software; Input/output methods, data interrupts, and general issues in digital signal processors (DSPs); Differences in the architectures, functions, and applications of DSPs.

CENG602 Wireless and Mobile Networks (3 CH)

IoT is multi-disciplinary and broadly involves leveraging sensing and communication technology to solve problems in a wide variety of domains. The objective of this course is to highlight different verticals where IoT has been and continues to be employed. Ubiquitous connectivity is another key reason behind the emergence of the IoT and therefore, this course aims to cover the

history, evolution, and developments in wireless and mobile network systems with a particular emphasis on technologies relevant to the IoT (both short-range and long-range). In particular, this course will cover topics on Wireless HART, IEEE 802.15.4, IEEE 802.11ah, Bluetooth Low Energy, Zigbee Smart Energy, HomePlug Low Power Wide Area Networks (focusing on LoRaWAN, SIGFOX, NB-IoT) and 3GPP Machine Type Communications (MTC).

Prerequisites

- CENG210 with a minimum grade D

CENG603 Internet of Things (IoT) Systems and Platforms (3 CH)

This course builds on the introductory communication networks course(s) that the students may have taken during their undergraduate education. A brief overview of some of the important topics from the network and transport layer from the undergraduate course is provided followed by treatment of advanced topics, in particular, protocols that have been developed to meet the requirements of the Internet of Things. The specific topics covered will focus on IPv6, network layer protocols such as Routing for Low Power and Lossy Networks (RPL), 6LoWPAN, IPv6 over time slotted channel hopping (6tisch), IPv6 over Bluetooth Low Energy and application layer protocols such as Constrained Application Protocol (CoAP) and Message Queue Telemetry Transport (MQTT). The motivation and overview of different IoT platforms will also be provided in addition to hands-on exercise on how to use the Thingworx platform for building an IoT application.

CENG604 Sensors, Data Acquisition and Interfaces (3 CH)

This course covers a selection of sensors, transducers and the signal conditioning necessary for including these in a data acquisition system such as internet of things. It investigates most common types of sensors, the analogue to digital and digital to analogue conversion principles and their practical applications for data acquisition and control. Examples of a selection of output drivers and devices are also provided. Applications of recording data from sensors (real-time data acquisition and interfaces) in daily life are also provided.

Prerequisites

- CENG320 with a minimum grade D
- CENG201 with a minimum grade D

CENG640 Internet of Things Security (3 CH)

This course will examine the security and ethical issues of the vast implementation of smart devices known as the Internet of Things (IoT). It will discuss IoT technology and market-specific topics, relevant case studies of IoT security vulnerabilities and attacks, and mitigation controls. It will also discuss common security architectures that can be applied to IoT systems and discusses regulations and standards that apply to secure IoT systems.

Prerequisites

- CENG210 with a minimum grade D

CENG655 Special topics in Computer Engineering (3 CH)

This course covers special topics on various advanced or specialized topics in Computing. Its content is customized on every offering depending on current trends and expression of mutual interest by students and faculty

CENG709 Modeling, Simulation and Performance Evaluation (3 CH)

Computer simulation concepts and modeling theory, probability distributions and queuing theory, random number generation, probability distribution generation, data collection and input analysis, discrete modeling and simulation concepts, Monte Carlo" Simulation.

CENG742 Advanced Computer Architecture (3 CH)

This course covers topics essential to modern computing systems including review of current state of computer hardware and architecture; single and multi-core hardware; memory hierarchy and performance; cache hierarchies; cache coherence protocols; pipelining and hazards; quantitative design and analysis; instruction-level parallelism; data-level parallelism; thread-level parallelism; ultra-low power/energy design and optimization; microarchitectures for dependability; microarchitecture modeling and simulation; buses and arbitration; and peripheral devices.

CENG750 Advanced Design and Analysis of Networks (3 CH)

This is a course focusing on advanced and emerging research topics in networks. The course topics include advancement of the following; sensor networks such as nanonetworks and IoT, emerging network management methods such as cognitive networks, current and new network paradigms such as fog, dew, cloud computing, state-of-the-art network technologies such 5G broadband networks, Li-Fi, and 802.11ax, and new network services such as information-centric networks and IoT services. The course consists of both a research papers reading/lecture/discussion component and a project component.

CEPG701 Advanced Computer Architecture (3 CH)

Review of classical topics in advanced computer architecture: pipelining, branch prediction, shared memory architecture, message passing architecture, synchronicity, performance metrics and laws, scalability. Special emphasis will be placed on parallel architectures: instruction-level parallelism, thread-level parallelism, data-level parallelism, SIMD/MIMD computers, PRAM models, multi/many-cores, vector processors, interconnection networks, network computing, advanced techniques for exploiting parallelism, parallel processing using modern graphics cards, mapping of parallel algorithms. Students will get exposure to multi-core microprocessors as well as advanced graphic/accelerator cards for a better understanding of how modern computing systems support and implement basic parallel processing concepts.

Prerequisites

- CSEB300

CEPG702 Failure Mechanisms and Reliability (3 CH)

This course presents classical reliability based on statistical analysis of observed failure distributions. Techniques to improve reliability, based on the study of root-cause failure mechanisms, will be presented, based on knowledge of the life-cycle load profile, product architecture, and material properties. Techniques to prevent operational failures through robust design and manufacturing processes will be discussed. Students will gain the skills in the field of reliability as it directly pertains to the design and the manufacture of reliable products.

Prerequisites

- ITPG701
- ITPG713

CEPG703 High-Performance Microprocessor Architecture (3 CH)

Modern architecture, instruction set analysis and design, pipelined and multi-core architectures, software-hardware interaction, memory hierarchy, virtual memory stresses, and evaluation of multi-level systems.

Prerequisites

- SECB621
- ITPG713

CEPG704 Advanced Digital Design (3 CH)

The course will cover ASICs and digital system design methods with emphasis on field-programmable devices; logic design fundamentals; digital system architectures; programmable logic devices; computational unit design; state machines, memories, busses; hardware description languages (VHDL); synthesis, simulation, and testing.

Prerequisites

- ITPG701

CEPG705 ASIC Design (3 CH)

This course covers design of digital Application Specific Integrated Circuits (ASICs) based on Hardware Description Languages (Verilog) and EDA tools, logic synthesis. Emphasis on design practices and underlying algorithms, timing-driven design, low-power design, design-for-test and ASIC applications.

Prerequisites

- CSEB310

CEPG706 Advanced VLSI / Nano-electronics (3 CH)

This course builds upon basic CMOS VLSI design and introduce novel techniques and issues that arise in the design of: advanced microprocessors, memories, FPGAs, and embedded cores in sub-130nm technologies and beyond.

Prerequisites

- ITPG713

CEPG797 Special Topics in Computer Engineering (3 CH)

This course covers selected topics of current interest in computer engineering with emphasis on new frontiers in field and topics taken from current research and/or technical publications.

NEBP701 Advanced Networking (3 CH)

This course covers advanced topics in networking including network services and performance, network requirements analysis, network flow analysis, internetworking, end-to-end protocols, congestion control and resource allocation. The course also covers topics in quality of service approaches (integrated and differentiated services), scalable and highly available networks, and policy-based networking. New trends in emerging network technologies will also be covered.

Prerequisites

- NEBP310

NEBP702 Pervasive Networking (3 CH)

This course explores research issues in pervasive computing and covers concepts related to ubiquitous data access, virtualization, sensing and actuation, mobile technologies, location and context awareness, security and

trust. This course will expose students to existing architectures, mechanisms and design patterns pertaining to pervasive and ubiquitous computing.

NEBP703 Advanced Wireless Communications (3 CH)

This course covers concepts related to radio channel characterization concepts such as signal strength prediction techniques and coverage, indoor/outdoor models, fading, delay spread, interference models and outage probabilities, Digital modulation and transmission system performance issues, Signal processing techniques, diversity and beam-forming, multiple-input multiple-output (MIMO) systems, Basic principles of antenna design and analysis for mobile communication systems. Selected MAC protocol standards e.g. 802.11 and 802.16.

Prerequisites

- NEBP441

NEBP704 Design and Analysis of Networks (3 CH)

This course focuses on the tools and techniques for the economic design of telecommunication networks that meet the requirement goals of an organization (for example, reliability or performance.) In particular, it emphasizes the application of queuing methods, optimization & network models, and heuristic search techniques for the design of modern communication networks. Applications to VANETs, Call Center Design, Virtual Private Network Design, Local Distance Networks, and Wireless & Satellite Communications will be discussed.

Prerequisites

- ITPG701

NEBP705 Vehicular Mobile Ad hoc Networks (3 CH)

This course covers research advances in vehicular ad hoc networks (VANET). Students taking this course will be exposed to VANET communication architecture, issues and challenges; routing techniques; data dissemination and resource discovery; communication standards and protocols: Wave, IEEE 802.11p. Security issues in VANET.

Prerequisites

- ITPG709

NEBP797 Special Topics in Software Engineering (3 CH)

The content of this course is customized on every offering depending on current trends and interests.

Computer Science and Software Engineering

CSBP112 Introduction To Programming (3 CH)

This course covers introductory concepts in computer programming using C++. There isan emphasis on both the concepts and practice of computer programming. This coursecovers principles of problem solving. Topics include program development process,variables, data types, expressions, selection and repetition structures, functions, textfiles, and arrays.

CSBP119 Algorithms and Problem Solving (3 CH)

Introduction to problem-solving methods and program development including: the role of algorithms in the problem-solving process, implementation strategies for algorithms, the concept and properties of algorithms, and basic algorithms. Program design strategies including implementation using a programming language which supports modular design and includes: I/O, events, control structures, arrays, functions.

CSBP121 Programming Lab I (1 CH)

This lab based course consists of a set of laboratory assignments and projects to engage students in the process of understanding and implementing basic structured programming concepts. Key topics include problem solving, simple data type and structure data types such String and Arrays, basic statements such as assignment, input and output; selection statement, repetition statement, and methods.

Corequisites

- CSBP119 with a minimum grade D

CSBP123 Introduction to Programming (4 CH)

This course covers introductory concepts of problem-solving and basic program development using Python. Students will be introduced to the role of algorithms design in the problem-solving process and to the process of writing programs via hands-on experience. Topics include data types, input/output, conditional and iteration control structures, lists, dictionaries, and functions.

CSBP219 Object Oriented Programming (3 CH)

Object-oriented design, encapsulation and information hiding, separation of behavior and implementation, classes and subclasses, inheritance (overriding, dynamic dispatch), polymorphism (subtype polymorphism vs. inheritance), class hierarchies, collection classes and iteration, Primitive Data Structures and Application (Array, String, and String Manipulation), Programming Practice using an IDE (modularity, testing, and documentation.

Prerequisites

- CSBP119 with a minimum grade D

CSBP221 Programming Lab II (1 CH)

This lab-based course consists of a set of laboratory assignments and projects to engage students in the process of understanding and implementing programming language concepts. It provides hands-on experience with object-oriented programming. Key topics include objects, classes, subclasses, inheritance, polymorphism, and graphical user interface.

Prerequisites

- CSBP119 with a minimum grade D

Corequisites

- CSBP219 with a minimum grade D

CSBP301 Artificial Intelligence (3 CH)

Artificial Intelligence (AI) technology is increasingly prevalent in our everyday lives. It has uses in a variety of industries from gaming, to finance, robotics and medical diagnosis. Topics include the basics and applications of AI, machine learning, probabilistic reasoning, robotics, computer vision, natural language processing and how AI impacts society. This course incorporates hands-on exercises and projects.

Prerequisites

- CSBP319 with a minimum grade D

CSBP315 Operating Systems Fundamentals (3 CH)

Operating systems examples; Criteria to select, deploy, integrate and administer platforms or components to support the organization's IT infrastructure; Fundamentals of hardware and software and how they integrate to form essential components of IT systems; Operating system principles; File systems; Real-time and embedded systems; Fault tolerance; Operating system maintenance, administration and user support.

Prerequisites

- CENG205 with a minimum grade D

CSBP316 Human Computer Interaction (3 CH)

Human-Computer Interaction (HCI) is the discipline of studying the use of computers by humans and the creation of interactive systems and software that are useful, usable, and enjoyable for the people who use them. The HCI course provides a comprehensive introduction and deep drive into the following topics: principles of user interface design; interface prototyping; user psychology and cognitive science; user interface development; user centered design; styles of interaction; usability testing; human interaction evaluation techniques; web

based user interfaces. HCI students have opportunities to work in a medium-size HCI project where they develop a GUI by following a user centered design process.

Prerequisites

- CSBP219 with a minimum grade D

CSBP319 Data Structures (3 CH)

Techniques for developing, testing and debugging moderate size programs; Arrays, strings and string processing; Linked structures; Exception handling; Knowledge, implementation, and use of files, lists, stacks, queues, trees, heaps and graphs; Strategies for choosing the right data structure; Recursion.

Prerequisites

- CSBP219 with a minimum grade D
- Pre/Co CSBP221 with a minimum grade D

CSBP320 Data Mining (3 CH)

This course introduces the concepts, issues, tasks and techniques of data mining process. Topics include data preparation and feature selection, association rules, classification, clustering, evaluation and validation, and sequence mining, and data mining applications. The course mainly focuses on data mining issues such as data selection and cleaning, machine learning techniques to ``learn" knowledge that is ``hidden" in data, and the reporting and visualization of the resulting knowledge. The course illustrates data mining process by examples of practical applications from the life sciences, computer science, and commerce. Several machine learning topics including classification, prediction, and clustering will be covered.

Prerequisites

- STAT210 with a minimum grade D

CSBP340 Database Systems (3 CH)

The objective of this course is to give a thorough introduction to the concepts for organizing, querying and managing databases. This course introduces the concepts relating to information systems in organizational usage, focusing on the analysis and modelling of data. It covers the fundamentals of databases, the process of database design, including data modelling, and in particular the Entity Relationship. Students will gain a sound practical understanding of the SQL relational query language. They will also develop deep technical knowledge in a relational DBMS and a sense of professionalism and team work discipline.

Prerequisites

- CSBP319 with a minimum grade D

CSBP400 Modeling & Simulation (3 CH)

Introduction to system modeling and decision-making using computer simulation; Discrete-event simulation and popular modeling paradigms; Continuous and hybrid simulations: Input modeling, Output analysis and random numbers; Application areas and tools for simulation.

Prerequisites

- STAT210 with a minimum grade D

CSBP411 Machine Learning (3 CH)

This course introduces the fundamental concepts of machine learning. Topics include extracting and identifying useful features that best represent the data. Pre-processing methods such as replacing missing entries, feature selection, discretization and popular supervised and unsupervised learning algorithms such as linear regression, decision trees, k-nearest neighbor, Bayesian learning, support vector machines, neural networks and k-means are also covered in the course. Topics related to evaluating what is learned include evaluation strategies, cross-validation, Leave-one-out, Bootstrap prediction probabilities. Applications covered in the course include text and web mining, document classification, bioinformatics. The course is accompanied by hands-on problem solving using some of the popular machine learning toolboxes and programming languages.

Prerequisites

- CSBP301 with a minimum grade D

CSBP421 Smart Computer Graphics (3 CH)

This course covers fundamental techniques in computer graphics and mathematical foundations. Topics include graphic tools, geometric transformations, basic and advanced rendering techniques, computer animation in film, gaming and simulation.

Prerequisites

- CSBP319 with a minimum grade D

CSBP431 Bioinformatics (3 CH)

Overview of molecular biology as related to bioinformatics. Bioinformatics and the relationship between computer science and biology in the field of bioinformatics. Algorithms in general and specifically those often used in bioinformatics. Computing tools used in bioinformatics. Databases available for bioinformatics work. Scientific method and how bioinformatics applications apply. Models of successful collaborations between biologists and computer scientists. Computational models of biological processes and their role in scientific discovery.

Prerequisites

- SWEB450 with a minimum grade D

CSBP441 Applied Computer Vision (3 CH)

Computer Vision is a key element in many products such as cameras, medical image processing and diagnosis, and home and industrial robotics. This course covers the fundamentals of computer vision, simple pattern recognition techniques for face recognition and optical character recognition (OpenCV), image labeling techniques, and simultaneous localization and mapping navigation systems (SLAM) for navigation of autonomous vehicles.

Prerequisites

- CSBP301 with a minimum grade D

CSBP461 Internet Computing (3 CH)

The Internet is increasingly used as a large interconnection network for deploying distributed applications to solve challenging problems in diverse areas. This course covers the basic principles and practices of Web application development (client-side and server-side programming) and distributed computing over the Internet. It focuses on the Internet as a domain for sharing resources using distributed computing with client/server programming, Web services and Service-Oriented Computing. In this course students will learn the basic foundations of Internet computing and use Web technologies (HTML, HTTP, XML, Java Servlets Java Server Pages, and Web services) to develop Internet-based applications.

Prerequisites

- CSBP340 with a minimum grade D

CSBP476 Robotics and Intelligent Systems (3 CH)

This course provides students with a working knowledge of methods for design and analysis of robotic and intelligent systems. Particular attention is given to modeling dynamic autonomous robot systems, measuring and controlling their behavior, and making decisions about future actions. The objective of this course is to provide the basic concepts and algorithms required to develop intelligent robots that act in complex environments. The intent is to motivate and prepare students to conduct research projects in the field of robotics and intelligent systems.

Prerequisites

- CSBP301 with a minimum grade D

CSBP483 Mobile Web Content and Development (3 CH)

This course introduces students to the basics of contemporary mobile application development. The main requirement of the course is to build a functioning application on smart-phones and tablets. Students explore mobile architecture and environment setup. They learn different components, views, and controls that comprise UI, UI layout, constraints, and event handlers. The course covers advanced topics that include data access, data binding, and SQLight. Students must design and develop a working mobile application.

Prerequisites

- CSBP340 with a minimum grade D

CSBP487 Computer Animation and Visualization (3 CH)

This course will cover advanced topics in computer graphics. The emphasis will be on scientific visualization, animation, procedural modeling, and procedural texturing by using industry standard tools and methodologies.

CSBP491 Computational Intelligence for Data Management (3 CH)

This course provides students advanced knowledge on computational intelligence methods related to various aspects of data analysis. Rather than treating computational intelligence and data analysis separately, the course allows students to examine the integration of these two disciplines. The emphasis is on how to apply computational intelligence methods to various data analysis aspects.

Prerequisites

- CSBP319

CSBP499 Special Topics in Computer Science (3 CH)

Special topics in Computer Science is a unique course. The topics are selected from recent developments and trends in Computer Science. The course may introduce new or emerging aspects in the field, contemporary applications and theory in computer science, or assesses the state-of-the-art through readings, discussions, and critiquing current literature.

CSPG701 Advanced Design and Analysis of Algorithms (3 CH)

The course starts by reviewing asymptotic notations and growth of Functions (Θ, O, Ω notations), recursion and recurrences. Study of various algorithm design paradigms (divide & conquer, greedy, and dynamic programming); Advanced data structures (B-Trees; Binomial Heaps; Fibonacci Heaps; Data Structures for Disjoint Sets). Complexity Analysis (Polynomial Time; Polynomial Time Verification; NP-Completeness and Reducibility; NP-Completeness Proofs; NP-Complete Problems); Study of some advanced algorithms (selected from the following: Sorting Networks; Algorithms for Parallel Computers; Matrix Operations; Polynomials and FFT; Number-Theoretic Algorithms; String Matching; Computational Geometry; Approximation Algorithms).

CSPG703 Complex Software Systems (3 CH)

Complexity; nature and structure of complex systems; impact and pervasiveness of complex systems; methods and technologies for developing highly reliable complex systems; relationship between complex software systems and societalscale systems; conceptual framework; software modeling of societal-scale systems; reference designs and architectures.

Prerequisites

- ITPG701

CSPG704 Elements of Artificial Intelligence (3 CH)

This course is intended to prepare the students to address intelligent systems issues in computational biology, computer graphics, computer vision, human language technology, machine learning, intelligent agents, medical informatics, robotics, and the semantic web. Advanced topics include machine learning, knowledge representation, search, constraint satisfaction, graphical models, and logic.

Prerequisites

- ITPG701

CSPG705 Intelligent Agents & Semantic (3 CH)

Semantic web, reactive and deductive agents, reasoning on the web, agent communication techniques, ontologies, social web systems, semantic web-based services.

Prerequisites

- ITPG701

CSPG706 Big Data Analytics and Cloud Computing (3 CH)

This course covers advanced data mining techniques for Big Data, especially, data stream mining, and cloud data mining. This course will enable learners to apply the big data mining techniques to discover useful relationships and patterns from massive data and utilize them in strategic and competitive decision making in an enterprise setting. Topics will cover efficient, scalable and effective construction of predictive and analytical data mining models from data streams and data cloud; comprehensive and in-depth knowledge of Cloud Computing concepts, technological foundations, architecture, applications and services.

Prerequisites

- ITPG713

CSPG707 Pattern Recognition (3 CH)

This course introduces the fundamentals of statistical pattern recognition with examples from several application areas. Techniques for analyzing multidimensional data of various types and scales along with algorithms for projection, dimensionality reduction, clustering and classification of data are explained. The course presents competing approaches to exploratory data analysis and classifier design, allowing students to make judicious choices when confronted with real pattern recognition problems. Students use MATLAB software and implement some algorithms using their choice of a programming language. Topics include: Bayes decision theory, parametric approaches, the Ugly Duckling theorem, discriminant functions, performance assessment, nonparametric classification, feature extraction, unsupervised learning, support vector machines and kernels, and Boosting basics.

CSPG730 Data Mining for Advanced Analytics (3 CH)

Data mining (DM) tools and techniques can be used to predict future trends and behaviors, allowing individuals and organizations to make proactive and data-driven decisions. Topics include data exploration and preprocessing, data quality verification, data warehouses, data analytics and machine learning techniques for model and knowledge creation, Statistical learning theories, classification, association and clustering, ensemble learning, model building and evaluation, interpretation of patterns in large collections of data, data visualization, and important research issues relevant to advanced mining applications.

CSPG731 Distributed and Parallel Computing (3 CH)

The course starts by discussing the need for distributed and parallel computing. Covers the design and implementation of parallel and distributed systems. Topics include Cluster Computing, Grid Computing, Cloud Computing, supercomputing, Many-core Computing, Graphics Processing Unit (GPU) architecture and parallel computing. Parallel algorithm design and implementation issues for such systems. We will cover topics such as synchronous and asynchronous communication, and multithreading implementation, and discuss the challenges therein and corresponding solutions. In addition, we will also study parallel models of computation such as dataflow, and demand-driven computation; message passing and Message Passing Interface (MPI) programming; embarrassingly parallel problems; decomposition and load balancing; shared memory and Open Multi-Processing (OpenMP) programming.

CSPG751 Software Engineering (3 CH)

This course covers advanced concepts in software engineering. It starts by eliciting the core concepts and principles underlying the methodologies and techniques required to develop sound software systems. Topics include fundamental software engineering principles and theory, software life cycles, requirement engineering, system specification, system modeling, system architecture, system implementation, system testing, software maintenance, as well as project management. Study of the importance of problem specification, programming style, periodic reviews, documentation, thorough testing, and ease of maintenance.

CSPG797 Special Topics in Computer Science (3 CH)

The content of this course is customized on every offering depending on current trends and interests.

SWEB300 Software Engineering Fundamentals (3 CH)

The course covers the basics of software engineering. It introduces the phases of Software Development Life Cycle (SLC), namely, requirements gathering and analysis, design approaches and modeling, and testing. The course discusses also the main software development models and focuses on the object-oriented paradigm, its concepts, its characteristics, and its design principles. The course concludes with a brief introduction to the wide area of Computer Aided Software Engineering (CASE).

Prerequisites

- CSBP219 with a minimum grade D

SWEB312 Software Requirements and Specification (3 CH)

Main topics include the study of methods, tools, notations, and validation techniques for the analysis and specification of software requirements.

Prerequisites

- CSBP219 with a minimum grade D

SWEB450 Analysis of Algorithms (3 CH)

Asymptotic analysis of upper and average complexity bounds; Identifying differences among best, average, and worst case behaviors; Big oh, little oh, omega, and theta notation; Standard complexity classes; Empirical measurements of performance; Time and space trade-offs in algorithms; Using recurrence relations to analyze recursive algorithms; Algorithmic strategies including brute-force, greedy, divide-and-conquer, backtracking, branch-and-bound, and pattern matching; Introduction to P and NP.

Prerequisites

- CSBP319 with a minimum grade D
- CENG202 with a minimum grade D

SWEB451 Game Development (3 CH)

Theoretical and practical issues in the development of video games; fundamental elements of game development; game history and genres; game analysis; game architecture; game engine evaluation; game worlds and their dimensions; character archetypes; character behavior and animation; intelligent behavior; logical and physical game laws; societal and cultural issues.

Prerequisites

- CSBP319 with a minimum grade D

SWEB645 Application and Service Development for the IoT (3 CH)

This course introduces students to the fundamentals and basics of contemporary mobile application development. In particular, the course focuses on mobile architecture, mobile UI design, and environment setup. Students learn different UI aspects such as controls, layouts, constraints, and event handlers. The course covers advanced topics that include sensor data, multimedia, Cloud databases, and Google Maps. The course is project oriented in which students must finish and demonstrate a mid-size working mobile application. Code design, data capturing, and architecture are emphasized.

SWEB651 Software Construction (3 CH)

The course focuses on Agile process, quality issues and software engineering lifecycle, theoretical basis, such as Abstract Data Types, advanced object-oriented mechanisms, techniques and principles for producing reusable components, reuse issues, multithreading design, inter-process communication, architectural patterns, service-oriented architecture. The course offers the students the opportunity to develop a project following the software engineering lifecycle, including debugging, testing, demonstration and presentation.

SWEB652 Requirements Engineering (3 CH)

This course provides the knowledge and skills necessary to translate user needs and priorities into system requirements, which form the starting point for engineering software systems. Techniques for translating user needs and priorities into specific functional and performance requirements are presented. Topics include Goal Oriented RE, scenario oriented RE, elicitation techniques, Validation and Verification, and specifying requirements using informal/semi-formal/formal techniques. To acquire practical and research experience, students participate in groups to develop software requirements specifications (SRS) and summarize/present research papers. Case studies and tools will be introduced.

SWEB653 Software Testing & Quality Assurance (3 CH)

This course emphasizes the importance of software testing. It introduces the main concepts and techniques of testing in order to assure software system quality. In particular, the course covers software testing at the unit and module levels. New ways of testing are introduced by this course. They consist in modeling the software into logical structure, syntactic structure, graphic structure, or input space characterization, and then covering the model elements. Based on the new style of testing different techniques are presented in order to manually and automatically generate high quality test data. In addition, the course covers emergent trends of software testing such as, testing web sites, web services, mobile applications, and testing for safety and security. This course covers also topics on software quality and quality assurance.

SWEB654 HCI and Usability (3 CH)

The course explores the concepts of human computer interaction and focuses on HCI usability. It covers theory, models and principles of human-computer interaction design, development methods for interfaces. The course defends the User Centered Design philosophy and covers several techniques to implement it such as prototyping, UX learning, Agile UX and usability testing. To acquire practical and research experience, students participate in groups to study, design and implement HCI as part of a term project and write research papers.

SWEB655 Web Applications (3 CH)

The course focuses on technologies and industry standards for accessing and manipulating information and services via Web applications. This course aims at building core competencies in web design and development. It includes introductions to XHTML, eXtensible Markup Language (XML), Cascading Style Sheets (CSS), Asynchronous JavaScript And Xml (AJAX) with XML and JavaScript Object Notation (JSON) as primary means to transfer data from client, and server and server-side languages, such as ASP.NET or Java 2 platform (JEE). Course topics also include: HTTP Protocol, Application server vs. Web server, Model View Controller (MVC) architecture and Java beans.

SWEB656 Special Topics in Software Engineering (3 CH)

Software Engineering is a highly evolving field and new approaches and methods are developed continuously. This special topic course focuses on a major research trend in Software Engineering and assesses the state-of-the-art through readings, discussions, critiquing current literature, and elaborating a technical paper addressing the challenges in software engineering. Research strategies, effective presentations, and technical writing are emphasized throughout the course.

SWEB657 Embedded Software (3 CH)

This course covers fundamental principles and techniques for embedded software engineering. Continuous, discrete, and concurrent behavior modeling methods are introduced with a focus on the component-based development approach for designing, implementing, and analyzing embedded software. Formal models for reachability analysis and model checking, as well as approaches to quantitative analysis, are covered. To acquire practical and research experience, students participate in groups to develop implementation projects and write research papers.

SWEB701 Complex Software systems (3 CH)

Complexity; nature and structure of complex systems; impact and pervasiveness of complex systems; methods and technologies for developing highly reliable complex systems; relationship between complex software systems and societalscale systems; conceptual framework; software modeling of societal-scale systems; reference designs and architectures.

Prerequisites

- ITPG701

SWEB702 Software Engineering (3 CH)

This course covers advanced theoretical concepts in software engineering and provides an extensive hands-on experience in dealing with various issues of software development. It involves a semester-long group software development project spanning software project planning and management, analysis of requirements, construction of software architecture and design, implementation, and quality assessment. The course will introduce formal specification, component-based software engineering, and software maintenance and evolution.

Prerequisites

- SWEB701

SWEB703 Advanced Software Architecture and Design (3 CH)

This course covers advanced concepts and methodologies for the development, evolution, and reuse of software architecture and design, with an emphasis on object-orientation. Identification, analysis, and synthesis of system data, process, communication, and control components. Decomposition, assignment, and composition of functionality to design elements and connectors. Use of non-functional requirements for analyzing trade-offs and selecting among design alternatives. Transition from requirements to software architecture, design, and to implementation.

SWEB704 Software Maintenance, Evolution, and Re-Engineering (3 CH)

This course covers the principles and techniques of software maintenance. Impact of software development process on software justifiability, maintainability, evolvability, and planning of release cycles. Use of very high-level languages and dependencies for forward engineering and reverse

engineering. Achievements, pitfalls, and trends in software reuse, reverse engineering, and re-engineering.

College of Law

Islamic Studies

ISLM100 Islamic Culture (3 CH)

This is a required general education course aims at studying Islamic culture, its concept, sources, and characteristics. The course also deals with the following areas of Islamic culture: faith, worship, transactions, and personal status. The course discusses a number of life vales in Islam, such as honesty and credibility. The course dwells upon contributions made by the Muslims to the humanities, social, and natural sciences, in addition to some contemporary issues, such as medical issues and the other in Islam.

ISLM114 Recitation & Cantillation (3 CH)

The course aims to train students to pronounce and recite the verses of the Qur'an correctly. Students learn the basic rules of cantillation and then apply them to the last ten parts of the Qur'an and to other Suras which should be memorized by students.

ISLM201 Fiqh of Worship (3 CH)

This course deals in detail with the forms of worship in matters of ritual purity, prayer, and pilgrimage and provides the students with fiqh views on issues connected with these maters, weighing one against another in order to enable them to be proficient in fiqh when they undertake to teach the forms of worship and to pass fatwas with regard to these issues, which are of great importance as they form the basis of the relationship with the Creator.

SHAR112 Introduction to Islamic Law and its Sources (3 CH)

The course deals with an introduction to the definition of jurisprudence and Sharia, its divisions and the characteristics. The role of Islamic jurisprudence is covered through the study of its various sources, like The Quran, The Sunna, Fiqh consensus, inference, open interests, approbation, pretext closure accompanying and Tradition.

SHAR204 Personal Status (Marriage and Divorce) (3 CH)

This course covers the provisions of the marriage and the rights of the husband in Islam compared to the personal status law of the United Arab Emirates .. The student will know the terms of the subject and the marriage provisions and the effects of the marriage contract as whole. This course also with the provisions of the band, such as the couple divorce (Khula) divorce, judicial separation, and the effects of the band, child custody, etc

Prerequisites

- SHAR112 with a minimum grade D

SHAR212 Rules of Jurisprudence (3 CH)

Jurisprudence Rules: This course deals with the definition of the Jurisprudence Rule and how this rule differs from the Fundamental rule. Furthermore, this course provides a brief idea about the historical development of rules in the Islamic Jurisprudence and their roles in understanding the different branches of the science of Jurisprudence. It intends to equip students with a grasp of the theoretical frameworks that Muslim jurists utilize and to have some understanding of the rules of the books of "Similarities and Counterparts" and their relation with the Journal of Justice Judgements. Finally this course explores the meaning of the main Jurisprudence Rules, their examples and importance in building the jurisprudence ability of student

Prerequisites

- SHAR112 with a minimum grade D

SHAR327 Inheritance, Will & Mortmain (3 CH)

This course covers the provisions of inheritance in Islam with its important , and the need for it in our life , and how to apply it in the judiciary , (Fatwa) and other field , with an indication of what is going on in United Arab Emirates laws .. The course also aims to introduce the will and mortmain (Waqf) in Islamic jurisprudence in terms of: their definition , statement of their terms and other provisions, through personal status law and civil transactions law in UAE.

Prerequisites

- SHAR112 with a minimum grade D

SHAR329 Principles of Islamic Jurisprudence (3 CH)

In this course, the student will get to understand the concept of principles of jurisprudence as a branch of knowledge, its theme and benefits. The student also will get to know how this branch of science has evolved and derived. In addition, the student will learn the theory of sharia rule, the lawgiver, types of sharia rules and the subject matter of the sharia rule.

Prerequisites

- SHAR112

SHAR409 Islamic Criminal System (3 CH)

This Course will deal with the Islamic crimial legislation. It will cover the definition of Hudood, the distinction between Hudood, Dia, Quisas and Ta’azir, study of various categories of Hudood such as adultery, accusation of adultery, theft, armed robbery, apostasy and transgression. The focus in this Course will be on the application of Hudood, Dia, Quisas and Ta’azir within the framework of the UAE Federal Penal Law.

Prerequisites

- SHAR112 with a minimum grade D
- PUBL203 with a minimum grade D

Private Law

PRVT113 Introduction to Law (3 CH)

This course aims at acquainting the student with the two major concepts; 'the Law' and the 'Rights'. The first concept of Law deals with the nature, necessity and the goals of the Law, and the properties of the Legal Rules. The study also includes the divisions of law, the temporal and spatial validity of law, and the interpretation of law. The Second concept of Right covers the nature, basis and types of Right; with special focus on the idea of the 'legal personality'. This entire course is aimed at providing the student with sufficient knowledge about the essential legal thoughts; so as to enable him to understand the different divisions of law. The course also provides the student, with elementary training on learning oral and written, legal skills.

PRVT201 Consumer Protection Law (3 CH)

This course deal with the legal concepts related to the Federal Consumer Protection Law No. (24) 2006. Topics to be covered in this course include: the definition of consumer, the fundamental rights of consumer, the obligations of the provider, and the liabilities of different parties involved in consumer contracts. The course contains also the study of consumer contracts and the rights of consumer such as the rights to be protected from unfair terms or misleading advertising. Further, it addresses obligations of the seller/supplier such as to comply with producers stipulated by the executive bylaw enacted under the 2006 Act above mentioned before the conclusion of the contract and after that and the legal liability of the supplier/ producer when breaching such obligations.

Prerequisites

- PRVT210 with a minimum grade D

PRVT210 Sources of Obligation (3 CH)

This course introduces students to the Voluntary and non-Voluntary sources of obligations in the light of the civil transactions Law in UAE. It particularly focuses on the basic conditions of contract, its validity, interpretation, and the consequences of its dissolution. It also includes the following topics: Unilateral will, unlawful acts, Unjustified Enrichment, and finally the law as a direct source of obligation.

Prerequisites

- PRVT113 with a minimum grade D

PRVT211 The Rules of Evidence (3 CH)

This course deals with different methods of proof, both formal and substantive rules of evidence; writing, testimony, oath, declaration, presumptions, expertise and inspection. Furthermore, it deals with the evidential weight of electronic records and signatures in the light of Electronic Transactions Law.

Prerequisites

- PRVT210 with a minimum grade D

PRVT227 Principles of Commercial Law (3 CH)

This course covers the study of the Commercial Law, its evolution and historical background and its sources, with a special emphasis on the theory of project and kinds of commercial transactions. The course includes the concept of trader, his rights and obligations, kinds of commercial contracts, as sale by installment, sale by public auction, carriage of items and carriage of persons. It also covers Commercial Mortgage, Commercial Agency, Brokerage, Commission Agency, Commercial Representation, Securities Market, Business Premises and International Sales.

Prerequisites

- PRVT113 with a minimum grade D

PRVT2652 Business Law (E) (3 CH)

The course covers the study of commercial activities; their identification, the types and the importance of differentiating between them and civil activities. It deals with merchant and the conditions of acquiring the title of 'merchant'. It deals with the commercial companies; types, characteristics of each type and the securities issued by share-holding companies. It covers the commercial papers; like- Bill of Exchange and cheque. It also deals with all Banking

operations like- bank deposits, accounts, letters of credit and various banking services, commercial contracts and e-contracts.

PRVT302 Civil Procedures (3 CH)

This course represents the students with the legal procedures applied before the UAE federal courts in the civil and commercial actions. It explains the structure of the court system in the UAE and courts jurisdictions. Furthermore, it explores in-depth the development of the dispute, from filing the lawsuit with the court's registrar through administering the hearings, recusal of the judge, suspension and termination of the action, to the rendition of the judgment and appeal. It also handles the relationship of the Public Prosecution with the court system and its role in civil actions.

Prerequisites

- PRVT211 with a minimum grade D

PRVT304 Labour Law (3 CH)

This course provides an overview of national and international legislation regulating employment. It covers a wide range of topics, including concept of an employment contract, as well as its types and their enforcement; the employee’s rights in wage and leave; the employee’s right in end of employment compensation and other rights upon end of employment; the right of UAE nationals in contribution to pension fund; the employee’s obligations toward the employer: and settlement of employment disputes.

Prerequisites

- PRVT211 with a minimum grade D

PRVT307 The Rules of Obligations (3 CH)

This course examines the effects of obligations, and the ways of protecting the rights of the creditor. It also concentrates on the descriptions of the obligation: the condition, the term, variety of objects of obligation, alternative and elective obligations, positive and negative joint liability. The course covers the transfer of obligation: assignment of right and assignment of debt. Finally, it deals with

the discharge of the obligation: by performance, performance and subrogation, renovation, and the lapse of time limitation without performance.

Prerequisites

- PRVT211 with a minimum grade D

PRVT333 Selected Studies in Comparative Private Law-English (3 CH)

This course aims to introduce students to the concept of comparative law, the benefits of undertaking comparative law studies, borrowing from one legal system to another, and modernization of Arab & Islamic legal systems. It focuses on some applications of comparative law, particularly those relevant to private law, i.e. civil law, commercial law and maritime law. These include a study of the concept of law, the concept of right, the concept of property, the concept of contract, the concept of lease, the concept of waqf, the concept of insurance, the concept of liability, the concept of corporation, the concept of partnership, the concept of commercial transactions, and the concept of maritime law. These concepts will be studied in detail, and the study will be in the form of a comparison between UAE law and English law. These topics will be covered in detail according to the time allocated, as stated below.

Prerequisites

- ESPU1052 with a minimum grade D
- PRVT113 with a minimum grade D

PRVT338 Company Law (3 CH)

This course covers the following topics: Nature and elements of a company; Requirements for company formation; General Partnership; Simple limited partnership; Joint participation; Public joint stock company; Joint stock closed company; Limited liability company; Dissolution and Liquidation of the company.

Prerequisites

- PRVT227 with a minimum grade D

PRVT339 Commercial Arbitration Law (3 CH)

This course introduces the legal framework for Arbitration, its main types, nature and characteristics. Topics include: the composition of the arbitral tribunal; forms and substance of an arbitration agreement; qualifications, jurisdictions and responsibilities of arbitrators; the arbitral procedures, the challenge, recognition and enforcement of arbitral awards.

Prerequisites

- PRVT227 with a minimum grade D
- PRVT302 with a minimum grade D

PRVT340 Securities Law (3 CH)

This course deals with the legal and regulatory framework applicable to the Securities markets in UAE. Topics include: the main types of securities and their characteristics, the conditions and legal requirements for their issuance, clearing settlement, and trading; the rules of speculation in the financial markets, the operation of the Securities and Commodities Authority. Emphasis is also placed on the conditions of brokerage companies and the liability of brokers.

Prerequisites

- PRVT338 with a minimum grade D

PRVT406 The Law of Execution (3 CH)

This course introduces the students to the Law of Compulsory Execution of Judgement. It covers all legal aspects that follow the rendition of the judgement. This includes the study of the compulsory execution of the judgment based on its core pillars, i.e. the Writ of Execution and the Judge of Execution. In addition, it covers the subject of Summary Execution, along the methods of execution, its procedures and disputes; until ending with the Allocation of the Execution Proceeds.

Prerequisites

- PRVT302 with a minimum grade D

PRVT407 Private International Law (3 CH)

The Private international law course involves the study of the applicable law in private international relations; civil, commercial and personal status relations; the conditions of court jurisdictions in disputes involving foreign subjects and the applicable procedural law in this respect and the execution of foreign judgments.

Prerequisites

- PRVT302 with a minimum grade D
- PRVT307 with a minimum grade D

PRVT408 Maritime and Aviation Law (3 CH)

This course discusses the following topics: aircraft registration, legal status of aircraft and the crew, leasing, purchasing, mortgaging and insuring of the aircraft. Carriage by air. This course examines as well the relevant international agreements that regulate Civil Aviation.

Prerequisites

- PRVT227 with a minimum grade D
- PRVT338 with a minimum grade D

PRVT410 Nominated Contract (Sale, Lease & Construction) (3 CH)

The course is designed to study the contracts of sale, lease and construction in terms of their formation, effects (obligations of both parties), and termination. It deals also with the different relationships in the construction industry and the nature of electronic sale contracts and real estate contracts on maps. Finally, this course analyses the relevant rules of UAE law relating to such contracts.

Prerequisites

- PRVT307 with a minimum grade D

PRVT453 Commercial Papers & Banking (3 CH)

This course contains the study of various commercial papers, like; the bill of exchange; the promissory note and the cheque. It also covers various aspects of banking operations such as terms deposits, current accounts, documentary credits, letters of credit and bank loans.

Prerequisites

- PRVT227 with a minimum grade D

PRVT455 Rights in Rem (3 CH)

This course deals with original real rights based on a definition of real rights and their characteristics, and a definition of the right of ownership, its elements, scope, and the legal restrictions pertaining to it. Furthermore, this course explores the jointly held property and its division, family property and its rules, and the common ownership and its rules. It also shed light on the different causes of acquiring property, and the reasons for the termination of ownership. Finally, the course addresses the rules of credit guarantees and the legal regulation relating to mortgages and the rights to privilege.

Prerequisites

- PRVT307 with a minimum grade D

PRVT462 Intellectual Property Laws (3 CH)

This course is designed to provide students with the fundamental aspects of Intellectual property rights under UAE law and international agreements. It covers topics of copyrights, trademarks, geographical indications, Patents, industrial designs, lay-out design of integrated circuits, and the protection of plant varieties. The course focuses on both national and international legal rules governing intellectual property.

Prerequisites

- PRVT227 with a minimum grade D
- PRVT338 with a minimum grade D

PRVT600 Advanced Studies in Civil Law (3 CH)

The course includes a deep study of one subject of the Civil Transactions law, such as one type of responsibility (contractual or tort) or one of the important and practical civil contracts, such as a construction contract.

PRVT601 Advanced Studies in Commercial Law (3 CH)

This course aims at studying the definition of these contracts, their characteristics and features, their rules, and the effects resulting from them.

PRVT603 International Trade Contracts (E) (3 CH)

When traders sell or buy goods or commodities on the international markets, the transaction is composed not of one but of several contracts: the goods are sold under a contract of sale, transported under a contract of carriage, insured under a policy of insurance and frequently financed through a letter of credit. The purpose of this course is to examine the regulation of each of these contracts in UAE law, and applicable international law and standards, focusing in particular on the practical problems which arise when the various contracts do not mesh together. This Course also includes: The United Nations Convention on Contracts for the International Sale of Goods, and the United Nations convention on the Limitation Period in the International sale of Goods.

PRVT604 Alternative Dispute Resolution (E) (3 CH)

The object of the course is to study methods of resolving disputes other than by adjudication in courts. The course will include the definition of arbitration, the differences between arbitration and conciliation, the differences between national and international arbitration, arbitration agreement, arbitration procedures, applicable law, arbitration award, arbitration award enforcement, invalidity of arbitration award.

PRVT605 Modern Finance Transactions in Islamic Law (3 CH)

The course includes banking operations such as banking deposits and accounts, credits, commercial papers operations, safe rental and other operations, with focus on operations related to the role of the banks in

financing economic projects. Some of these subjects will be deeply studied from an Islamic perspective and compared with positive law.

Prerequisites

- PRVT600 with a minimum grade C
- PRVT601 with a minimum grade C
- PRVT602 with a minimum grade C

PRVT606 Thesis (7 CH)

The Masters thesis may be on any topic related to Private Law, broadly defined. The resulting thesis must be of a quality suitable for publication in English. It must be defended publicly and deposited in digital form in the Zayed Public Library.

Prerequisites

- PRVT605 with a minimum grade C

PRVT607 World Trade Agreements (E) (3 CH)

This course examines the multilateral and regional legal regimes governing importation and exportation of goods across national borders. Key topics include the history and institutions of the General Agreement on Tariffs and Trade (GATT) and World Trade Organization (WTO), accession to the WTO, dispute settlement under WTO rules, transparency and participation in the GATT-WTO system, regulation of import duties and non-tariff barriers, rules on customs classification and valuation.

PRVT608 E-Commerce (E) (3 CH)

The course includes an introduction to the legal concept of e-commerce, its importance, its spread, problems of evidence, special nature of contracting through internet, protection of the internet consumer.

PRVT609 Advanced St.In Prvt.Int. Law (3 CH)

This course includes studying the applicability of foreign laws before national courts. It provides solutions for conflict of laws in various contexts, such as personal status matters and civil transactions. This study is based on the UAE legal system with respect to the recognition of the foreign awards and compared with the related Islamic rules.

PRVT610 Legal System for Economic Activity in Free Zones (E) (3 CH)

This course covers notions of free economic zones, free zones founding conditions, arranging and founding of the free zone, changes of the free zones, free zones user, conditions and procedures on tax benefit, free zone activities (import and export of goods from the free zone, temporary exit of goods from the free zone, standards, technical and quality norms and prices), application of regulations, agreements and employment relations, treatment of goods, customs supervision and control in the free zone, termination of the operating of the free zone and of the user.

PRVT611 Advanced Studies in Civil Procedure (3 CH)

The course includes a thorough study of a selected subject from among the subjects of the Civil Procedures Law, such as joining a third party before the court of first instance, appeal and cassation. The method of study is an analytical one where the student explore the subject through comparing between the implemented rules and the Sharia (Islamic Law).

Prerequisites

- PRVT600 with a minimum grade C
- PRVT601 with a minimum grade C

PRVT612 Advanced Studies in Insurance (3 CH)

This course covers one of the advanced topics in insurance contracts, such as insured damages, conditions of compensation in obligatory insurance or potential right in insurance contract.

Prerequisites

- PRVT600 with a minimum grade C

PRVT613 Advanced Studies in Intellectual Property (3 CH)

The course includes following subjects: Patents, Trade marks, Copyright, Industrial Property, Commercial Property, the impact of GATT & TRIPS Agreements and the Islamic position towards them.

Prerequisites

- PRVT600 with a minimum grade C

PRVT707 Civil Law (3 CH)

This course offers an in-depth study into one of the topics relating to civil law. It concentrates on the legal issues and problems from a practical and comparative perspective, and evaluates the legal recognition of the current civil contracts by addressing the main areas of strength or weakness in this regard and determining what the law ought to be in order to strike a balance between the different interests of the parties involved. Topics to be covered include: Duty to achieve a specific result; Duty of best efforts; personal guarantees and insurances in kind;. the liability arising from personal acts, the liability arising from the acts of others, Professional responsibility, compensation for moral damage, Joint ownership, insurance again liability, and so forth.

PRVT708 Commercial law (3 CH)

This course discuss one of the topics relating to Commercial Law according to its importance. It offers an in-depth study into one of the topics relating to commercial law. It concentrates on the legal issues and problems from a practical and comparative perspective, and evaluates the legal recognition of the current commercial contracts by addressing the main areas of strength or weakness in this regard and determining what the law ought to be in order to strike a balance between the different interests of the parties involved. Topics to be covered include: the theory of the merchant, the commercial activities,

the banking operations, commercial competition, electronic commerce, and so forth.

PRVT711 Civil Procedures Law - E (3 CH)

This course shall examine deeply the process for advancing claims in the civil law context. It is essentially a course that will provide students with the framework for commencing a proceeding the civil court and/or responding to a claim that has been advanced. It will focus on examining the Rules of Civil Procedure, which will be augmented with a discussion of case law and how the rules have been interpreted.This course is based on writing researches and discussing issues relating to the rules governing the litigation process according to the UAE and Comparative laws. Topics in this course may include: judicial jurisdiction, parties to civil litigation, the theory of dispute, Judgment and the elements of reasoning, the defenses theory, the theory of appeal, and the effects of judicial decisions.

PRVT712 Companies Law and Investment Legislation - E (3 CH)

This course deals with the main provisions governing commercial companies in UAE, with special emphasis on the current areas of strength or weakness relating to the legal framework for doing business in UAE. Furthermore, this course sheds light on the legal recognition of free zones in the State and the role of the relevant institutions in attracting investments. By encouraging students to conduct presentations; discuss recent issues relating to companies and investment in the State, produce written work and collaborate with peers on set tasks or projects, this course will develop the ability of PhD students to delineate and evaluate issues, think analytically, select relevant materials and produce reasoned arguments encompassing policy, existing practice and knowledge.

PRVT716 Real-Estate Legislation- E (3 CH)

This course explores the legal regulation of real-estate transactions in the UAE by requiring students to present their own arguments, provide comments on the main judicial decisions, examine specific real estate contracts, and then present a written work on current real estate problems. This course also compares the local real-estate legislation followed in the United Arab Emirates with other legislation in some countries, and determines what the law ought to be in order to create a suitable and transparent investment climate that protects the rights of all involved parties. By doing so, this course provides a comparative perspective on real estate legal issues, and enhances the

students' ability of analyzing and reasoning using statutes, court rules and judicial opinions.

PRVT717 Private International Law- E (3 CH)

This course deals deeply with selected topics of Private International Law such as: the international jurisdiction of the courts, the applicable law to the disputes that contain a foreign element, the enforcement of foreign judgments, conflict of laws, and the disputes of nationality. Furthermore, this course focuses on the practical matters and integrates comparative and international perspectives on most issues. It also provides students with the required skills to construct research questions, and develop argumentation relating to the problems associated with the application of private international law rules with regard to jurisdiction, recognition of foreign judgments, and other topics of discussion.

PRVT718 Securities and their Governing Legislation - E (3 CH)

This course deeply examines the legal and regulatory framework applicable to the Securities markets in UAE. Students in this course will be encouraged to evaluate, research, and analyze the various aspects of securities regulation studied. Students will also be required to provide comments on the current practices and judicial decisions in this regard. Topics include: the main types of securities and the conditions and legal requirements for their issuance and trading; the rules of speculation in the financial markets, the liability of brokers and the mechanisms of investor protection; insider trading and stock market manipulation. Emphasis is also placed on the role of the Securities and Commodities Authority in controling the financial market.

Public Law

LAW115 Legal Research Methodology (3 CH)

This course is divided into two parts, the first one is theoretical, and the second one is practical. In the first part, the instructor provides the student with the necessary knowledge to write a research based on scientific standards, by explaining the various levels and types of legal scientific research, scientific resources and tools, and how to systematically combine and organize these resources. In addition to, explaining how to choose a research topic and research methods in the legal field and how to develop a research plan. Then, to provide basic guidelines on legal writing, and documentation of resources,

and ethics to be adhered by the scholar. Whereas, in the second part the student is asked to write a research and apply the theorical knowledge of legal research methodology under the supervision of the instructor.

Prerequisites

- PRVT113 with a minimum grade D

LAW340 Internal Training (3 CH)

In this course, the student is introduced to the main legal skills such as searching for legal rules, legal writing, oral advocacy, negotiation, mediation and conciliation. Using his knowledge in all branches of law, the student practices the above mentioned skills by drafting legal opinions and memorandums, judicial bills, contracts, conciliation contracts and conducting oral arguments. The course instructor presents the cases needed for the mentioned practice, evaluates the students' performance and corrects it continuously. In addition, the students are advised to observe the noble ethics of legal profession.

Prerequisites

- PRVT338 with a minimum grade D
- PUBL305 with a minimum grade D
- PRVT302 with a minimum grade D

LAW440 External Training (1 CH)

The course of external training aims to provide the student of the College of Law with the proper legal training at those institutions that are involved, at different levels, in the application of the law. Its objective is to reinforce the students’ theoretical and practical knowledge which were gained throughout their studies in the classes. The course also seeks to familiarize students with the work environment and the processes implemented in the judiciary, in specific, and other legal institutions, in general. (The course is conducted over 6 weeks in any of last year semesters (including Summer). No courses are allowed to be registered during the internship).

Prerequisites

- PRVT302 with a minimum grade D
- PRVT304 with a minimum grade D
- PRVT307 with a minimum grade D
- PRVT338 with a minimum grade D
- PUBL335 with a minimum grade D
- PUBL305 with a minimum grade D
- PUBL310 with a minimum grade D
- SHAR327 with a minimum grade D
- SHAR329 with a minimum grade D

LAW666 Legal Research (3 CH)

This course will introduce students to: the fundamentals of the legal research and writing process; types of legal communication, both verbal and written; drafting techniques and correct legal citation; the importance of professional presentation and style; and oral presentation skills. This course will also provide students with the main theories and skills in order to continue with their own independent research for the dissertation component of the LL.M, by providing the opportunity to broaden students' experience of research methodology whilst facilitating students to develop strategies for executing their own reasearch. Students will find this course valuble in relation to other independent research and writing tasks encountered durtng the course of LL.M. At the end of this course, students will be given opportunity to write, present and discuss legal research in specific areas of Public or Private law by applying appropriate law methodologies. The pages of this research should not exceed 25 pgaes. Students are, of course, expected to submit original, non-duplicative work. Each student also presents his paper to the entire class in approximately 20 minutes and responds to questions from the class for approximately 15 minutes. The class provides written feedback to each presenter, in order to help the presenter improve the paper. During the semester, students turn in several drafts of their papers and receive both written and oral feedback for each part, with in-person conferences with the professors after each draft. By the end of the semester, students turn in the final completed paper and receive a letter grade for their work in the course.

LAW700 Quantitative and Qualitative Research Methods (3 CH)

The course covers the study of various scientific research methods, particularly quantitative and qualitative research methods, the design of research plans, and the process of conducting scientific research using a wide variety of relevant primary and secondary research sources and techniques. The course also focuses on the principles, skills, and methods necessary for conducting

legal research, including the selection of the research sample, data and doctrinal analysis, theory building and testing, and case study.

LAW701 Advanced Legal Research: Writing and Presentation (3 CH)

The couse provides a definition of scientific research in the field of law, its types and and levels, selection of the subject of research, methods of legal research, legal writing, research ethics and refernce documentation. As a course requirement, the student must write a legal research paper which reflects commitment to the relevant ethical and prpfessional rules in the fiels of law.

LAW702 Selected Legal Readings - E (3 CH)

This course will provide students with an overview of legal concepts, procedures, terminology and current issues in law including international law, administrative law, Commercial law, Contract law, employment law and so forth. By reading about selected topics in law, this course will also develop the ability of PhD students to delineate and evaluate issues, think analytically, select relevant materials and produce reasoned arguments encompassing policy, existing practice and knowledge. There is no one single book which covers the whole subject area. Students will be exposed to various sources of English scholarly materials including textbooks, websites, databases and law journals that are relevant to the selected themes raised by the instructor.

LAW703 Advanced Studies in Comparative Legal Systems (3 CH)

Since many of the research projects will necessarily involve some study of materials from other legal systems, a minimum level of familiarity with other legal systems would be necessary. This course is designed to introduce students to the theory and practice of comparative law by providing them with a broad understanding of the different major legal systems which exist globally; their historical backgrounds; their sources and characteristics. The course also considers selected topics in private or public law, looking at how different legal systems respond to issues familiar to students from studies within their own legal disciplines. During the course, students will be given the opportunity to compare specific areas of law between various jurisdictions. They may also explore some distinguishing features of Common and Civil Law. Topics to be covered in this course shall include for example the doctrine of judicial precedent and its use in the different legal systems, the role of judge and jury in common law system, and the theory of contract under the different major legal systems.

LAW800 Comprehensive Examination (0 CH)

The comprehensive examination, which is an integral part of the PhD Program, is designed to ascertain and assess the student's comprehensive and in-depth knowledge of the main areas in the field of law and to evaluate the student's potential to complete a doctoral dissertation successfully. Students who pass the comprehensive examination may advance to Ph.D. Dissertation. In preparation for the comprehensive examination, the student is required to develop a specific area of interest that shall be approved by the College Council. The specific area of interest will be articulated in the student's statement of interest which ought to be submitted with the application to the program. The specific area of interest is expected to be the subject of the student's dissertation.

Corequisites

- LAW703 with a minimum grade C
- (PRVT711 with a minimum grade C or PUBL715 with a minimum grade C)

LAW900 Dissertation Research (36 CH)

Student conducts high quality academic research under the direction of his/her supervisor. Student and supervisor shall meet on regular basis and discuss progress and issues related to the student's dissertation research. Furthermore, the student writes an annual report based on a meeting with supervisor and Advisory Committee, in which a review is conducted to determine progress, identify problems, and project dates for completion of various tasks. The research shall represent original contribution to human knowledge in the particular field of law and is presented in a written research dissertation of a publishable standard. The document shall also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The dissertation shall not exceed 70000 words in length. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the College of Graduate Studies.

Prerequisites

- LAW702 with a minimum grade C

LW111 Arabic For Specific Purposes (3 CH)

The course aims at enhancing the level of Arabic Language for Law student. This will be achieved through conducting intensive and continues readings on selected rulings of the Supreme Court and the writings of some prominent scholars and legal authors. The student will also be asked to prepare and introduce some legal papers using the correct and strong Arabic Legal terminology and expressions. In addition to that, the students will be trained in making oral presentations using their skills in an appropriate manner.

PUBL114 Constitutional Law (3 CH)

This course contains a brief study of the 'State', elements of State, forms of State and powers of State in comparative systems, with special focus on the Federal State and its application in the UAE. The main focus would be on the study of Constitutional Law, its definition, its sources, the control on the constitutional validity of laws and application of these aspects in the UAE. The course also deals with a study of the Constitutional Organization of the Federal Authorities according to the UAE Constitution.

PUBL206 Administrative Law (3 CH)

The course covers the definition and sources of Administrative law, and the activities of the public administration, i.e., execution of laws, preservation of public order, and public utilities. The course focuses also on various legal means of public administration: administrative decisions, administrative contracts and public property.

Prerequisites

- PRVT113 with a minimum grade D

PUBL207 Public International Law (3 CH)

The course includes the definition of Public International Law, its sources subjects. The inter-relation between the Domestic Law (Municipal Law) and Public International Law and the governing theories are adequately dealt with. Various aspects covering Public International Law in times of peace are also dealt with, including, the Law of Treaties, establishment of States- their rights

and obligations, recognition, state responsibility, use of force, and settlement of international disputes.

Prerequisites

- PRVT113 with a minimum grade D

PUBL209 Penal Law- General (3 CH)

The Course shall introduce students to the general theories of crime and punishment through three topics. First, examining the principle of criminalization rule in terms of its definition, sources, interpretation, jurisdiction implementation and justification and excuse reasons. Second, the course shall examine the general principle of crime in terms of definition, types, elements - acts rues and men's real- completed or attempted crime, and modes of participation. Finally, the course will explain the criminal culpability in terms of criminal responsibility, defense to crime, types of punishment, punishment execution, mitigating and tightening reasons of punishment, and reasons of sentence expiration

Prerequisites

- PRVT113 with a minimum grade D

PUBL226 Selected Studies in Comparative Public Law-English (3 CH)

This course includes the study of some selected areas of public law, i.e International Law, Administrative Law, Constitutional Law, and Criminal Law. The study will be of a comparative nature in the sense that it presents to the students different schools of thought adopted by different legal systems including that of the UAE, various legal doctrines and ideologies, and the underpinnings with regard to some very basic principles of law and government. The issues tackled in this course will include, but not limited to , the nature of the international legal system and the way it operates in a plural international community, the theories of crime and punishment, the concept of judicial review, the principle of separation of powers. The course will be taught in English aiming at enhancing the level of English legal language for our students.

Prerequisites

- ESPU1052 with a minimum grade D
- PRVT113 with a minimum grade D

PUBL305 Penal Law Specific (1) Individual and Financial Crimes (3 CH)

The legal rules governing crimes and penalties are covered in this course. The course consists of three parts: (1) The offences against public interest, such as the offence of bribery, the offence of embezzlement of public funds and the offence of forgery; (2) The offences against persons (human body), such as intentional and unintentional killing and maiming and (3) The offences against properties, such as theft, cheating and the breach of trust.

Prerequisites

- PUBL220 with a minimum grade D

PUBL306 Penal Law (Specific) 2 "Emerging Crimes" (3 CH)

This course deals with particular types of crimes: offences against the public interest, economic crimes, information technology crimes, drug crimes, money laundering, and human trafficking. A cohernet set of offences contained in the vocabulary of this course is to be chosen and taught in each semester.

Prerequisites

- PUBL220 with a minimum grade D

PUBL308 International Organizations-English (3 CH)

The course deals with the following topics : the idea of international organization and its general rules, the membership in the international organizations, the organs and the staff in the international organizations, the functions and the powers of the international organizations, the international legal personality of the international organizations and the decisions making process. The course includes also studying of some International organization: the League of Nations, The United Nations and some regional and specialized organizations.

Prerequisites

- PUBL207 with a minimum grade D

PUBL309 Public Employment (3 CH)

It includes: studying the legal provisions for the public employee in terms of his public service and his or her rights and obligations and his disciplin in accordance to the Federal Civil Service Act and its implemented regulations in United Arab Emirates.

Prerequisites

- PUBL206 with a minimum grade D

PUBL310 Public Finance and Tax Legislation (3 CH)

This course deals with the study of the State budget, its principles, the process of preparation, ratification and control added to that, the public income, the public expenditure, the phenomenon of their increase with its social effect and the public loans. The course also deals with tax legislation regarding the types of taxes and fees, direct and indirect taxes, double taxation, transfer of tax burden, tax evasion, and the implementation (customs and fiscal) of VAT.

Prerequisites

- PUBL206 with a minimum grade D

PUBL335 Criminal Procedures Law (3 CH)

The course deals with the following topics: the scope and effect of the criminal procedures law, the criminal actions and cases, preliminary investigation the pre - trial procedures, the trial and the means of challenging of the criminal decisions including the appeal of these decisions.

Prerequisites

- PUBL209 with a minimum grade D

PUBL401 International Human Rights Law (3 CH)

The course studies the theory oh human rights, its deveplopment in the positive international law, particularly in the United Nations system and in the international and regional human rights conventions. It deals also with the international mechanisms for the protection of human rights and it focusses on the jurisdiction of the european court of human rights. In addition, the course will deal with the international mechanism available for individualsincluding the individual complaint, and with the application of human rights conventions in the domestic legal systems.

Prerequisites

- PUBL207 with a minimum grade D

PUBL421 Press Law and Ethics (3 CH)

This course includes two parts. Part I is dedicated to a brief study of the ethics prescribed by the codes of ethics that deal with the different aspects of conduct of persons who are working in the fields of mass media. Part II contains a brief study about the main elements of the Mass Media Legal System in the world in general, and a focused study of the legal system of mass media in the UAE (print and electronic media/journalism and cinema) in particular. The Mass Media Legal system in the UAE, their establishment, administration, activities and the related legal issues like restraints, prohibitions on the freedom of expression involving criminal and administrative procedures are part of this course.

PUBL630 Advanced Studies in Criminal Law (3 CH)

This course concentrates on 2 different topics in the criminal law (general principles). The first topic deals with one of the crime elements and the second topic will concentrate on the theory of punishment and related theories. Examples of these topics are the study of the act of actus reus and mens rea of the crime, and the custodian institutions.

PUBL631 Advanced Studies in Constitutional Law (3 CH)

In this course, students study in depth one or two subjects of Constitutional law that are especially important in U.A.E. The study should deal with the subject in different legal systems (comparative study), comparing the Constitutional status of the subject in U.A.E.

PUBL633 Advance Studies in International Criminal Law (3 CH)

This course provides introduction to international criminal law, its historical development with emphasis on the establishment of the International Criminal Tribunal. The study of the International Criminal Tribunal focuses on its jurisdiction, applicable procedures, pre-trial and trial process on international level.

PUBL634 Advanced Studies in Criminal Procedures (3 CH)

This course includes studying one or more criminal procedures law issues, with comparison to Islamic criminal law procedures. Examples of these subjects are the pre-trial and trial process and its institutions and agencies, appeal process and the process of appeal in front of cassation court.

PUBL635 Advanced Studies in Administrative Law (3 CH)

In this course, students study in depth one or two subjects of Administrative law that are especially important in U.A.E. The study should deal with the subject in different legal systems (comparative study), comparing with the legal status of the subject in U.A.E.

Prerequisites

- PUBL630 with a minimum grade C
- PUBL631 with a minimum grade C
- PUBL632 with a minimum grade C

PUBL636 Thesis (7 CH)

Thesis in LLM in Public Law must be conducted in a topic related to a branches of public Law. The topic will be selected by the student upon approval of his academic supervisor. The topic and it's plan should be approved by the Department Council, the College Council and other competent university

authorities. The thesis will be defended, discussed and approved according to the university bylaws and policies. The Thesis will be in Arabic with Arabic and foreign references.

Prerequisites

- PUBL635 with a minimum grade C

PUBL637 Advanced Studies in Administrative Contracts (3 CH)

This course aims at defining administrative contracts, public criterion, contracts by law, types of administrative contracts, liberty and restrictions of administration in making an administrative contract, tenders in UAE and comparative laws, jurisdiction for disputes of administrative contracts, administrative development of contractual disputes, effects of administrative contracts, invalidity of administrative contracts and settlement of disputes with this respect.

PUBL638 International Relations & Organizations(E) (3 CH)

The course includes an introduction to the concept of international relations, its history, elements of modern states, rules on effects of war and fighting (jihad), rights of prisoners of war and civilians, treaties in Islam and modern international law, and the most important international organizations.

PUBL639 Human Rights (E) (3 CH)

The course involves comparing modern related issues with Islamic Sharia principles and arrangements. The course involves studying one or two major crimes provided for by the federal penal code. These crimes will be chosen among the most prevailing modern crimes in UAE, such as drug-related crimes or computer-related crimes, money laundering, check crimes and forgery in credit cards.

Prerequisites

- PUBL630 with a minimum grade C
- PUBL631 with a minimum grade C
- PUBL632 with a minimum grade C

PUBL640 Advanced Studies in Criminal Law-Specific Crimes (3 CH)

The course involves studying one or two major crimes provided for by the Federal Penal Code. These crimes will be chosen among the most prevailing modern crimes in UAE, such as drug-related crimes or computer-related crimes, money laundering, check crimes and forgery in credit cards. Course involves comparing modern related issues with Islamic Sharia principles and arrangements.

Prerequisites

- PUBL630 with a minimum grade C

PUBL655 Environmental Law (2 CH)

This course contains a study about the activity of police control in the field of Environmental protection. It contains, as well demonstration of laws that protect the elements of the environment: air, water, soil, animals and plants against harmful materials, radiations, wastes and noise.

PUBL705 Criminal Law (3 CH)

The course deals with one or more topics of substantive or procedural criminal law in an in-depth manner, taking into consideration the modern aspects related to the UAE, such as the evolution of the criminal responsibility of legal persons, the principle of the judge's freedom of conviction or the crimes of human trafficking.

PUBL706 Administrative Law (3 CH)

This course offers an in-depth study into one of the Administrative law topics. Its purpose is to advance of students’ comprehension of the different topics of Administrative law. The Course will focus on one or more substantive or procedural issues which is selected by the Department of Public law in each Semester , with focus on contemporary questions of the UAE Administrative law.

PUBL709 Public International Law - E (3 CH)

This course aims to study one of the public international law topics in depth, such as state immunity, international inheritance and unilateral acts in international law. - State immunity: Talks about the concepts of state immunity, historical development and study of the United Nations Convention on state immunity and it's applications in international and national courts. - International Inheritance: Talks about the concept of international inheritance, types and forms, and the succession of States in the light of international treaties and concentrates on the records, properties, debts and the declaration of the United Nations on succession of States in respect of nationality of natural persons and the problems raised by the issue of succession of states. - Unilateral acts: Talks about the concept of unilateral acts and it's relation to the theory of the sources of international law: the legal forms and sequel.

PUBL710 Criminal Procedure Law- E (3 CH)

The course instructor will select one or more topics from the Code of Criminal Procedure that raise issues in jurisprudential theory and judicial application, ensuring that the study is in-depth and utilizes comparison to other laws and Islamic law.

PUBL713 International Crimes and Judicial System - E (3 CH)

The Course depends on requiring students to prepare papers, comment on judicial rulings in different subjects and holding discussion sessions on different topics related to the principles that govern the concept of international crimes and international judicial system. The Course will examine the elements and the development of war crimes, the crime of genocide, crimes against humanity, with special reference to the Statute of International Criminal Court, and ad hoc international criminal courts.

PUBL714 Constitutional Law - E (3 CH)

The Course boosts students academic capacity to write papers, comments on judicial rulings, and hold discussion sessions on variouse aspects of constitutional law , such as: the supremacy of constitution , political oversight over the constitutionality of laws and its development in France, the emergence of judicial review of constitutionality of laws in the United States, legal systems of judicial review, judicial review over the constitutionality of laws and its impact on the protection of rights and freedoms. It focuses on judicial review system in the UAE.

PUBL715 Contemporary Crimes- E (3 CH)

This Course will be concerned with preparing papers, commenting on judicial decisions and holding discussion sessions on one or more of the new crimes such as terrorism, crimes related to capital markets, Cyber-crimes, money laundering, and human trafficking.

College of Medicine and Health Sciences

Anatomy

ANAT602 Techniques in Morphological Science (2 CH)

This course will introduce students to a variety of methods used in morphology research. The course will have both lecture and laboratory components and cover the theory, fundamental operating principles and specimen preparation methods for different morphological techniques such as immunohistochemistry, light and electron microscopy. The content of the course will also include the use of instruments and troubleshooting. At the end of the course students should be able to handle small laboratory animals, retrieve tissue samples from laboratory animal, fix and section tissues for light microscopy, confocal and electron microscopy, process biological tissue samples for immunohistochemistry, immunofluorescence, identify organelles at the EM level and collate and label micrographs.

ANAT603 Medical Cell and Tissue Biology (2 CH)

This course will guide students in learning advanced information on the microscopic structure of the cells and tissues of the human body and the biological features of their components. The correlation of structure and function at the cellular and molecular levels will be emphasized in lectures and laboratory sessions. The application of cell and tissue biology to research and clinical disciplines will be emphasized. For each topic, an introduction to the cellular architecture and specialized function of a given tissue will provide the necessary background that will explore contemporary research into the molecular and cellular basis of human diseases involving that tissue or organ.

ANAT604 Stem Cell Biology (2 CH)

This course is intended as an introduction and in-depth discussion focused on the biology of stem cells. The course will introduce the features of stem cells and basic mechanism regulating their self-renewal and pluripotency. In addition, the course will focus on selected examples of adult stem cells with an introduction to translational medicine approaches involving stem cell biology. Major emphasis will be placed on how advances in stem cell biology and tissue engineering can be applied to the use of embryonic and adult stem cells in regenerative medicine. In addition to these topics, Students will be introduced to the ethical, regulatory, and legal issues related to stem cell research.

ANAT605 Human Gross Anatomy (3 CH)

The structure of the human body will be studied in lectures and cadavers. The relationship between structure and function will be emphasized, as well as common variations which may or may not lead to altered function. In addition, the embryological processes leading to the gross structure, as well as the histological organization will be pointed out.

CYHS107 Cytology and Histology (3 CH)

This course covers the general structure and functions of the building blocks of the human body (the cells) and how different cell types are organized to form the four basic tissues of the body which perform different functions.

EMBR213 Human Embryology (3 CH)

This course covers normal human embryonic and fetal development so that a foundation is established to understand abnormal development in relation to medicine. The more common anomalies and abnormalities will be used as examples.

HANA104 Human Anatomy 1 (3 CH)

This course covers the anatomy of the thorax in the human body. Specifically, this will include the heart, chest wall, lungs and mediastinum. For each area it will include nerves, arteries, veins, muscles, joints, bones, etc. and will include an understanding of how these structures interact in terms of function.

HANA111 Human Anatomy 2 (3 CH)

This course covers the relevant anatomy of the cardiovascular, respiratory and abdominal systems necessary for the understanding of the pathology of diseases. Students will be able to understand the anatomy of the system and their significance to clinical practice.

HANA214 Human Anatomy 3 (3 CH)

This course covers relevant anatomy of the male and female pelvis perineum, lower limb and upper limb. Students will know the nerve as well as the blood supply of these regions. This knowledge is a must to understand the pathology of diseases. Students will be able to understand the anatomy of the system and their significance to clinical practice.

HANA220 Human Anatomy 4 (4 CH)

This course covers the anatomical structures relevant to the understanding of diseases of the head, neck and the nervous system.

HBIO106 Human Biology (3 CH)

This course allows students to appreciate the evolution and the diversity of life. Basics of normal human anatomy and function relevant to human medicine. Students will also have developed an appropriate vocabulary and command of the English language such that they will be able to describe and discuss (written, oral) the structure and function of the various topics covered in this course.

PRR600 Principles of Research (1 CH)

The Principles of Research will offer MSC/PhD students the generic skills and methods they need to successfully complete their programs. The Principles of Research will use lectures, seminars and workshops and group discussions to introduce students to the methods for identifying, solving, analyzing and reporting of a specific problem pertinent to biomedical sciences. Laboratory data management and safety (environmental safety, radiation safety, and biosafety) will also be covered. At the end of the course, student will be able to

select their bibliographical data from relevant databases, formulate a research hypothesis, design a research project, analyze and interpret data, write an abstract and a research manuscript and present a conference paper

Biochemistry and Molecular Biology

BMB601 Techniques in Biochemistry (2 CH)

This course is designed to introduce students to a range of experimental techniques that are in routine use in a functioning biochemistry laboratory with the objective that they can understand basic principles behind these techniques and are able to understand their applicability in their future research. Whenever possible, the course combines lectures illustrating the scientific principles underlying a particular technique with the demonstration of the methodology in the laboratory.

BMB602 Advanced Molecular Biology (3 CH)

The field of Molecular and Cellular Biology has given scientists unprecedented control over species manipulation and development. This course will have an in-depth coverage of the structure, function, and synthesis of DNA, RNA, and proteins. In this course, we will discuss the nature of genes and chromosomes (the repositories of genetic information) and the mechanics of DNA synthesis and genome replication, followed by discussions on repair, recombination and transposition. We will also discuss the pathways of gene expression (transcription, RNA processing, and translation) and the mechanisms of regulating these pathways, with special emphasis on transcriptional control. Latest literature on these topics will be covered.

BMB603 Advanced Cell Biology (2 CH)

This course will focus on the cellular biochemistry of higher organisms: mechanisms of cellular communication, intracellular signaling, cell growth and oncogenic transformation. During the course, two basic cellular structures will be discussed: membrane and mitochondria, two important key players in cell

signaling and cell death. Concepts like cell signaling, cell cycle, oxidative stress and cell death will be reviewed. The course will end with an introductory lecture on stem cell biology. Recent experimental findings and new approaches used to investigate how cells work will be emphasized. Students will also be taught how to explore the cell biology literature and to critically evaluate scientific publications in some of the topics.

BMB604 Advanced Topics in Biochemistry (2 CH)

This course is designed to prepare students in learning advanced cellular biochemistry and metabolism under physiological and pathophysiological conditions for successful careers in academia and biotechnology industries. The course also provides enhanced education opportunities for students who wish to extend their knowledge, experience, and opportunities as independent scientists in academic research at universities, biotechnology and pharmaceutical industries, health/biomedical science management or teaching. In this course, advanced cellular biochemistry will be explained to signify the importance of metabolism in normal physiology and pathophysiological conditions. Faculty lectures and students reports will focus on these.

BMB605 Molecular and Cellular Biology of Neurodegenerative Diseases (2 CH)

Dysfunction of the human brain can produce a wide variety of neurological and psychiatric illnesses. Over the past decades, neuroscientists have begun to unravel the basic underlying mechanisms of a number of important diseases of the nervous system, at the cellular, molecular and genetic levels. None of these disorders are completely understood, and, perhaps more importantly, none are yet susceptible to either total prevention or cure, so that these conditions remain among the most important health problems of our society. These lectures are designed to familiarize the students with basic information about two important neurological disorders Alzheimer’s disease, Parkinson’s disease, Huntington's disease, and Prion diseases, focusing on a relatively brief clinical description of the condition and a more in depth discussion on current hypotheses about the mechanisms underlying these diseases.

BMB606 Special topics in Biochemistry (1 CH)

This course will provide students the chance to rotate through the laboratory of a potential supervisor to learn about the various projects in progress in that laboratory with emphasis on acquainting themselves with the type of research work and techniques being used. Regular attendance (one hour per week) and active participation of the student in observing and learning about these projects is of great importance. The students should study the literature provided by their respective supervisors and familiarize themselves with the research activities being carried out in the laboratory chosen by them.

MBIO215 Molecular Biology (3 CH)

This course covers the fundamentals of Molecular Biology. The first part introduced the students to the fundamentals of DNA and RNA and how they are used to make proteins. This part of the course consists of the structure/function of nucleic acids, how DNA is assembled into chromatin, replicated, transcribed into RNA, and translated into proteins. Alongside, students are introduced to the concept of genes and how gene expression is regulated, followed by how this process differs in prokaryotes that do not have a nucleus, and eukaryotes, organisms with nucleus. The second part of the course introduces the students to how problems with DNA replication and expression can lead to "errors" that result in disease and how one can study DNA/RNA/proteins in "Molecular Medicine". Thus, this part of the course discusses mutations, how mutations are repaired in the body, and how changes in the structure of DNA can be introduced via specific recombination systems to create diversity. This is followed by a series of lectures on how one can study DNA, RNA, and proteins at the molecular level to study and diagnose diseases and even use these methods for cloning and creating new types of DNA molecules. The course ends with a lecture on how the body uses RNA (RNAi) to control gene expression, a new area that is revolutionizing Molecular Biology.

MCHE103 Chemistry for Medicine (3 CH)

This course covers foundational concepts in general chemistry to enable students to understand the physiology and biochemistry of the human body in health and disease which they will study in subsequent courses. During the Chemistry practicals, students will be introduced to the principles of safe laboratory practice and will become familiar with the equipment commonly used in the chemistry laboratory. Students will become familiar with scientific writing in terms of completing laboratory reports.

MCHE108 Biological Chemistry (3 CH)

This course is divided into three parts. During the first part, students will be introduced to the different classes of the basic molecules of life (amino acids, proteins, carbohydrates, nucleic acids and lipids) the differences in their structure and function and how these form into biochemical complex compounds. The second part will discuss the biology of cells of higher organisms: the structure and function of cellular membranes and organelles; the chromatin structure and genes; the cytoskeleton, the extracellular matrix and cell movements; the cell death and cell junctions. Finally, the third part will introduce the concept of nutrition describing the importance of vitamins and minerals. In addition, cellular physiology areas such as pH, buffers and enzyme mechanisms will also be discussed.

MTAB221 Cellular Communication and Metabolism (2 CH)

This course covers cellular communication and metabolism for successful progress in organ system. The course will provide basic knowledge of cellular communication and receptor based cell signalling by hormones and intracellular signalling mechanisms which control cellular growth and metabolism. The course will also introduce you with basic concept of cellular metabolism (anabolism i.e. synthesis of biomolecules and catabolism i.e. breakdown of biomolecules) in different compartments of cells using carbohydrate (sugars), nucleotides, lipids, and amino acid metabolism as examples. You will also learn about the metabolism and excretion of the important metabolic waste products such as urea and bilirubin. Since liver is a central organ for nutrient metabolism, synthesis, storage and secretion/excretion of metabolic products, you will also learn many functions of the liver in maintaining metabolic homeostasis. During this Course, the students will learn in details, the processes by which cells metabolize their nutrients (carbohydrates, lipids, amino acids and nucleotides). They will also learn how cells are communicating with each other and how their metabolism are controlled and regulated.

Institute of Public Health

BMSC700 Recent Advances in Molecular Biology (3 CH)

The field of Molecular and Cellular Biology has given scientists unprecedented control over species manipulation and development. This course will have an in-depth coverage of the structure, function, and synthesis of DNA, RNA, and proteins. We will discuss the nature of genes and chromosomes (the repositories of genetic information) and the mechanics of DNA synthesis and genome replication, followed by discussions on repair, recombination and transposition. We will also discuss the pathways of gene expression (transcription, RNA processing, and translation) and the mechanisms of regulating these pathways, with special emphasis on transcriptional control.

BMSC701 Advanced Research Techniques (3 CH)

This course aims to give a broad but comprehensive introduction to the majority of the important techniques used today in biomedical research. It aims to give a background in the theory, practise and applications of the various techniques, as well as their limitations and pitfalls. It is hoped that, after having completed the course, students will be well equipped to embark upon research projects with a useful knowledge of the techniques covered and how to apply them to address specific research-based questions, and also how to interpret the data derived from these applications. It is not the aim of the course to teach students how to perform various procedures - this can only be achieved with extensive, repeated, supervised, hands-on laboratory training which is obviously not feasible in this context. The format of each session may vary according to the individual needs of each topic or presenter. Most session will commence with a tutorial covering the principles and practice of the technique at hand, followed by a less formal session where instrumentation can be seen in operation, experimental examples can be examined, and raw data can be viewed and discussed.

BMSC702 Advances in General Pathology (3 CH)

The course is mainly General histopathology, which deals with the basic concept of the various disease processes. This program offers the students a comprehensive review of the theoretical and practical aspects of general histopathology. The students will be exposed to formal lectures and laboratory practicals, which will emphasize the most modern concepts and methodologies

in the fields of cell injury, inflammation, tissue repair, infection, hemodynamic changes, vascular disorders, environmental disorders and neoplasia.

BMSC703 Microbial Pathogenesis and Host Defense (3 CH)

This course will explore ways in which microbial pathogens, particularly bacteria and viruses, interact with their hosts. Topics that will be covered include bacterial-host cell interactions, role of bacterial toxins in pathogenicity, viral infections and escape strategies, emerging and re-emerging viral infections, host defense and innate/adaptive immunity, exaggerated immune responses and immunopathology, virus-host cell interactions in cancerogenesis, and strategies for vaccine development.

BMSC704 Current Advances in Pharmacological Sciences (3 CH)

Pharmacology is an interdisciplinary field. This PhD course tackles major recent findings in divers' area of pharmacology with a focus on cancer pharmacology, neurodegeneration and cognitive functions, cardiovascular and metabolic diseases. This course emphasis is on the molecular mechanism of action of the most recent applied and experimental drugs including monoclonal antibodies, tissue engineering advances, and genome editing progress. Therefore, the contents of the course will remain dynamic and evolve from year to year depending on what is viewed as significant advances in that year. It is intended that the seminar should provide a more didactic and interactive meeting. During this course, students will also be introduced to the most advanced research methodologies and will have extensive training to develop their skills, including ethics and communication that will be achieved via written assessments and oral presentations and discussions.

BMSC705 Advances in Genetics (3 CH)

This course is designed to cover selected topics and recently published articles that are influencing in a significant manner our understanding of human genetics and genomics with emphasis on recent advances in genomic technologies and disease mechanisms. Therefore, the contents of the course might vary from year to year depending on what is viewed as a significant advance in that year.

BMSC706 Advanced Cancer Biology (3 CH)

This course will focus on cellular and molecular mechanisms underlying cancer progression, metastasis, and recurrence. Advances in cancer treatment, including targeted therapy and immunotherapy will also be discussed. This course will be based around seminars and interactive discussion sessions focused on the latest developments in the field accompanied by critical evaluation of published research articles. The content of the course will evolve from year to year depending on the latest advances in the field. During the interactive group sessions, there will be a round table discussion of selected research papers (which will be pre-circulated to all students) concerning important topics in cancer. The students will learn to dissect the study's major aims, methodology and logic employed to address the question, the strengths and weaknesses of the results, and their implications. The emphasis will be on the methodological, conceptual and practical aspects of the research papers in the field. An important part of this course will be to develop the student's ability to critically evaluate published research papers. The manuscript for evaluation will be selected by the course coordinators and provided to each student at the beginning of the course. In consultation with the course coordinator and co-coordinator, each student will also select a research paper/topic and prepare it for presentation to the whole class at the end of the course.

BMSC707 Medical Cell and Tissue Biology (3 CH)

This course will guide students in learning advanced information on the microscopic structure of the cells and tissues of the human body and the biological features of their components. The correlation of structure and function at the cellular and molecular levels will be emphasized in lectures and laboratory sessions. The application of cell and tissue biology to research and clinical disciplines will be emphasized. For each topic, an introduction to the cellular architecture and specialized function of a given tissue will provide the necessary background that will explore contemporary research into the molecular and cellular basis of human diseases involving that tissue.

BMSC708 Advanced Topics in Neuroscience (3 CH)

Advanced Topics in Neuroscience is a course that focuses on specific contents that are particularly relevant to modern neuroscience and pathophysiology of the nervous system, allowing students to discuss, critique, and interpret primary research literature in the field. Upon successful completion of this course, students will be able to demonstrate comprehensive and integrated knowledge at the frontier of this discipline and explain critically the highly complex and diverse matters in this field. In addition, the course will explore

training and practice on translational idea generation and refinement. It is a modular course that provides broad base to sample contemporary understanding and developments on normal and abnormal brain functioning, allowing each student to focus on selected topic of interest. The course will focus on specific contents that are especially relevant to gain a deeper understanding of ourselves, how the nervous system works and what controls our behaviors, including consciousness learning and memory, brain plasticity, and motor functions. However, it also covers the most recent developments in the neurobiology of diseases, including neurodegeneration, movement disorders, autism, depression, stress related diseases and other neurological and psychiatric diseases. The course will also cover principles of the most recent cutting-edge technologies available to study brain function like connectomics, super-resolution microscopy, functional MRI, EEG, electrophysiology and calcium imaging. The course is composed of weekly seminar series in which various topics about modern neuroscience are discussed. Seminars are also presented by students or when suitable by visiting outside neuroscientists. At the end of the course, student will submit a reflection paper on a chosen topic of special interest/thesis relevance. The reflection paper can be structured as a literature synthesis, opinion paper, theoretical paper, or a research grant proposal. Together, the seminars and reflection paper will prepare the student for the course assessment during which the candidate will be examined on deep comprehension and critical thinking of a broader research topic/paper.

BMSC709 Advanced Pathophysiology (3 CH)

Pathophysiology identifies the changes that occur when a function of the body is compromised by disease, injury or other abnormality. In Advanced Pathophysiology course students will explore the application of advanced knowledge of the complex physiological functions and pathophysiological processes to understand the fundamental mechanisms of organ health and disease. The course will be focusing on pathophysiology of three bodily systems, including the cardiovascular, respiratory and gastrointestinal system as major focus points of research in the department. Selected topics from other bodily systems will also be explored. The course will enable students to discuss, critique, interpret and eventually contrast primary research literature in each and between those fields. At the end of the course students will be able to demonstrate comprehensive and integrated knowledge at the frontier of pathophysiology and explain critically the highly complex and diverse matters in this field. The course has modular structure with up 30% of the topics modifiable aiming to provide broad yet targeted knowledge and understanding of abnormal bodily functioning. Particular attention is given to the most recent cutting-edge technologies available to examine the alterations in function as well as adaptive, integrative and regulatory mechanisms of bodily dysfunction at the molecular, cellular, organ and system levels. The course combines

seminars, lectures and presentations, and focused integration sessions led by students and faculty. At the end of the course, students will have to submit a reflection paper on a chosen topic of special interest/thesis relevance. The reflection paper can be structured as a literature synthesis, opinion paper, theoretical paper, or a research grant proposal. Finally, the course will insert a small focused discussion, training and practice on translational idea generation and refinement; here the main emphasis will be on comparative research of underlying pathophysiological processes across bodily systems. At the end of the course, students are expected to demonstrate deep comprehension and critical thinking of a pathophysiologic processes.

BMSC710 Computational Biochemistry and Artificial Intelligence for Medical Applications (3 CH)

Computational sciences and artificial intelligence have been integrated in ubiquitous applications in the fields of sciences and medicine. This technology serves as a powerful tool to mark advancements in research, discoveries and medical practice. This course is composed of two parts: Computational Biochemistry and Artificial Intelligence. The first part covers computational sciences with focus on molecular docking, molecular dynamics, and quantum mechanics. It is a combination of theory and computational practical sessions. The theory will include the fundamentals and limitations of each of the methods, and the practical sessions will involve hands-on applications on chemical or biochemical systems. The second part covers artificial intelligence and its applications. It includes the fundamentals of statistics and machine learning algorithms. The theory of this part will be complemented by hands-on sessions that involve model building, technique validation and decision analysis, with focus on medical applications.

Prerequisites

- CHEM112 with a minimum grade D
- BIOC160 with a minimum grade D

BSTA110 Biostatistics and Epidemiology 1 (2 CH)

This course introduces students to the basic concepts and principles of epidemiology and biostatistics. After a review of the history and development of epidemiology as the basic science of public health, students will consider definitions of health, the determinants of health and the natural history of disease. They will then be introduced to the science of demography, measures

of disease frequency and sources of data for measuring health outcomes. Students will distinguish descriptive epidemiology from analytical epidemiology and they will then cover the key epidemiological study designs in a logical sequence from ecological and cross sectional studies to case-control and cohort studies, and randomized controlled trials. They will learn how to ask public health research questions, propose hypotheses and select appropriate study designs. They will apply their new learning to practical public health problems. They will be introduced to infectious disease epidemiology and outbreak investigation. The biostatistics sessions will deal with the interpretation of results obtained from the practical applications of statistics used in medical research including descriptive statistics and inferential statistics.

BSTA218 Biostatistics and Epidemiology 2 (2 CH)

This course will build on the concepts and principles of epidemiology and biostatistics that students were introduced to in BE1. After a revision session covering health outcome measures, students will cover rate adjustment, cause, bias and confounding. They will then be introduced to screening and clinical trials. Students will have an opportunity to practice literature searches and critical appraisal. They will learn more about ethics in medical research and will have a revision session on scientific writing. They will have sessions on chronic disease and injury epidemiology and will conclude with environmental epidemiology and an infectious disease case study. The biostatistics session deal with the interpretation of results obtained from the practical applications of statistics used in medical research including cohort studies and clinical trials.

CMCE800 Comprehensive Examination (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student's knowledge of his or her discipline, as well as the student's scholarly potential. The CE consists of an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. It must be taken before the start of the student's fifth semester in the program. Students taking the CE must be in good academic standing after completion of the required coursework. Student is also expected to prepare a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies.

The CE may be repeated only once, no later than the end of the student's fifth semester. A second unsuccessful attempt leads to immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

CMHS702 Journal Club I (2 CH)

This course is mainly student's driven where students are required to select 2 recent original research articles for an individual presentation and group discussion on separate dates. Research articles to be presented are expected to be describing major scientific advancement in their area of research and are selected in consultation with the student academic supervisor. The paper discussions will enhance the presentation, problem solving, and critical thinking skills of the student.

CMHS703 Journal Club II (2 CH)

This course is mainly student's driven where students are required to select 2 recent original research articles for an individual presentation and group discussion on separate dates. Research articles to be presented are expected to be describing major scientific advancement in their area of research and are selected in consultation with the student academic supervisor. The paper discussions will enhance the presentation, problem solving, and critical thinking skills of the student.

Prerequisites

- CMHS702 with a minimum grade D

CMHS704 Journal Club III (2 CH)

This course is mainly student's driven where students are required to select 2 recent original research articles for an individual presentation and group discussion on separate dates. Research articles to be presented are expected to be describing major scientific advancement in their area of research and are selected in consultation with the student academic supervisor. The paper

discussions will enhance the presentation, problem solving, and critical thinking skills of the student.

Prerequisites

- CMHS703 with a minimum grade D

CMHS705 Journal Club IV (2 CH)

This course is mainly student's driven where students are required to select 2 recent original research articles for an individual presentation and group discussion on separate dates. Research articles to be presented are expected to be describing major scientific advancement in their area of research and are selected in consultation with the student academic supervisor. The paper discussions will enhance the presentation, problem solving, and critical thinking skills of the student.

Prerequisites

- CMHS704 with a minimum grade D

CMHS731 Research Proposal Development (1 CH)

The course is for students who are at the stage of developing a research proposal. The course covers topics related to research protocol structure including research ethics, objectives, methodology and planning. Students will also be trained on different aspects of literature search strategies and scientific writing.

CMPH600 Biostatistics & Clinical Research Design (3 CH)

The aim of this course is to train students on the design, conduct, evaluation, and analysis of clinical research. The course will also help students develop the skills to design and conduct clinical research. Topics covered include searching the literature, writing research protocol, qualitative, observational and experimental research design, descriptive statistics for qualitative and quantitative variables, statistical hypothesis testing and its application to group comparisons in terms of means and proportions; measures of performances;

measures of associations, and literature evaluation. The course provides an extensive application of the methodology through computer by using the SPSS software.

CMPH601 Fundamentals of Public Health (2 CH)

This module is designed to give an answer to the question ?what is public health?? and to introduce the main concepts, principles, and practices of public health, illustrated by selected major topics in both high income countries and emerging economies.

CMPH602 Biostatistics (2 CH)

To introduce the basic statistical methods used in public health research. As part of this introduction, students will learn to make practical use of SPSS.

CMPH603 Epidemiological Methods (2 CH)

To provide an introduction to the basic concepts and methods of epidemiology.

CMPH604 Health Care Evaluation and Needs Assessment (2 CH)

To provide students with an overview and critical appreciation of the assessment of health needs and the evaluation of health care.

CMPH605 Public Health Management (2 CH)

To provide students with a range of ways of thinking about health services and health systems. Drawing on epidemiology, history, medicine, economics and sociology, the module will help students understand how services function, the reasons services have developed in the way they have, the basis of some universal, persistent problems, and possible solutions to such difficulties.

CMPH606 Health Promotion and Disease Prevention (2 CH)

To provide students with an overview and a critical appreciation of the nature and purpose of health promotion.

CMPH607 Health Protection (2 CH)

To provide a multidisciplinary framework for understanding the principles of interventions against infectious diseases, environmental hazards and emergency preparedness.

CMPH609 Introduction to Public Health (2 CH)

This is an introductory course for MPH students. The course will review the definition, history and scope of public health including notable public health successes. It will cover the determinants of and disparities in health and prospects for the future. It will describe the assessment of population health, demography and sources of data for public health. The course will also provide students with an introduction to public health ethics. It will introduce students to the Global Burden of Disease Study, Blue Zone Case Studies and the state of public Health in the Arab World. Finally the course will examine health care systems and emerging public health challenges. The course will use a range of teaching methods including lectures, mini-workshops, seminars and class-exercises. Assessment will be by a written examination using short-answer questions.

CMPH613 Occupational Health (2 CH)

To provide students with an thorough overview of the scope and content and modern occupational health practice. This module will cover the curriculum and provide the necessary academic training for students to sit the accreditation examination of most boards, colleges and faculties of occupational medicine.

CMPH614 Public Health Assignments I (2 CH)

During the course students will complete three substantial written assignments. These will provide an opportunity to pursue a specific area of public health in depth and to demonstrate the knowledge and skills acquired during the taught part of the course. The final assignment will require the student to demonstrate that he/she can integrate the various strands of learning acquired during the

course to provide a substantial and worthwhile contribution to public health understanding.

CMPH615 Clinical Epidemiology (2 CH)

To provide an introduction to the main issues in clinical epidemiology including the design, analysis and interpretation of clinical trials.

CMPH616 Public Health Assignments II (2 CH)

During the course students will complete three substantial written assignments. These will provide an opportunity to pursue a specific area of public health in depth and to demonstrate the knowledge and skills acquired during the taught part of the course. The final assignment will require the student to demonstrate that he/she can integrate the various strands of learning acquired during the course to provide a substantial and worthwhile contribution to public health understanding.

CMPH617 Environmental Public Health (2 CH)

This module will focus on the ways in which the environment can affect health. Students will be introduced to study designs in environmental health including ways in which exposure and outcomes are measured. The following topics will also be covered: environmental monitoring, surveillance systems for environmentally determined disease, investigation of disease clusters, GIS, main environmental hazards (chemicals, radiation) and media (soil, food, water, air). Students will also consider sustainability, climate change and environmental legislation and regulation. The focus will be on both high income countries and emerging economies.

CMPH618 Current Issues in Public Health (2 CH)

This course is designed to broaden students thinking and build on their appreciation of current public health priorities and controversies. The course will concentrate on current perspectives and research findings about problems important to the health of individuals and communities. The sessions cover a broad spectrum of population-based, prevention-oriented issues relevant to the

professional practice of public health in the private and public sectors of both domestic and international communities.

CMPH620 Maternal and Child Health (2 CH)

This course is designed for MPH students. The course will review the epidemiology of maternal, child and newborn health (MNCH) and relevant national and global policies and programs for MNCH. It will cover the health challenges posed by high-risk infants and children and in addition will address the key topics of reproductive health, maternal and child nutrition and adolescent health. The course will also address women's place in development and lacatation management. The course will use a range of teaching methods including lectures, ini-workshops, seminars and class-exercises. Assessment will be by a written examination using short-answer questions.

CMPH622 Chronic Disease Epidemiology (2 CH)

This course will discuss non-communicable disease epidemics and their implications.

CMPH623 Public Health Assignments III (2 CH)

During the course students will complete three substantial written assignments. These will provide an opportunity to pursue a specific area of public health in depth and to demonstrate the knowledge and skills acquired during the taught part of the course. The final assignment will require the student to demonstrate that he/she can integrate the various strands of learning acquired during the course to provide a substantial and worthwhile contribution to public health understanding.

CMPH627 Advanced Epidemiological Methods (2 CH)

This course provides students with an introduction to the advanced concepts, methods, and study designs used in epidemiology.

Prerequisites

- CMPH603 with a minimum grade D

CMPH628 Global Health (2 CH)

This course is designed for MPH students. It will review the global burden of disease and injury and make comparisons between of health in developed and developing countries . The course will describe progress on MDGs. It will cover health inequities and a comparative analysis of health systems and health sector reforms. The course will use a range of teaching methods including lectures, mini-workshops, seminars and class-exercises. Assessment will be by a written examination using short-answer questions.

CMPH629 Skills for Public Health Practice (2 CH)

This course provides an introduction to the skills needed for effective public health practice for MPH students. It will cover sources of data and how to perform a literature search on PubMed. The course will review scientific writing, data presentation and plagiarism. It will provide students with an Introduction to critical appraisal of public health research. The course will also refresh students' numerical skills by providing mathematics revision for epidemiology and biostatistics. The course will use a range of teaching methods including lectures, mini-workshops, seminars and class-exercises. Assessment will be by a written examination using short-answer questions.

CMPH630 Advanced Biostatistics (2 CH)

This course covers advanced statistical methods used in public health research including multivariate methods and survival analysis. It will provide students with advanced skills in selecting appropriate statistical tools for analysis of complex data and interpreting the results of statistical analyses reported in the health literature.

Prerequisites

- CMPH602 with a minimum grade D

CMPH631 Advanced Environmental Health (2 CH)

This is an advanced MPH course in which students are expected to build on the fundamental knowledge gained from the basic Environmental Health course. The course is particularly focused on the health impact of

environmental contaminants of air, water, soil, and food. Students are expected to integrate and solidify their knowledge in solving environmental health problems based on multi-disciplinary approaches. In addition, students will develop specific skills in advanced epidemiological methods used to quantify environmental health risks and be able to pursue careers in relevant scientific fields.

Prerequisites

- CMPH617 with a minimum grade D

CMPH633 Advanced Public Health (2 CH)

This course will review the major public health issues of local and global importance. It will provide students with an opportunity for advanced learning on the major threats to health and their distribution within populations. The course will cover the strengths and weaknesses of the main types of public health interventions and the challenges in dealing with uncertainty in making public health policies. Finally the course will address ethical issues and their importance to epidemiology and public health along with the philosophy underpinning public health action and how to apply it to health policies. The course will use a range of teaching methods including lectures, mini-workshops, seminars and class-exercises. Assessment will be by a written examination using short-answer questions.

CMPH713 Qualitative Research Methods (1 CH)

This course provides students with skills in qualitative research methods used in social and behavioural sciences. It provides students with methodological and practical experience of planning and conducting qualitative or mixed research methods. The course will cover theory and practice of qualitative research, approaches used in designing and conducting qualitative research projects in the fields of public health and health services research. Students will gain hands-on experience in various qualitative methods and analytical techniques while carrying out a research project related to their area of interest.

CMPH741 Epidemiology I (2 CH)

This course provides a comprehensive introduction of epidemiological concepts and methods, including measures of occurrence and association, study

designs, and validity. After completing this course, students are able to discuss the strengths and weaknesses of various study designs, calculate and interpret epidemiologic parameters, and apply the principles and methods of epidemiology to the design and analysis of new research studies. The course reflects both the conceptual development of epidemiology and its increasingly focal role deali-ng with public health and medical problems.

CMPH742 Biostatistics I (2 CH)

This course covers some common statistical methods used in public health research including descriptive statistics, measures of association such as odds ratio and relative risks, measures of performances such as sensitivity, specificity and ROC curves, some common statistical hypothesis testing procedures and power and sample size calculations. The course exposes students to intensive hands-on computer applications using a portfolio of data sets from the medical and healthcare fields.

CMPH743 Essentials of Population Health (2 CH)

This course is an advanced self-learning and instructor-/student-directed seminar-based course for PhD students. The course will explore advanced epidemiology and public health topics of local, regional, and global impact. In this course, students will be assigned to research, explore, analyse, synthesize and present advanced health topics of current interest including, but not limited, to health problems of developed and developing nations, health promotion and disease prevention, role and importance of health informatics, public health genomics, healthcare delivery systems, health economics, environmental problems, spectrum of factors influencing the health status of populations and communities, and emerging/re-merging disease epidemics. Each session will has a theme (e.g. communicable diseases, non-communicable diseases). Each session starts with a theme-comprehensive presentation delivered by an expert faculty member. Students will then have to deliver 40-minutes presentation on a specific topic related to the session's theme followed by 15-20 open discussion.

CMPH744 Health Interventions, Policy & Practice (2 CH)

This course is designed to broaden students thinking and build on their appreciation of current public health priorities and controversies with presentations on current public health topics and interactions with presenters. Faculty and staff will present issues and encourage discussion and critical thinking. This course will concentrate on current perspectives and research

findings about problems important to the health of individuals and communities. The sessions cover a broad spectrum of population-based, prevention-oriented issues relevant to the professional practice of public health in the private and public sectors of both domestic and international communities. The students will also present the relevant guidelines/policies on health interventions at local level.

CMPH751 Epidemiology II (2 CH)

This advanced level course builds on previous knowledge of epidemiology. It provides students with a deeper knowledge of many advanced epidemiological concepts, methods, and complex study designs. The course covers controversies and new thinking in epidemiologic practice including sampling, data analysis, confounding, and causal inference and reasoning. The course also introduces principles and methods of different contemporary epidemiologic research topics. Students who wish to advance their knowledge and skills in epidemiological methods and those who need such skills in their research projects are recommended to enroll in this course.

Prerequisites

- CMPH741 with a minimum grade D

CMPH752 Biostatistics II (2 CH)

This course covers some advanced statistical methods used in public health research including correlations, multiple linear regression, binary logistic regression, survival analysis models. Poisson and negative binomial regression models. It will provide students with advanced skills in selecting appropriate statistical tools for the analysis of complex data and interpreting the results of statistical analyses reported in the health literature.

Prerequisites

- CMPH742 with a minimum grade D

CMPH753 Environment and Human Health (2 CH)

The course is designed to provide a broad knowledge base and deep understanding of contemporary environmental health problems. It is also

tailored towards the development of students' skills in identifying, and evaluating current environmental health issues in UAE and around the World. Lectures are focused on expanding the breadth and depth of students' knowledge in the field of environmental health and the interaction between the environment and human health. It is also designed to enable students apply research methods in analyzing current challenges with respect to environmental pollution and human health and creating scientific approaches to provide strategic solutions. Environmental health priorities are also critically discussed in order to cultivate students' critical thinking. Topics include air, water and land pollution, exposure to heavy metals, hazardous chemicals, and infectious agents. Specific methodological approaches with respect to environmental research are also covered.

CMPH754 Health Promotion Programs - Strategies for Development and Evaluation (2 CH)

The course will provide students with advanced theoretical knowledge and practical skills needed for the effective design and assessment of community health promotion programs by building their skills in advocacy, networking, and policy analysis. It will cultivate students multifaceted practical and ethical competencies needed for community needs assessment, health promotion models and activities. This course will be building PhD students' leadership that will cultivate their participatory efforts in program planning and evaluation strategies. Students will be engaged in developing and/or implementing and/or evaluating a community health education program. Strategies will be based on the best professional practices and social/behavioral theories and models. Students will conduct needs assessment, construct goals and objectives, and develop strategies and activities for health promotion program. They will be required to generate a report at the end of the semester that can be used to inform decision makers on the success or limitations of the program and can be added to the professional evidence base. Students will be able to choose topics that will promote wellness for the community such as prevention of chronic diseases, infectious diseases, injuries, sexual health, mental health, nutritional health or for special community groups such as children, youth, pregnant women, elderlies, smokers, drug users, etc. They will be able to design for the group an effective health education program tailored for their needs within a socio-cultural perspective and by considering the political and legislative context in the UAE.

CMPH755 Infectious Diseases Prevention and Control (2 CH)

This course is an advanced self-learning and student-directed seminar-based course for PhD students (elective course). The course will explore

epidemiology and evaluate public health prevention and intervention programs to control infectious diseases of local, regional, and global threats, as well as its social and economic impact. In this course, students will be assigned to research, explore, analyze, synthesize, and present advanced topics on the epidemiology of emerging and re-emerging infectious diseases. Students will also research, critically summaries, compare, and evaluate the effectiveness of clinical and public interventions implemented in developing and developed countries to contain the spread of infectious diseases such as the novel coronavirus (COVID-19). Students will also learn how to evaluate disease control prevention and intervention programs for diseases of public health importance to underserved populations. Students will deepen their understanding of the epidemiology and control measures applicable to diseases of public health importance throughout the world, including but not limited to neglected diseases at local and regional levels. Interventions to be studied will be primarily pharmaceutical (e.g. therapeutic or prophylactic drugs, vaccines) and non-pharmaceutical (e.g. education campaigns, public lockdowns, and environmental modifications). Each session will focus on one or two infectious diseases. Each infectious disease will be discussed in terms of local, regional, and global epidemiology as well as in terms of prevention and intervention programs (e.g. vaccination, lockdown, and public awareness) to control the local and global spread of the disease. Students will have to deliver a 40-minutes presentation on a specific infectious disease agent followed by 15-20 open discussion.

CMPH756 Introduction to Health Policy and Health Economics (2 CH)

The course introduces students to health policy and health economics for public health and health systems thinking. Drawing on epidemiology, medical and political concepts, the course focus on health policies and global health for health systems. Following this, the principles and concepts of economics will be introduced including the microeconomics and the microeconomics systems, economic evaluation tools, including; Cost Minimization Analysis, Cost Effectiveness Analysis, Cost Utility Analysis and Cost Benefit Analysis. Empirical examples of economic evaluations will be presented and discussed.

PHCM560 Public Health and Community Medicine (4 CH)

This course covers knowledge, attitudes and skills to fulfill public health and occupational health responsibilities to patients, communities and the UAE population as a whole.

STA600 Biostatistics & Experimental Design (2 CH)

The course is an introduction to some important topics in biostatistics. It represents an introduction to the field and provides plenty of data sets to be analyzed using some common statistical methods. Specific topics include type of variables in statistics; descriptive statistics for qualitative and quantitative variables and graphical representations; statistical hypothesis testing and its application to group comparisons in terms of means and proportions; measures of performances; measures of associations; linear regression; logistic regression and an introduction to survival analysis. The course provides an extensive application of the methodology through computer by suing the SPSS software. The course materials are designed with very limited mathematical formulas and the emphasis is on interpretation and concepts.

Medical Education

CLSM360 Clinical Skills and Professionalism 1 (6 CH)

The course spans the entire year and exposes students to practical clinical skills in medicine such as doctor/patient communication skills, Cardiovascular skills, Respiratory skills, and Urogenital skills. The weekly clinical skills are selected to fit into the clinical themes of the week in the Problem Based Learning curriculum which runs in parallel, thereby reinforcing the theoretical and clinical integration. Clinical faculty members share in the instruction and assessment of students in this course. Volunteers from the Al Ain community get trained in being simulated patient educators and support the clinical skills course, providing opportunities for students to learn skills on real people. Furthermore, the SPs are trained to give feedback to the learner, from a patient's perspective. Each week of the course begins with a clinical skills demonstration session which is led by a subject expert tutor. The weekly objectives and checklist of skills is distributed at the demonstration session- for all students to use as their guide to practice and soft copies of all such documents are made available to the students in the Curriculum Management System. Students are divided into small groups (maximum 8/ group) and have designated time for un-supervised self-practice and tutor feedback in the curriculum. During un-supervised self-led practice sessions, students have access to simulated patients, models, all necessary examination equipment, mannequins, audio and video-recording facilities, to record and learn from their own performance. Tutor feedback sessions are intending to provide students with protected time in a safe setting, where they can practice their skills, and get feedback on ways to improve it. Students are formatively assessed by their tutors on their professionalism at each weekly tutor session and summatively assessed in a midyear OSCE and a final OSCE.

CLSM460 Clinical Skills and Professionalism 2 (6 CH)

The course spans an entire year and exposes students to practical clinical skills such as history taking and examination of the Gastrointestinal System, Clinical Endocrinology and Metabolism, Musculoskeletal System and Child Neurodevelopment, Central and Peripheral Nervous System and Clinical Assessment of the Behavioral System. The weekly clinical skills are selected to fit into the clinical themes of the week in the Problem Based Learning curriculum which runs in parallel, thereby reinforcing the theoretical and clinical integration. Clinical faculty members share in the instruction and assessment of students in this course. Volunteers from the Al Ain community get trained in being simulated patient educators and support the clinical skills course, providing opportunities for students to learn skills on real people. Furthermore, the SPs are trained to give feedback to the learner, from a patient's perspective. Each week of the course begins with a clinical skills demonstration session which is led by a subject expert tutor. The weekly objectives and checklist of skills is distributed at the demonstration session- for all students to use as their guide to practice and soft copies of all such documents are made available to the students in the Curriculum Management System. Students are divided into small groups (maximum 8/ group) and have designated time for un-supervised self-practice and tutor feedback in the curriculum. During un-supervised self-led practice sessions, students have access to simulated patients, models, all necessary examination equipment, mannequins, audio and video-recording facilities, to record and learn from their own performance. Tutor feedback sessions are intending to provide students with protected time in a safe setting, where they can practice their skills, and get feedback on ways to improve it. Students are formatively assessed by their tutors on their professionalism at each weekly tutor session and summatively assessed in a midyear OSCE and a final OSCE.

ENDO420 Endocrine and Metabolism (6 CH)

This course covers normal endocrine control of body functions and the pathophysiology of endocrine glands. Clinical relevance will be emphasized throughout the course. The clinical seminars offer a survey of the most important endocrine/metabolic disorders. The following themes will be covered: Hypothalamus and Pituitary, Thyroid, Parathyroid and Mineral Homeostasis, Adrenals and Gonads, Gonads and Breast, Metabolism and Diabetes Mellitus, Diabetes Mellitus and Nutrition, and Integration of endocrine function. The core concepts of the course are the knowledge, skills and attitudes necessary to: Describe normal structure and function of the endocrine system and compare it with abnormal structure and function, Identify the etiology of disease whether congenital, traumatic, infective, nutritional, neoplastic, degenerative or idiopathic, Assess and diagnose endocrine system disorders through an understanding of the clinical history, physical and mental state examination

and appropriate investigation, Discuss the principles of management of endocrine and metabolic disorders, Identify and discuss professional, ethical and societal issues that arise in the course of patient management, and Compare normal and abnormal metabolism.

FIEE599 Final Integrated Examination (60 CH)

Final Integrated Examination covering all six years of study with emphasis on the last two clinical years to determine eligibility to graduate. The exam consists of four parts which are the in-house Multiple Choice Question exam, an International benchmark exam (IFOM) similar to the NBME, an OSCE assessment, and a Clinical examination.

GAST410 Gastrointestinal System (6 CH)

This course covers an overview of gastrointestinal disorders at the level of a fourth year medical student. The course consists of basic/clinical science lectures combined with relevant laboratory teaching and problem based learning (PBL) in relation with gastrointestinal tract disorders. Students will review the normal anatomy, histology, physiology, immunology and microbiology of the gastrointestinal tract. This will form the basis to proceed with disorders that will be studied in terms of pathophysiology and clinical presentation in addition to appropriate management options. At the end of the course students should be able to understand the clinical presentation of gastrointestinal disorders and be able to reach a diagnosis or formulate a differential diagnosis and plan the appropriate investigative methods to arise at final diagnosis and hence appropriate treatment of gastrointestinal disorders they will encounter in their clinical years.

HEHA450 Behavioral Sciences (6 CH)

This course covers the general patterns and principles of human behavior in healthcare. The knowledge and skills offered in this course can and should be applied in all clinical settings. Core Concepts: Describe normal human behavior through the Biopsychosocial Model and compare it with abnormal human behavior, Identify the etiology of mental disorders through the interaction between environmental factors and individual characteristics (including genetic endowment), Develop skills to assess and diagnose mental disorders through a comprehensive enquiry into the clinical history, physical and mental state examination and appropriate investigation, and Present rational treatment of mental disorders in order to relieve symptoms and minimize disability.

LITM102 Language and Literacy (3 CH)

This course aims to enhance students' English literacy through a guided journey that follows selected themes of medicine that have emerged through history along with present day perspectives. Particular emphasis will be paid to historical and philosophical landmarks in the global story of medicine. Vocabulary and content readings are regularly assessed through Blackboard. A variety of media is included in the course to support and enhance the chosen texts. The course's ambition is to foster a level of excitement and curiosity with regard to the learning process in the field of medicine. A main theme in the course is the idea of light, vision, hidden knowledge and the revelations that come from dedicated study. Another key concept that runs through the course is the role of serendipity and sagacity with regards to scientific discovery. Questioning and critical analysis skills are emphasized as necessary to help them develop understanding with regards to complex and new ideas. The language and literacy course hopes to establish a sound base from which students may start off in their progress towards becoming mature scholars.

MMAT101 Numeracy and Information Technology (3 CH)

This course covers several areas including numeracy and information technology as well as communication technology skills to enable student to conduct literature searches and to solve common numerical problems (e.g. percentage, proportions) and to manage, analyse and present data in graphical and tabular form to a varied audience. They will also learn the skills of interpreting data in its many formats. Students will become familiar with common statistical vocabulary (e.g. mean, correlation coefficient). Students will be expected to develop the skills necessary to find, critically analyse and then use information to solve problems or answer questions. Once having found information using different search engines and databases, students will then develop the skills required to select appropriate information for the task (i.e. using evidence-based principles).

MSCE299 Pre-Medical Program Exam (24 CH)

Comprehensive exam covering the first two years of pre-medical studies.

MUSC430 Musculoskeletal System (6 CH)

This course covers the pathophysiological bases of diseases involving the organs of locomotion, i.e. bones, joints, muscles, and peripheral nerves. Common complains related to the musculoskeletal system such as, pain or weakness in the limbs, back etc. are due to an extremely broad range of causes, e.g. trauma, immunological disorders, infections, tumors, congenital diseases, etc. The intention when designing the course was to provide the knowledge on the pathology and pathophysiology of the most common musculoskeletal disorders which later on, during clinical years, can be applied to the cases of real patients. Since the course relies heavily on the anatomical and physiological knowledge already covered during the MSC years, students are strongly advised to extensively revise the relevant chapters. Core Concepts: Be able to describe the differences in the structure and function of the organs of locomotion under physiological and pathological conditions, Identify the most common etiologies behind the various symptoms of musculoskeletal diseases, Understand the pathophysiological bases of diseases involving the bones, joints, muscles and peripheral nerves, Have a general concept on the various diagnostic possibilities when dealing with patients of musculoskeletal diseases, and Have an understanding on the therapeutic approaches used in the management of patients with bone, joint, muscle or peripheral nerve diseases.

NEOR440 Neuroscience and Special Senses (10 CH)

This course covers the brain as it the most complex of organs, it is the medium of all human experience in somatic and psychological domains and the organ that governs the body and the mind. The study and investigation of its structure and function under normal and morbid conditions is, therefore, a core subject in pre-clinical and clinical medicine. PBL is used for integrating basic, para-clinical and clinical neuroscience, offering a blend of concepts and practice, taking the student through the science of the nervous system and its clinical applications for the prevention, diagnosis and treatment of neurologic diseases.

OSCE499 Pre-Clinical Program Exam (20 CH)

Comprehensive exam covering the two years of pre-clinical studies.

PCOM105 Professional Practice and Communication 1 (3 CH)

Through their experiences with the UAE health care system, students will appreciate the role of the health care professions team in the holistic treatment of patients, as members of a multicultural society. Students will come to understand the expectations society has of them as professional, ethical and safe doctors and future health care practitioners in the UAE. Students will develop their English language skills so that they are able to communicate and present information in different formats (written, oral) to different audiences and using different technologies (e.g. IT). Students will also gain an appreciation of the importance of knowing who they are as learners and will explore different strategies for learning and studying, including team work, managing and organising oneself, and actively seeking feedback for self-improvement as they develop the skills required for continuing professional development.

PCOM112 Professional Practice and Communication 2 (3 CH)

This course builds upon the core communication skills acquired during three early level courses and further develop students' ability to communicate effectively, both orally and in writing. Specifically, this course will provide students with the necessary analytical and research skills to critically evaluate a topic and demonstrate their communication skills. In addition, students will develop a deeper insight into the medico-ethical issues associated with working in the health-care profession both in the UAE and globally. They will also begin to explore lifestyle as a determinant of health, in particular nutrition, physical activity, smoking, safety, and food safety.

PCOM219 Professional Practice and Communication 3 (2 CH)

This course equips students with a variety of problem-solving skills and analytical tools that can be used in both research and professional practice. As such, the course will foster the students' ability to critically analyse and solve a problem using evidence-based practice. Students will learn the theoretical underpinnings of health promotion, health education, and interventions focussed on population health, whilst developing the ability to work both independently and as part of a team on a group project. They will use their research skills and communication skills in the application of health promotion and education theory to develop appropriate health education tools for the local context.

PCOM226 Professional Practice and Communication 4 (2 CH)

This course covers several bioethical issues using case studies which are deconstructed so that students acquire a more mature approach to the complexities of decision making and ethics. Students will participate in the act of deliberation upon case studies, ethical principles and video material. This will also naturally highlight and build upon communication and analytical skills whilst engaging with ethical dilemmas. The course encourages students through reflective writing to investigate their own feelings and ideas in regards to the content covered in class. This aims to have students not only understand the various principles involved in bioethics but to also understand themselves and the professional world they are entering where ethics and professionalism play a vital role. The assessment scheme in the course which is compositionally driven has, as its goal outcomes that will allow students to demonstrate what they have learned through their own personal and insightful engagement with the course material. Academic writing along with the ability to deliberate is also reinforced and topically in sync with one of their concurrent courses.

RESP340 Respiratory System (7 CH)

This course covers normal and abnormal processes in the respiratory system and introduces clinical approaches to diagnosis and treatment of the most prevalent respiratory diseases.

RSCH600 Research (18 CH)

This research course is designed for all graduate students at the Faculty of Medicine and Health Sciences (FMHS), who are enrolled in its various graduate programs to conduct their research towards a thesis. This will provide students with an opportunity to carry out research in the laboratory of their supervisors, acquire skill and gain research experience, and develop their research projects. Students will learn the methodologies employed in the supervisors' laboratory introducing them to a wide range of research tools that will help them be equipped to plan and organize their research, as well as to communicate their findings. The students will practice scientific thinking and learn scientific processes, which may be helpful in advancing the students in their educational and career goals.

RSCH601 Research Project (4 CH)

The non-thesis option is for graduate students at the College of Medicine and Health Sciences (CMHS), who do not wish to undertake laboratory-oriented project for their thesis, or who cannot commit to the time necessary for a thesis work. The student has to write a structured project report under the supervision of a faculty member on a topic mutually consented and related to the research interests of supervisor. The structured report must contain title, abstract, introduction, discussion and references. This will provide the student's with an opportunity to formulate the research question, to use the proper keywords to collect and retrieve the literature and organize them in a logical order to clearly present and discuss the conclusions as well as the knowledge and arguments that form the basis of their findings both in writing and oral presentation. The student will learn scientific thinking, literature search, organizing literature and communicating the findings. This will help in advancing the student's in their educational and career goals. The student will be encouraged to publish it in the form of a review article.

RSCH900 Dissertation Research (30 CH)

Student conducts high quality academic research under the direction of his/her supervisor. Student and supervisor shall meet on regular basis and discuss progress and issues related to the student's dissertation research. Furthermore, the student writes an annual report based on a meeting with supervisor and Advisory Committee, in which a review is conducted to determine progress, identify problems, and project dates for completion of various tasks. The research shall represent original contribution to human knowledge in the particular academic field and is presented in a written research dissertation of a publishable standard. The document shall also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the College of Graduate Studies.

RSCH910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based

on two main parts: (1) the Committee's evaluation of the dissertation document and (2) the Committee's evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal. The Dissertation Defense course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

Medical Microbiology and Immunology

INFE310 Infection, Inflammation and Immunity (7 CH)

This course covers: Terms commonly used in microbiology, e.g. infectious agent, infection, symptomatic and asymptomatic infection, infection and disease, virulence and pathogeniciy. Principles of bacteriology, parasitology, virology and mycology in clinical medicine, with emphasis on bacteria, parasites, viruses and fungi of medical importance. The pathological basis of infectious diseases and inflammation. Principles of chemotherapy in infections and infectious diseases The principles of interaction between host immune responses and establishment of infection. The principles of hypersensitivity, allergic and anaphylactic reactions and other immunopathologic mechanisms (acquired disorders of immune deficiency, auto-immunity and auto-immune diseases). The principles of anti-inflammatory therapy Surveillance, epidemiology, prevention and control of infections and infectious diseases. The themes of the course are Infectious agents (viral, bacterial, fungal, parasitic), Immunity, Common inflammation, and Therapeutics (antimicrobials-anti-inflammatory drugs).

JRC601 Biomedical Sc Journal Club 1 (1 CH)

This will require students to discuss and critique an original and recent journal article, not a review paper, describing a major scientific advancement in their area of research and will be chosen in consultation with the student's supervisor. Each student is required to discuss and critique one research article.

JRC602 Biomedical Sc. Journal Club II (1 CH)

This will require students to discuss and critique an original and recent journal article, not a review paper, describing a major scientific advancement in their area of research and will be chosen in consultation with the student's

supervisor. Each student is required to discuss and critique one research article.

Prerequisites

- JRC601 with a minimum grade D

MCRO223 Principles of Microbiology and Immunology (3 CH)

This course covers the different groups of microorganisms, their structure, metabolism and growth, and how they cause diseases in the human. Also covered are the different body defence mechanisms against the micro-organisms.

MMIM601 Molecular Bacteriology - Gene, Structure, Pathogenesis (2 CH)

This is an advanced graduate level course on the pathogenesis bacterial infections. The first set of lectures on general bacteriology will describe the molecular structure and genetics of the bacterial cell. The common themes (e.g. adhesion, invasion and toxin production) in the infectious process together with the concepts of “pathogen” and “virulent” will also be dealt with during these lectures. The second part of the course takes an organ-system based approach on the most important bacterial pathogens and the pathology they cause. Particular emphasis will be put on the molecular interplay between the host and parasite to understand how bacteria breach natural host barrier, how they exploit new niches in the host and avoid host defense mechanism. All during these lectures genes and structures targeted in recent molecular and immunological diagnostic work, as well as in vaccine development will be identified and described.

MMIM602 Principles of Cellular and Molecular Immunology (2 CH)

The field of immunology has witnessed a huge surge in knowledge in the last 40 years. From relatively modest and rather esoteric beginnings, immunology has become one of the most dynamic and exciting areas of medical sciences. This course encompasses the major sub-disciplines in the field. These will include, but not be limited to, development and maturation of the various cell lineages of the immune system, phylogeny and structure-function relationship of cell-associated as well as soluble receptors used by the immune system, the

mechanisms of antigen processing, presentation, and recognition, properties of innate vs. adaptive immune responses, communication and cell-cell interactions, immunoregulation, and humoral and cellular effector mechanisms. Throughout the course, the Seminar material will be discussed with emphasis on the underlying original experimental findings. Moreover, practical applications will be related to basic immunological principles wherever appropriate.

MMIM603 Molecular Principles of Viral Replication and Pathogenesis (2 CH)

Virology has made a significant contribution in revolutionizing modern molecular biology. Many of the tools of molecular biology in use today were conceived of while studying viruses, their replication and ability to cause disease. Thus, this course will focus on virus replication and pathogenesis. Understanding the basic steps of virus replication is important for combating virus spread since these steps can serve as targets for intervention. Similarly, a study of viral pathogenesis is critical for not only successful control of virus transmission, but also towards the development of vaccines and other novel therapeutic agents. Hence, the first part of the course will introduce basic principles that unite all viruses and will discuss the molecular basis of virus replication and pathogenesis. In addition, it will also cover effects of viruses on the host cell since the life cycle of viruses are intricately connected to the host cell functions. This will include topics related to the ability of viruses to persist into the host cell, cause latency, acquire cellular genes (viral oncoproteins), as well as the ability to transform host cells. The second part of the course will present an in-depth view of major viral groups that cause human diseases, including retroviruses, adeno- and adeno-associated viruses, papillomaviruses, herpesviruses, influenza, and hepatitis viruses. The focus of these lectures, once again, will be on the specifics of virus replication and pathogenesis within the specific viral group. The format of the course will be lectures and active participation of the students is a must. The class will meet once a week for approximately two hours with a fifteen minutes break.

MMIM605 Gene Therapy (1 CH)

Gene therapy is the novel, state-of-the-art approach to treating human disorders using nucleic acids as the therapeutic agent. The disorders open to gene therapy include inherited genetic deficiencies, infectious and autoimmune maladies and extends to chronic and acquired diseases such as diabetes, cancer, and cardiovascular diseases. Thus, gene therapy aims to cure medical problems at the source; illnesses that otherwise were incurable, did not have effective treatments, or treatments that affected only the symptoms, but not the

cause. This course will provide the student with a comprehensive overview of the field of gene therapy from the basics to the ethical implications. It will cover topics related to the fundamentals of gene delivery, how it can be used as a new form of therapy, what are some of the gene delivery systems (both viral and non-viral), what strategies have been used for therapy within the organism, what are some of the successes and failures in human, and finally what are some of the ethical and legal considerations that arise out of this new field of medicine. The goal of the course is to familiarize the student with the basics of gene therapy and bring them up-to-date as to where gene therapy stands today both technologically and ethically. The format of the course will be Seminars and student directed presentations.

MMIM606 Molecular Techniques Viral Pathogenesis (1 CH)

The advent of novel techniques in cellular and molecular biology has revolutionized our understanding of viruses and viral diseases. These technical advances have not only resulted in the discovery of new viruses implicated in human disease (e.g. Kaposi's sarcoma virus), but also unraveled the mechanisms of pathogenesis of some viral diseases. This in turn has led to improved diagnosis, control and prevention of viral infections. The recent introduction of HPV vaccine for the prevention of cervical cancer is one success story. This advanced level graduate course will provide a comprehensive overview of the common molecular techniques used in studying viruses and their involvement in human diseases. The emphasis will be on how these molecular techniques can be used for the detection and analysis of viruses in tissue specimens routinely sent to diagnostic pathology departments. The course will be delivered in the form of seminars, complementary laboratory sessions and student directed presentations. Successful completion of this course should give the student a sound understanding of the molecular techniques available for studying viruses in tissue specimens.

MMIM607 Antibiotics and Antibiotic Resistance (1 CH)

This course covers the pharmacological, microbiological and laboratory aspects of anti-bacterial agents, anti-infective therapy and antibiotic resistance. The core knowledge to understand the various approaches to anti-infective therapy, to conduct and interpret anti-microbial sensitivity testing and to understand the bases of laboratory monitoring of drug therapy will be provided. Anti-bacterial drugs, their chemistry, mode of action and pharmacological properties will be described while special emphasis will be put on the molecular bases, genetics, mechanisms and importance of anti-microbial resistance.

MMIM608 Immune-Mediated Diseases (2 CH)

From the topics covered in a prerequisite course of cellular and molecular basis of immune reactivity it is clear that a fully functional immune system is necessary for survival and health. It also appears that there is an obvious and dangerous potential for the immune system to kill its host. This course discusses the consequences of differentiational arrests in the development and different types of pathogenic immune reactivity that cause immune mediated diseases. This Course will cover at an advanced level, cellular and molecular mechanisms underlying inappropriate immune responses leading to tissue damage. The first part includes pathological immune response to self-antigens. The course will also cover the mechanisms of loss of tolerance to self, the failure of the regulatory mechanism of immune responses and pathogenic role of different effector cells and molecules leading to progression of diseases in experimental models and human pathology. Particular emphasis will be given to the immunodiagnostic modalities and disease monitoring. The second includes the responses characterized as hypersensitivity reactions caused by a response to innocuous antigen (allergy) or an exaggerated response to an infectious agent. The third part of the course is to discuss primary immune deficiency diseases. This course will also cover therapeutic aspects of immune-mediated diseases including anti-inflammatory agents, cytokines and cytokine antagonists and inhibitors, immunotherapy of allergy, and new approaches including stem cell and gene therapy in autoimmunity.

MMIM609 Microbiome in health and disease (2 CH)

The human microbiome is referred to as the genomic content of microorganisms (microbiota) inhabiting a particular site in the human body, such as the skin, gastrointestinal tract, respiratory tract, and urogenital tract. They form a complex and discrete ecosystem that adapts to the various conditions of each niche. Alterations in microbiome composition have been associated with many infectious and non-infectious diseases including inflammatory bowel disease, autoimmune diseases, cancers and diabetes. Multi-omics techniques, including genomic, transcriptomic, proteomic, and metabolomic analyses, are used to better understand how the microbiota are acting on and interacting with the human hosts in health and disease. This course will provide the students with deep understanding of microbial communities residing at different niches in the human body, their diversity, cell-cell communication, interaction with the immune system, modulation and impact on human health. Students will be exposed to modern molecular techniques and bioinformatics tools for profiling and analysing microbiome data sets. They will also learn how to integrate these data to develop a holistic

understanding of the interactions between host and microbial communities in both health and disease states.

SEM601 Biomedical Sc. Seminar I (1 CH)

This will require students to make a PowerPoint presentation on an assigned topic in their area of research in consultation with the student's supervisor, which will help the students to develop their research projects. Each student is required to present one seminar. The students are also highly encouraged to attend all faculty seminars.

SEM602 Biomedical Sc. Seminar II (1 CH)

This will require students to make a PowerPoint presentation on an assigned topic in their area of research in consultation with the student's supervisor, which will help the students to develop their research projects. Each student is required to present one seminar. The students are also highly encouraged to attend all faculty seminars.

Prerequisites

- SEM601 with a minimum grade D

Obstetrics and Gynecology

OBGY540 Obstetrics and Gynaecology (8 CH)

This course deals with Women's health, female reproductive system, pregnancy, delivery and associated problems. This clerkship is designed to provide students with the basic information and skills needed to attend to a gynecological or obstetric patient and to prepare the foundation for further training in the field.

Pediatrics

PAED530 Pediatrics I (8 CH)

This course covers pediatric concepts that are essential for all medical students. The curriculum is modeled after the COMSEP and NBME examination (see Educational Resources). In addition, students are required to complement this clinical training with self-learning endeavors (e.g., using educational resources listed later). Self-learning is the only way to ensure acquisition of all core pediatric foundations listed in this booklet and elsewhere. By the end of the rotations, students will gain clinical (bedside) experience, in addition to didactic learning. They are expected to become competent in these six domains: History taking, Physical examination, Problem list, Differential diagnosis, Investigation, and Management (especially of common/ important conditions).

PAED575 Pediatrics II (4 CH)

This course allows students to act as sub-interns in the hospital by being an integral part of the hospital team, provide them with autonomy and independence while retaining reasonable didactic teaching. There are various components for this course including hospital attachment, afternoon teaching sessions and on-calls. Assessment will be done throughout the course based on attendance, mini-clinical evaluation exercise (Mini-CIEx), hospital evaluation, case presentation and documentation. At the end of the rotation students have clinical examination and NBME assessments. Each student will have a logbook to record attendance, participation in sessions, and practical procedures performed which must be signed by the attending tutor.

Pathology

GENT601 Molecular Basis of Human Diseases (2 CH)

The course addresses five fundamental mechanisms of human diseases and how to explore them in the laboratory. It provides in-depth analysis of cellular detoxification, cellular bioenergetics, mitochondrial disturbances, malignant transformation and inflammation. The topics are covered in ten seminars. Students need to write a full report on each topic, which composes 50% of the grade. The other aspect of the course includes five laboratory sessions that

cover cellular thiols, cellular bioenergetics, intracellular caspases and in vitro assessment of cytotoxicities.

GENT602 Bioinformatics and Genomics (2 CH)

Bioinformatics applies the principles of information science and technology to answer some of today's most complex questions in the life sciences. Its research lies in the development and application of computational approaches for the storage, analysis and interpretation of biological data. In the medical arena, particularly in functional genomics, researchers are currently using technologies that yield vast amounts of complex data. This data first needs to be stored in integrated, highly curated and user friendly databases. Analytical algorithms and analysis pipelines need to be applied to the data in order to extract as much information from the experiment as possible. Finally, in order for the life science community to be able to use these algorithms, they must be packaged in user-friendly, easily accessible tools. Bioinformatics thus has three components: database structure, data mining and data analysis procedures, and software development.

HONC320 Mechanisms of Malignancies and Hematology (7 CH)

This course covers an overview of hematology and oncology at the level of the third year medical student. The course consists of basic/clinical science lectures combined with relevant laboratory teaching and problem based learning (PBL) in relation with hematologic and oncologic disorders. Students will study basic mechanisms of cancer development, progression, diagnosis, therapy, screening and prevention. They will also study fundamental concepts of hematology including blood-forming organs and the origin and function of blood cells and plasma. They will also examine the theoretical and clinical aspects of normal and pathological conditions of erythrocytes, leukocytes, platelets, coagulation and blood group systems.

PATH224 Pathology (3 CH)

This course covers the general mechanisms underlying the alteration of the normal structures and functions of tissues when there is disease and the body’s response. Students will appreciate the mechanisms by which the body restores normal structure and function following a disease process. It will also introduce students to basic concepts in neoplasia.

PATH602 Human Genetics (2 CH)

Genetic disorders are a major cause of morbidity and mortality in UAE as well as other populations. Understanding the molecular and cellular basis of these disorders is crucial for the development of effective prevention, diagnosis and treatment. This course will cover the basics and the advanced aspects human genetics.

WMEX350 Renal and Urogenital Systems (6 CH)

This course covers the essentials of history taking and physical examination pertaining to renal and urology systems. The course is designed to cover common topics and conditions in the field of nephrology, nephropathology and urology. It commences from basic medical sciences reviewing renal and urology systems embryological development, structure and function. The course highlights aberrant development, structure and function. The course is constructed of theme based weeks. Hence, lectures, practicals and problem based learning revolve around a specific theme and its differential diagnoses. Interactive learning is the core teaching method with one-to-one feedback by experienced clinicians and tutors. A structured checklist is used the faculty tutors to measure student performance and provide constructive feedback. Self-reflection and peer feedback are also encouraged. Standardized (simulated) patients of community volunteers provide an opportunity to practice and master physical examination in an optimal environment. The course dedicates time to cover medico-legal aspects in the practice of medicine supplemented by field trip to Dubai Police Headquarters. The course is comprehensive, yet challenging and stimulates students to employ medial reasoning, and clinical knowledge in solving patients related conditions.

Pharmacology and Therapeutics

CDPM330 Cardiovascular System (7 CH)

This course covers normal and abnormal processes in the cardiovascular system and introduces clinical approaches to diagnosis and treatment of the most prevalent cardiovascular diseases.

PHAM225 Pharmacology (3 CH)

This course covers basic pharmacology topics such as the nature of drugs, the different forms of drugs, the processes and the factors that influence their absorption, transportation, effectiveness, and elimination. Students will be able to relate the normal and abnormal processes of the autonomic nervous system and the pharmacological agents which forms the bases for the therapy for the autonomic system disorders.

PHTX601 General Systemic Pharmacology (2 CH)

This course is designed to teach graduate students the effects of drugs on different organ systems. The drugs acting on major organ systems will be reviewed (the autonomic nervous system and the cardio-vascular, respiratory, kidney, endocrine, gastrointestinal, neuromuscular transmision, antimicrobials and central nervous systems). The course will deal with understanding the molecular basis for the actions of drugs and the characteristics of interactions between drug molecules and those of the substrates of drug action in the cell. This course will be in a seminar format as well as computer based practical programs.

PHTX602 Molecular Mechanism of Drug Action (2 CH)

This course is designed to teach graduate students general principles of drug actions in the biological systems. The topics are designed to cover most of the major biological mechanisms involved in drug actions. There will also be opportunity to understand current approaches to the principles that dictate interactions of drugs with biological systems.

PHTX603 Neurotransmitters in Health and Diseases (2 CH)

This course is devoted to exploring the biosynthesis, inactivation, receptors, and signaling mechanisms of neurotransmitters and chemical mediators including GABA, glutamate, acetylcholine, catecholamines, purines, peptides, prostaglandins, and histamines. In brief, the molecular and cellular aspects of receptor mechanisms as well as signaling pathways, and effector systems will be discussed. The teaching format includes Seminars and discussions.

PHTX604 Molecular Principles of Organ Toxicity (2 CH)

This course is designed to teach graduate students the mechanisms involved in the actions of drugs and toxins on the target organs. The course will focus on molecular mechanism of chemically-induced toxicity to specific organs in the mammalian species. It describes the principles of cellular and molecular mechanisms of organ system toxicology with emphasis on developmental toxicology, carcinogenesis, immune toxicity, renal toxicity, hepatic toxicity and neurotoxicity.The effects of toxins on respiratory, blood, cardiac, skin and eyes at the cellular level will also be addressed in this course. Various factors affecting toxicity to each particular organ will be studied.

PHTX607 Advanced Pharmacotherapy 1 (3 CH)

Advanced Pharmacotherapy courses are designed to provide students with advanced knowledge in clinical therapeutics. Students will gain the necessary skills and knowledge required to optimize patients' treatment and design an evidence-based individualized pharmacotherapeutic plan. The course will discuss treatment of choices, adding and adjusting medications and doses. Goals of treatment and monitoring strategies, drug interactions, and adverse drug reactions will be also discussed for each disease and medications. Pharmacotherapy 1 will focus on cardiovascular diseases (Hypertension, dyslipidaemia, ischemic heart disease, heart failure, venous thromboembolism, Peripheral artery disease, acute coronary syndrome, atrial fibrillation and stroke).

PHTX608 Advanced Pharmacotherapy 2 (3 CH)

Advanced Pharmacotherapy courses are designed to provide students with advanced knowledge in clinical therapeutics. Students will gain the necessary skills and knowledge required to optimize patients' treatment and design an evidence-based individualized pharmacotherapeutic plan. The course will discuss treatment of choices, adding and adjusting medications and doses. Goals of treatment and monitoring strategies, drug interactions, and adverse drug reactions will be also discussed for each disease and medications. Pharmacotherapy 2 will focus on Endocrine and Renal diseases (Diabetes Mellitus type I&II, Thyroid Disorders, Adrenal Gland Disorders, Acid-Base Disorders, Acute Kidney injury, Chronic Kidney Disease).

PHTX609 Advanced Pharmacotherapy 3 (2 CH)

Advanced Pharmacotherapy courses are designed to provide students with advanced knowledge in clinical therapeutics. Students will gain the necessary skills and knowledge required to optimize patients' treatment and design an evidence-based individualized pharmacotherapeutic plan. The course will discuss the treatment of choices, adding and adjusting medications and doses. The goals of treatment and monitoring strategies, drug interactions, and adverse drug reactions will be also discussed for each disease and medication. Pharmacotherapy 3 will focus on Respiratory, Gastrointestinal, Rheumatology, and Bone Diseases (Asthma, Chronic Obstructive Pulmonary Disease (COPD), Gastrointestinal Reflux Disease (GERD), Peptic Ulcer, Inflammatory Bowel Diseases (IBDs), Portal Hypertension and Liver Cirrhosis, Osteoarthritis, Rheumatoid Arthritis, and Osteoporosis).

PHTX610 Advanced Pharmacotherapy 4 (3 CH)

Advanced Pharmacotherapy courses are designed to provide students with advanced knowledge in clinical therapeutics. Students will gain the necessary skills and knowledge required to optimize patients' treatment and design an evidence-based individualized pharmacotherapeutic plan. The course will discuss treatment of choices, adding and adjusting medications and doses. Goals of treatment and monitoring strategies, drug interactions, and adverse drug reactions will be also discussed for each disease and medications. Pharmacotherapy 4 will focus on Infectious diseases and Critical Care Conditions (CNS infections, upper and lower Respiratory Infections, urinary tract infections, sepsis and septic shock, surgical prophylaxis, invasive fungal infections, skin and soft tissues infections, Clostridium difficile infection).

PHTX612 Medication Management and Pharmaceutical Care (3 CH)

This course introduces the student to their professional and clinical responsibilities as a pharmacist. The course will also provide the students with a systematic approach to patient-centred pharmaceutical care that will be applied and practiced throughout the curriculum and clinical clerkship. Topics covered include pharmaceutical care, ethical principles, providing drug information, communication skills, evidence-based medicine, collecting patient history, designing pharmacotherapy care plan, monitoring and adjusting treatment, and communicating recommendations to physicians.

PHTX613 Advanced Pharmacy Practice Experience 4: Ambulatory Care (4 CH)

This 4 Weeks internship will prepare interns to understand various disease states and pharmacotherapy as they relate to the management of patients in the ambulatory care setting. Intern will develop the necessary skills in optimizing pharmaceutical care plan including obtaining medication histories, assessing the appropriateness of medication regimens and protocols, counseling patients, monitoring therapies, and providing appropriate drug information to both patients and health-care providers.

Prerequisites

- PHTX612 with a minimum grade D
- PHTX607 with a minimum grade D
- PHTX610 with a minimum grade D
- PHTX631 with a minimum grade D

PHTX614 Advanced Pharmacy Practice Experience 2: General Internal Medicine 1 (4 CH)

This 2*4 Weeks internship will prepare the interns to become familiar with the etiology, pathophysiology, and treatment (drug and non-drug) of disease states commonly found in the adult internal medicine patients. Intern will be able to develop skills in evaluating patient data for providing pharmaceutical care and optimal drug therapy, identifying drug-therapy related problems, and developing rational drug therapy recommendations for adult internal medicine patients. In addition, they will be able develop a basic understanding of the various diagnostic and monitoring techniques utilized in internal medicine patients.

Prerequisites

- PHTX612 with a minimum grade D
- PHTX607 with a minimum grade D
- PHTX608 with a minimum grade D
- PHTX610 with a minimum grade D
- PHTX631 with a minimum grade D

PHTX616 Advanced Pharmacy Practice Experience 9: Adult Oncology (4 CH)

This 4 Weeks internship will prepare interns to become familiar with the etiology, pathophysiology, and treatment of disease states commonly found in oncology patients. Intern will be able to provide supportive care and to develop a pharmaceutical care plan and learn the process of identifying and solving drug related problems in oncology patients.

Prerequisites

- PHTX612 with a minimum grade D
- PHTX607 with a minimum grade D
- PHTX608 with a minimum grade D
- PHTX609 with a minimum grade D
- PHTX610 with a minimum grade D
- PHTX631 with a minimum grade D

PHTX618 Advanced Pharmacy Practice Experience 5: Infectious Diseases (4 CH)

This 4 Weeks internship will prepare interns to become familiar with the etiology, pathophysiology, and treatment (drug and non-drug) of various infectious disease states. Interns should be able to develop the skills to suggest the optimum pharmaceutical care plan and learn the process of identifying and solving drug related problems to patients with certain infectious diseases. Interns will also learn the principles and develop the skills necessary for the application of antimicrobial stewardship program.

Prerequisites

- PHTX612 with a minimum grade D
- PHTX607 with a minimum grade D
- PHTX608 with a minimum grade D
- PHTX609 with a minimum grade D
- PHTX610 with a minimum grade D
- PHTX631 with a minimum grade D

PHTX619 Advances in Pharmacology (1 CH)

This course will provide students the chance to rotate through the laboratory of a potential supervisor to learn about the various projects in progress in that laboratory with emphasis on acquainting themselves with the type of research work and techniques being used. Regular attendance (one hour per week) and active participation of the student in observing and learning about these projects is of great importance. The students should study the literature provided by their respective supervisors and familiarize themselves with the research activities being carried out in the laboratory chosen by them.

PHTX620 Advanced Pharmacy Practice Experience 7: General Pediatric (4 CH)

This 4 Weeks internship will prepare interns to develop a basic understanding of disease states and conditions commonly seen in the pediatric and neonatal patient. Emphasis will be placed on the therapeutic management of pediatric patients and the unique pharmacological/pharmaceutical requirements of these patients. The role of the clinical pharmacist in the selection and monitoring of drug use in pediatric patients will be emphasized to develop a pharmaceutical care plan and learn the process of identifying and solving drug related problems among neonatal and pediatric patients.

Prerequisites

- PHTX612 with a minimum grade D
- PHTX607 with a minimum grade D
- PHTX608 with a minimum grade D
- PHTX631 with a minimum grade DPHTX609 with a minimum grade D
- PHTX610 with a minimum grade D

PHTX621 Advanced Pharmacy Practice Experience 8: Critical Care Medicine (4 CH)

This 4 Weeks internship will prepare interns to become familiar with the etiology, pathophysiology, and treatment (drug and non-drug) of disease states commonly found in critically ill patients at the intensive care unit (ICU) and critical care unit (CCU). Intern will be able to develop a pharmaceutical care plan and learn the process of identifying and solving drug related problems to patients in the ICU and CCU.

Prerequisites

- PHTX612PHTX607PHTX608PHTX609PHTX610 with a minimum grade D
- PHTX631 with a minimum grade D

PHTX623 Research Project 1 (1 CH)

This course is intended to guide the student in the selection, preparation, and the ethical form submission of the research proposal. After the research proposal is prepared, submitted and approved by the ethical committee, the student will continue the project in the (Research project 2). The latter is the actual conduction of the designated research project where the student collects, analyses, and prepare the research report. The student has to conclude the proposal section successfully before moving to conducting the actual research. Research projects suggested by faculty members will be announced to the students at the beginning of each fall semester. Two students will be assigned to each project and supervised by a faculty member. Research project guideline and timeline are attached in the Appendix.

PHTX624 Modern Medicinal Chemistry and Drug Design (1 CH)

A broad variety of medicinal chemistry approaches can be used for the identification of hits, generation of leads, as well as to accelerate the development of high quality drug candidates. Structure-based drug design (SBDD) methods are becoming increasingly powerful, versatile and more widely used. This course demonstrates current developments in structure-based virtual screening and receptor-based pharmacophores, highlighting achievements as well as pharmacodynamics and pharmacokinetic challenges, along with the value of structure-based lead optimization, with emphasis on recent examples of successful applications for the identification of novel active compounds.

PHTX626 Advanced Pharmacy Practice Experience 6: General Surgery (4 CH)

The Surgery rotation is a 4 Weeks, elective, experientially oriented rotation where the Pharm-D student will be exposed to medication management in the surgical care setting. This will include but will not be limited to peri-operative

medication management, antimicrobial surgical prophylaxis, deep venous thrombosis prophylaxis and the ordering and monitoring of total parenteral nutrition hospital-wide.

Prerequisites

- PHTX612 with a minimum grade D
- PHTX607 with a minimum grade D
- PHTX608 with a minimum grade D
- PHTX609 with a minimum grade D
- PHTX610 with a minimum grade D
- PHTX631 with a minimum grade D

PHTX627 Advanced Pharmacy Practice Experience 3: General Internal Medicine 2 (4 CH)

This 2*4 Weeks internship will prepare interns to become familiar with the etiology, pathophysiology, and treatment (drug and non-drug) of disease states commonly found in the adult internal medicine patients. Intern will be able to develop skills in evaluating patient data for providing pharmaceutical care and optimal drug therapy, identifying drug-therapy related problems, and developing rational drug therapy recommendations for adult internal medicine patients. In addition, they will be able develop a basic understanding of the various diagnostic and monitoring techniques utilized in internal medicine patients.

Prerequisites

- PHTX612 with a minimum grade D
- PHTX607 with a minimum grade D
- PHTX608 with a minimum grade D
- PHTX609 with a minimum grade D
- PHTX610 with a minimum grade D
- PHTX631 with a minimum grade D

PHTX631 Advanced Pharmacotherapy 5 (3 CH)

Advanced Pharmacotherapy courses are designed to provide students with advanced knowledge in clinical therapeutics. Students will gain the necessary skills and knowledge required to optimize patients' treatment and design an evidence-based individualized pharmacotherapeutic plan. The course will

discuss treatment of choices, adding and adjusting medications and doses. Goals of treatment and monitoring strategies, drug interactions, and adverse drug reactions will be also discussed for each disease and medications. Pharmacotherapy 5 will focus on Neurological, Psychiatric, Hematological, and Oncology diseases (Anxiety, Depression, Alzheimer's disease, Epilepsy, Attention deficit hyperactivity Disease, Parkinson disease, Schizophrenia, Haematological malignancies, Oncology Supportive Care, Breast, Colorectal, Lung Cancers).

PHTX632 Advanced Pharmacy Practice Experience 1: Hospital Pharmacy (4 CH)

This 4 weeks internship will prepare the interns to become familiar with variety of aspects of a hospital pharmacy in both outpatient and inpatient pharmacy settings including the prescription processing, unit dose, intravenous admixture and parenteral fluids preparation, purchasing and inventory control, quality assurance, medication reconciliation, medication use evaluation, medication safety, clinical pharmacy services, regulatory requirements of drug distribution, disposal, controlled substances, investigational medication distribution, medical literature, and others issues related to hospital pharmacy practice. In addition, this internship will allow the students to gain professional skills toward patients interviewing and counseling and develop advanced communication skills with hospital pharmacy staff and other health care professionals. Students will be given the opportunity to develop manager/leadership skills through active participations in discussions and meetings concerning ethical issues encountered in practice, health care policy, pharmacy's quality improvement program, and participation in the design, development, and marketing of patient services.

Prerequisites

- PHTX607 with a minimum grade D
- PHTX612

PHTX633 Research Project 2 (1 CH)

This course will guide the student, through a step by step on how to conduct their research study that was approved at the end of Research project 1 course. The students are expected to collect their research data, enter data into SPSS, analyse data, write study results and discuss their research findings. At the end of this course, the students are expected to submit a final research report in the form of a manuscript. Two students will be assigned to

each project and supervised by a faculty member. Research project timeline and other related documents are attached in the Appendix

Prerequisites

- PHTX623 with a minimum grade D
- CMPH600 with a minimum grade D

PHTX634 Advanced Clinical Pharmacokinetics (2 CH)

This course aims to develop and integrate the advanced knowledge and skills required to apply Pharmacokinetic-Pharmacodynamic (PK-PD) concepts to calculate and formulate proper dosing regimens. Students will learn how to apply the PK-PD values in selecting and monitoring drug therapy regimens that maximize the drug efficacy and minimize the toxicity. In addition, students will learn how to use the PK-PD models and formulas appropriately to determine and select the proper therapy and dose that account for various factors such as patient's characteristics, liver and kidney, and other organs functions, disease state, drug-food, and drug-drug interactions.

Physiology

CANB601 Basic Cancer Biology (2 CH)

This course will focus on molecular and cellular mechanisms behind cancer initiation and progression. Particular focus on the control pathways will provide students the background to the cutting edge of drug design for targeted cancer therapy.

PHY601 Human Physiology 1 (2 CH)

The Human Physiology course will provide students with the core concepts of human physiological linking molecular, cellular and system/organ aspects in the study of human Neural, gastrointestinal, endocrine and reproductive physiology and disease.

PHY602 Human Physiology 2 (2 CH)

The Human Physiology course will provide students with the core concepts of human physiological linking molecular, cellular and system/organ aspects in the study of human cardiovascular, respiratory and renal physiology and disease. The goal is to allow students to acquire broad knowledge of functional principles at the cellular and organ levels in order to describe the concepts of integrated systems physiology in humans. Consequently they will be challenged to explore how to apply these basic physiological principles to research strategies addressing current and emerging relevant health issues.

Prerequisites

- PHY601

PHY603 Human Physiology 3 (2 CH)

The Human Physiology course will provide students with the core concepts of human physiological linking molecular, cellular and system/organ aspects in the study of human neural, integrative responses and physiology of aging. The goal is to allow students to acquire broad knowledge of functional principles at the organ and system levels in order to describe the concepts of integrated systems physiology in humans. Consequently they will be challenged to explore how to apply these basic physiological principles to research strategies addressing current and emerging relevant health issues.

PHY611 Advanced Electrophysiology (2 CH)

This course is aimed at students who have an interest in Electrophysiology.

PHYL101 Introductory Physiology (3 CH)

This course is designed to provide accurate and essential information about the function of the human body in an interesting manner to those students who are pursuing careers in food system education, science and allied health fields. The course is delivered for students who have minimal backgrounds in physical and biological sciences. The course is organised in groups of related subjects beginning with a discussion of the physical basis of life and proceeding through levels of increasing complexity. Each unit will include at the beginning objectives and a narrative outline, which meant to help students in reviewing them before the class. In addition, students will be involved in the learning

process. Finally, the course is designed to stimulate the students interests in the subject matter, and help them relate their classroom knowledge to their future vocational experiences.

PHYL109 Human Physiology 1 (4 CH)

This course begins with an introduction to human physiology and continues with introductions to the physiology of the cardiovascular and respiratory systems. The general introduction includes cell transport systems, basic electrophysiology of excitable cells, generation and conduction of action potentials, transmission of signals across gap junctions and the neuromuscular junction. It also includes an introduction to receptor physiology, simple motor reflexes and the physiology of skeletal, cardiac and smooth muscle. The cardiovascular physiology course includes the ionic basis of the cardiac muscle and pacemaker action potentials, excitation-contraction coupling, electrical and mechanical events of the cardiac cycle, cardiac output and its regulation, blood and lymph systems, autonomic regulation of the heart and blood flow. The respiratory physiology course includes the physical laws governing gas pressure and flow, mechanics of ventilation including lung volumes and capacities, the process of gas exchange and transport, control of breathing and an introduction to the pathophysiology of selected respiratory disorders. The courses will also include a variety of practical and computer based learning activities.

PHYL216 Human Physiology 2 (4 CH)

This course covers normal function of the human body following an organ system approach. The emphasis of this part of the course is to provide the student with understanding of the integrated regulation of various body processes among the major systems. The overall aim of the course is to provide the student with an intermediate level of understanding of the physiological basis of medicine. In this course, the focus will be on blood, endocrine, renal and gastrointestinal physiology.

PHYL222 Human Physiology 3 (3 CH)

This course covers four main topis: neurophysiology of the CNS, normal aging, reproduction and integrative physiological responses. The neurophysiology of CNS will explore the general organization and functioning of the peripheral nervous system, spinal cord, and brain as they provide a neurobiological framework for the understanding of the motor, and sensory functions, autonomic bodily actions, the functioning of special senses, and various

faculties of cognition. The particular goal of this pat is to provide the foundation for understanding the impairments of sensation, action, and cognition that accompany injury, disease or dysfunction in the central nervous system. The part related to senescence will present an overview of how time modifies biological processes and explore in some details the effects of aging on the endocrine, respiratory, cardiovascular, immune, musculoskeletal system and CNS. The part related to human reproduction will explore the main hormonal axis controlling reproductive cycle in woman and man. Finally, the integrative part of the course will explore integrated bodily responses in extreme environments like when diving, or when exposed to extreme heat. The course will build upon the knowledge acquired through prior studies aiming to achieve intermediate understanding of physiology of body functions.

Psychiatry and Behavioral Science

ETHC600 Ethical Conduct in Medical Research (1 CH)

Bioethics is the philosophical study of the controversies brought about by advances in biology and medicine. On the other hand, medical ethics is primarily a field of applied ethics, the study of moral values and judgments as they apply to medicine. When moral values are in conflict, the result may be an ethical dilemma or crisis. This course is designed to study the ethics with an integrated multi-cultural approach. The course will provide opportunity to acquire practical skills of dealing with daily practice ethical dilemmas. It will also provide experience to develop ethical frameworks which can incorporate different cultures in the cosmopolitan society we live and the era of globalization.

PSCH550 Psychiatry and Behavioral Sciences (4 CH)

This course covers practical and theoretical aspects of common psychiatric disorders. In the first three week of the programme, there will be tutorials and seminars on different Psychiatric illnesses. There will also be clerking patients sessions (usually in the morning) in Al Ain Hospital Psychiatric ward, where students are required to assess patients in detail followed by presentation of the cases to the assigned tutor. Attendance of the clerking patients sessions will be marked in the student's logbook and they are expected to assess a minimum of 10 patients. In the final week, there will be a clinical examination and a written (MCQ) examination as well as students will be expected to submit one long case and two short cases. This clerkship course will help students recognize commonly encountered mental health problems and be able to know when to manage a problem themselves and when to make a referral.

Surgery

SURG520 Surgery I (8 CH)

This course covers the principles involved in surgical practice and specific surgical diseases with theoretical and practical management of patient problems. All doctor/patient interactions are potential learning experiences. Clinical teaching in surgery will include: Ward (bedside) teaching with case presentation and discussion that is held on teaching and business ward rounds, Outpatient teaching, Operating theater attendance with teaching, On-call duties (weekly and weekend) with informal ad hoc teaching as and when appropriate, Clinical Skills and Procedure Training by junior doctors, Routine history and physical examination of surgical patients under the general supervision of junior doctors, Regular formal case discussion in various disciplines of surgery, Formal/scheduled teaching sessions on specific topics, and Solving exercises and tests in the electronic version. The Clerkship's principal components are: General Surgery, Anesthesia, Orthopedic Surgery, Urology, Vascular Surgery, Cardio-thoracic Surgery, Plastic Surgery, and Trauma/Critical Care.

SURG573 General Surgery (4 CH)

This course offers an opportunity to undertake a deeper exploration of general surgical disciplines as well as to improve proficiency in clinical skills and to provide greater exposure to practice in preparation for Internship. Students will be actively involved in deciding and documenting how they will learn from the experience. In so doing they will be developing skills for self-directed learning and ongoing professional development. Part of the emphasis of this clerkship is directed towards ensuring that the undergraduate student participates in the health care process. All doctor/patient interactions can be a potential learning experience. Students and teachers must make every effort to exploit this opportunity. Undergraduates must seek clarification whenever necessary, but should recognize that the timing of questions may have to be chosen sensitively so as not to interfere with the smooth delivery of clinical care.

SURG574 Surgery Specialty (4 CH)

This course covers surgery specialties in ENT and Ophthalmology.

Internal Medicine

ECCT570 External Elective (4 CH)

General External Elective Rotation for last year clinical students. Students will learn from this rotation in the descipline of their choice.

ECCT579 Internal Elective (4 CH)

This course aims to offer students an opportunity to undertake a deeper exploration of, or study in any clinical discipline of personal interest as well as improve proficiency in clinical skills and provide exposure to more clinical experiences in preparation for Internship. Students will therefore be expected to document how they learn from the experience. In so doing they will be developing skills for self-directed learning and ongoing professional development.

EMED578 Emergency Medicine (4 CH)

This course is designed based on the guidance of Society of Academic Emergency Medicine and International Federation for Emergency Medicine, Emergency Medicine Clerkship Curriculum. During this course students will gain experience in patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, documentation, professionalism, and system-based practice. The course includes regular lectures, simulation/skills lab activities, procedure workshops, case discussions, journal clubs, weekly written examinations, bedside evaluations (such as mini-CLEX), clinical shifts, case management exam, end of clerkship OSCE and final written examination. Students will be expected to act as the primary physician for their patients and coordinate all aspects of their care under the direct supervision of the Emergency Medicine faculty, consultant or specialist emergency physicians and senior Emergency Medicine residents. The Emergency Medicine rotation is aimed at teaching medical students the necessary skills to assess, stabilize and manage patients with a wide variety of undifferentiated urgent and emergent conditions. Patients will not be pre-selected, and students will be exposed to a wide variety of urgent and emergent medical, surgical, psychiatric, orthopaedic, and OB/Gyn problems. Emphasis would be placed on teaching the students how to develop a working differential diagnosis and how to appropriately narrow it without missing the need to appreciate and provide the necessary resuscitative measures if needed. They will need to acquire and develop the ROWCS approach (Rule-Out-Worst-Case-Scenario) after immediate life-threatening conditions have been stabilized.

IMED510 Internal Medicine I (8 CH)

"This course covers the clinical skills of internal medicine in a hospital rich teaching environment, in small group teaching methods, and by self- directed learning. Students are exposed to daily ward rounds with hospital multidisciplinary team of nurses, residents and consultants. Students clerk patients and attend evening duties. Students search medical databases and textbooks to solve and understand patient medical problems. Students discuss patients with senior faculty members at morning and afternoon teaching sessions. This integrated approach will help students to extend their medical knowledge, clinical skills and clinical reasoning. End-of-rotation assessment will be based on clinical competencies, demonstrated professionalism and demonstrated knowledge as well as the ability to apply that knowledge to the care of patients. The core clinical competencies which reflect student performance are: communication, problem solving, clinical skills, medical knowledge, and professional and ethical considerations."

IMED571 Internal Medicine II (4 CH)

This course covers the clinical skills of internal medicine in a hospital rich teaching environment, in small group teaching methods, and by self- directed learning. Students are exposed to daily ward rounds with hospital multidisciplinary team of nurses, residents and consultants. Students clerk patients and attend evening duties. Students search medical databases and textbooks to solve and understand patient medical problems. Students discuss patients with senior faculty members at morning and afternoon teaching sessions. This integrated approach will help students to extend their medical knowledge, clinical skills and clinical reasoning. End-of-rotation assessment will be based on clinical competencies, demonstrated professionalism and demonstrated knowledge as well as the ability to apply that knowledge to the care of patients. The core clinical competencies which reflect student performance are: communication, problem solving, clinical skills, medical knowledge, and professional and ethical considerations.

IMED572 Internal Medicine Selective (4 CH)

Internal Medicine clinical elective rotation.

Family Medicine

FAMD576 Family Medicine (4 CH)

This course allows students to experience hands-on patient care across the five ambulatory family medicine clinics. In the clinics, students see a wide range of medical as well as psychosocial issues including management of chronic diseases in the community. Along with this students present case-based discussions and actively participate in online portfolios to promote reflective learning. These equip the students to attain higher order clinical reasoning. This Clerkship builds student's knowledge on fundamentals of family medicine principles and common clinical conditions. The teaching methodology is adapted to accommodate experiential learning by direct patient care. The curriculum has been designed to meet the needs of the students as well as the region and culture. Students are assessed using in a 360 degree fashion using various methods including clinical evaluation, written examination and the US National Board of Medical Examiners online testing. Completing this Clerkship successfully enables medical students to transition to the next level as interns. Although the Clerkship is intensive, nevertheless the student feedback consistently indicates that they enjoy the rotation and surpass their learning goals.

FAMM600 Patient Examination and Clinical Assessment (2 CH)

This course aims to help senior pharmacists communicate and practice more confidently and competently as members of the health care team, whether in the in-patient or out-patient settings. It aims to provide the pharmacists with insight into what doctors do when interviewing patients, help them know how to utilize medical documentation maximally, and contribute ethically and significantly towards patient care. This course builds on the current experience of pharmacists working in various clinical settings. Each lecturer will highlight the objectives of the session, and will enhance the discussions by using cases as examples. This course does not assume any prior clinical skills abilities from its attendees. We assume that the attendees have a solid basic knowledge in pharmacology, and we will encourage them to utilize this knowledge when assessing the impact of drugs on the human body in healthy and ill people alike.

Genetics and Genomics

MGEN217 Medical Genetics (3 CH)

This course covers the basis of human traits with emphasis on genetic disorders and their modes of inheritance. Familiarization with the molecular and cellular basis of genetic conditions and the modalities available for treatment will be covered. Students will also learn about the genetic disorders that are particularly prevalent in the UAE population and their prevention strategies. Personalised medicines and the concepts of variability to susceptibility and resistance to infections and population genetics will be introduced.

Nutrition and Health

NUTR301 Human Nutrition (2 CH)

A foundation in the principles of nutrition offers a comprehensive study of the physiological roles of carbohydrates, lipids, proteins, minerals, vitamins and body fluids, their digestion, absorption, transport and metabolism. Their roles in disease prevention and promotion of optimum health. Principles of nutrition with application to the physiologic needs of individuals; food sources and selection of an adequate diet and formulation of recommended dietary allowances will be examined.

NUTR320 Macronutrient Nutrition and Metabolism (2 CH)

The course covers biochemical and physiological aspects of human nutrition with emphasis on major metabolic pathways of macronutrients including metabolism of carbohydrates, proteins and lipids, review digestion and absorption of energy nutrients, the regulation of fuel utilization, control of energy balance and the application of the foundation knowledge to human requirements. The course will also cover medical terminology.

Prerequisites

- CHEM283
- FDSC250 with a minimum grade D

Corequisites

- NUTR321 with a minimum grade D

NUTR321 Nutrition Assessment I (1 CH)

The course covers nutritional screening and the components of the nutritional assessment process, including medical, medication, and socioeconomic histories, biochemical, dietary, and anthropometric assessment

Prerequisites

- CHEM283 with a minimum grade D
- FDSC250 with a minimum grade D

Corequisites

- NUTR320 with a minimum grade D

NUTR330 Micronutrient Nutrition and Metabolism (2 CH)

The course description will include biochemical and physiological functions of vitamins and minerals in human nutrition and their interaction with other nutrients. Emphasis is on delivery of nutrients from foods to mammalian cells, function of nutrients, regulation, transport, essentiality, activation, storage, excretion, and toxicity in humans. The course will also cover medical terminology.

Prerequisites

- NUTR320 with a minimum grade D
- NUTR321 with a minimum grade D

Corequisites

- NUTR331 with a minimum grade D

NUTR331 Nutrition Assessment II (1 CH)

The course covers practical work of biochemical assessment and the use of biochemical indices in nutritional assessment in health and disease. In addition to applying nutrition care process for different documentation styles and plan different diet modifications.

Prerequisites

- NUTR320 with a minimum grade D
- NUTR321 with a minimum grade D

Corequisites

- NUTR330 with a minimum grade D

NUTR352 Human Nutrition in Various Ages Stages (3 CH)

This course is designed to provide students with view of the life cycle as a whole with each stage supported by nutrition needs essential for optimal health and development. Nutritional needs of each major phase of the life cycle are presented on the basis of both physiological and psychosocial development. Both normal nutrition topics and nutrition-related conditions and interventions are covered. Students will develop teaching and counseling skills that can be applied to people at various stages of the lifecycle through active learning and participation in class room activities and assignments that include a weekly presentation and a term project report.

Prerequisites

- NUTR330

NUTR355 Nutrition Seminar (1 CH)

This course will focus on developing students? skills in discussion and critical evaluation of nutrition research papers with emphasis on reading, critiquing, and summarizing published research articles. The course enhances students? active learning by developing their knowledge, skills, and application of nutrition research evaluation and presentation to an audience. It enhances students? ability to become dietitians who are critical thinkers and lifelong learners.

Prerequisites

- NUTR330 with a minimum grade D
- NUTR352 with a minimum grade D

NUTR360 Immunology and Nutrition (2 CH)

This course focuses on nutrient-immune function interactions, the impact of undernutrition on immune function and infection, the influences of fatty acids, amino acids, antioxidant vitamins, various minerals, prebiotics and probiotics on immunity, and food allergies.

Prerequisites

- NUTR330 with a minimum grade D

NUTR371 Food Service Systems Management I (2 CH)

The course purpose is to introduce the principles of effective resources management, in the design and administration of food service facilities. This may include Strategic and Organizational planning. Design of floor plans, equipment selection, Menu development, planning and quality food production, production sheets, and risk management for various institutional food service operations are included. Consideration is given to operating environmentally safe and efficient facilities with emphasis on sanitation and safety. Administrative and leadership responsibilities of the food service manager are emphasized.

Prerequisites

- FDSC331
- MGMT200
- NUTR372

NUTR372 Food Service Systems Management I SP (2 CH)

This supervised practice considers the application of managerial processes to the delivery of food to people in a variety of settings. The emphasis is on the food preparation area and the food flow from receiving to the practices of high quality customer service. This may include organizational and strategic planning and managing the integration of financial, human, physical, and material resources and coordination of services. Menu development, standardizing, development and/or modification of recipes/formulas, food procurement; receiving and storage; food production; and quality assurance are other topics to be considered. The supervised practice experience takes place on- and offsite, in food service operations of various organizations, including University residence halls.

Prerequisites

- FDSC331
- MGMT200
- NUTR371

NUTR375 Medical Nutrition Therapy I (NS Program) (3 CH)

This course explores changes in nutrient metabolism related to biochemical and physiological alterations in disease conditions and the development of therapeutic diets. The course covers, nutrient-drug interactions, weight management, gastrointestinal disorders, diabetes mellitus, cardiovascular disease, hypertension, food allergies, and metabolic disorders.

Prerequisites

- NUTR330 with a minimum grade D
- PHYL101 with a minimum grade D

Corequisites

- NUTR355 with a minimum grade D

NUTR377 Medical Nutrition Therapy I (CPD Program) (2 CH)

This course explores changes in nutrient metabolism related to biochemical and physiological alterations in disease conditions and the development of therapeutic diets. The course covers gastrointestinal disorders, diabetes mellitus, cardiovascular disease, hypertension, food allergies, and metabolic disorders.

Prerequisites

- NUTR330
- NUTR378

NUTR378 Medical Nutrition Therapy I SP (1 CH)

This supervised practice allows students to apply their knowledge in nutrition intervention principles for patients with conditions discussed in the lecture portion of the class (NUTR 377). These include gastrointestinal disorders, diabetes mellitus, cardiovascular disease, hypertension, food allergies, and metabolic disorders.

Prerequisites

- NUTR330
- NUTR377

NUTR379 Functional Food and Health (3 CH)

This course introduces the functional food concepts and the use of bioactive food ingredients to develop functional food products. It discusses examples of bioactive food ingredients including lipid, protein, fibers, phytochemicals and herbs. Relevant local compounds with a potential as functional ingredient will be considered as well. The course examines the relationship of functional foods with human health and the underlying mechanisms. The regulatory aspects of the development of a functional food and associated health claims are also discussed.

Prerequisites

- FDSC250 with a minimum grade D or FDSC260 with a minimum grade D

NUTR380 Food Service Systems Management (NS Program) (3 CH)

The purpose of the course is to introduce the principles of effective resources management, in the design and administration of food service facilities. This may include strategic and organizational planning, as well as financial and human resources management. Design of floor plans, equipment selection, Menu development, planning and quality food production, production sheets, and risk management for various institutional food service operations are included. Consideration is given to operating environmentally safe and efficient facilities with emphasis on sanitation and safety. Administrative and leadership responsibilities of the food service manager are emphasized.

Prerequisites

- FDSC330

NUTR396 Sports Nutrition (3 CH)

The course describes the relationship between nutrients and special demands of physically active people. A study of the metabolism of exercise and the role of diet in athletic performance. Topics covered include components of energy expenditure, role of macro- and micro-nutrients in energy metabolism, fluid balance and replacement, exercise and body composition, diet, and performance and exercise for health.

Prerequisites

- NUTR330

NUTR401 Nutrition Education and Communication (NS Program) (3 CH)

This course prepares students to work as effective nutrition educators by providing them the knowledge and skills needed for promoting nutrition-related behavior changes in their target groups (individuals, groups, and communities). The course will place special focus on developing students? communication and counseling skills using a variety of teaching methods and resources. Students will develop teaching and counseling skills that can be applied in a variety of work settings and for people at various stages of the life cycle

through active learning and participation in class room activities and assignments.

Prerequisites

- NUTR330

NUTR403 Nutrition Education and Communication (CPD Program) (2 CH)

This course prepares students to work as effective nutrition educators by providing them the knowledge and skills needed for promoting nutrition-related behavior changes in their target groups (individuals, groups, and communities). The course will place special focus on developing students? communication and counseling skills using a variety of teaching methods and resources. Students will develop teaching and counseling skills that can be applied in a variety of work settings and for people at various stages of the life cycle through active learning and participation in class room activities and assignments.

Prerequisites

- NUTR330
- NUTR404

NUTR404 Nutrition Education and Communication (SP) (1 CH)

Students enrolled in the Nutrition Education and communication course gain practical experience in nutrition education, counseling and communication skills through role plays in class and campus and community-based projects. The supervised practice takes place in schools, community health centers, and in campus. Students develop educational resources including posters, brochures, and computer games, develop lesson plans and deliver presentations to different target groups. Students also conduct nutrition awareness and screening activities in campus, shopping malls and community organizations.

Prerequisites

- NUTR330
- NUTR403

NUTR443 Meal Planning (3 CH)

This course aims to introduce the nutritional value and the characteristics of various food groups. It includes food patterns for different communities in general and the Gulf region in particular; approaches for meal planning and foods selection based on daily recommendations of necessary nutrients and approaches for applying food exchanges in meal planning and methods of meal evaluation.

Prerequisites

- NUTR352
- NUTR375

NUTR478 Medical Nutrition Therapy II (NS Program) (3 CH)

This course explores changes in nutrient metabolism related to biochemical and physiological alterations in disease conditions and the development of therapeutic diets. The course covers pulmonary disease, renal disease, liver and biliary disease, nutritional support (enteral and parenteral nutrition), metabolic stress, neoplastic disease, and HIV infections and AIDS.

NUTR480 Senior Research Project (NS Program) (3 CH)

The course is a capstone course to be individually designed by the faculty advisor for each senior student to integrate all courses and training of the student, from all activities involved by the student, during his/her entire stay at UAEU. Research methods, analysis of data collected, interpretation, and hypotheses must be developed by the students on a specific topic. A written thesis is to be produced by the student at the end of the course. (prerequisite: 90CrH completed)

Prerequisites

- NUTR375 with a minimum grade D

NUTR481 Senior Project (CPD Program) (3 CH)

The course is a capstone course to be individually designed by the faculty advisor for each senior student to integrate all courses and training of the student, from all activities involved by the student, during his/her entire stay at UAEU. Research methods, analysis of data collected, interpretation, and hypotheses must be developed by the students on a specific topic. A written thesis is to be produced by the student at the end of the course.

Prerequisites

- NUTR371
- NUTR372
- NUTR377
- NUTR378
- NUTR403
- NUTR404

NUTR482 Community Nutrition (NS Program) (3 CH)

This course is aimed at increasing students' understanding in the role of the public and community nutritionists in improving the nutritional health of communities. It discusses methods and application of statistical analytical techniques in nutritional epidemiological studies. Methods of community nutrition needs assessment, program planning and design, as well as marketing and delivery of nutrition programs are also covered.

Prerequisites

- NUTR375
- NUTR401

NUTR484 Food Service Systems Management II (2 CH)

The purpose of this course is to prepare students for administrative roles in Human Resources and Financial Management departments. In addition, emphasis is placed on food costing, labor issues, diversity, marketing, accounting, and budgeting for institutional food service. Cultural, financial, and other management concepts are considered in developing an institutional food service operation.

Prerequisites

- NUTR371
- NUTR372
- NUTR485

NUTR485 Food Service Systems Management II (SP) (1 CH)

This supervised practice emphasizes on the principles of human resource management, including labor relations; diversity issues; and materials management; in addition to the emphasis on financial management, including accounting principles; quality improvement; marketing theory and techniques; furthermore, the students apply the aforementioned knowledge areas to determine costs of services/operation, prepare a budget, interpret financial data, apply marketing principles, and sales promotion. 45 contact hours.

NUTR486 Community Nutrition (CPD) (2 CH)

This course is aimed at increasing students' understanding in the role of the public and community nutritionists in improving the nutritional health of communities. It discusses methods and application of statistical analytical techniques in nutritional epidemiological studies. Methods of community nutrition needs assessment, program planning and design, as well as marketing and delivery of nutrition programs are also covered.

Corequisites

- NUTR487

NUTR487 Community Nutrition (SP) (1 CH)

Provides students supervised fieldwork in community nutrition to integrate academic knowledge and skills acquired in the classroom with community-based experience. Students gain practical skills in community nutrition by conducting nutrition needs assessment of community groups, designing and implementing community-based nutrition projects for various target groups, including school children, pregnant women, elderly, and people with diet-related chronic diseases. The supervised practice experience takes place in

schools, community health centers, local public health departments, and university campuses.

Corequisites

- NUTR486

NUTR488 Medical Nutrition Therapy II (CPD) (2 CH)

This course explores changes in nutrient metabolism related to biochemical and physiological alterations in disease conditions and the development of therapeutic diets. The course covers pulmonary disease, renal disease, liver and biliary disease, nutritional support (enteral and parenteral nutrition), metabolic stress, neoplastic disease, and HIV infections and AIDS.

Prerequisites

- NUTR377
- NUTR378

Corequisites

- NUTR489

NUTR489 Medical Nutrition Therapy II (SP) (1 CH)

This supervised practice allows students to apply their knowledge in nutrition intervention principles for patients with conditions discussed in the lecture portion of the class (NUTR 488). These include pulmonary disease, renal disease, liver and biliary disease, nutritional support (enteral and parenteral nutrition), metabolic stress, neoplastic disease, and HIV infections and AIDS.

Prerequisites

- NUTR377
- NUTR378

Corequisites

- NUTR488

NUTR490 Internship (CPD) (6 CH)

The internship aims at providing students with practical skills relevant to their future career. The student spends 1 semester of practical training in food service and clinical dietetics departments in hospitals as well as fieldwork in community nutrition. Field training will give each student the opportunity to apply the various skills necessary to human nutrition and health. Pre-requisites: completing all course work

NUTR491 Internship (NS) (3 CH)

The internship aims at providing students with practical skills relevant to their future career. The student spends 320 hours of practical training in pharmaceutical companies, food companies, food control authorities, clinical dietetics departments in hospitals, or as fieldwork in community nutrition. Field training will give each student the opportunity to apply the various skills necessary to human nutrition and health. (This course is conducted over a complete semester during the last study year. No courses are allowed to be registered during the internship and student should complete 90 credit hour before taking this course and student should complete 90 credit hours before taking this course).

NUTR605 Advanced Nutrition Counseling Techniques (3 CH)

This course is designed to assist students in developing advanced nutrition counseling skills. The course places great emphasis in practical skills in nutrition counseling using a variety of teaching methods and resources. Students are expected to engage in practical activities related to each topic covered both in-class and in the field. Peer evaluations of the practical activitis will be applied throughout the semester. The course applies evidence-based theoretical models of behavior change and other techniques for effective nutrition counseling.

NUTR615 Community Nutrition and Health Promotion (3 CH)

This course aims to provide students skills needed for the development and evaluation of community nutrition interventions for health promotion and disease prevention. Students will learn about utilizing behavioral theory, conducting needs assessments, writing program objectives, developing intervention strategies, evaluating program implementation and effectiveness. The course also covers skills in grant writing and budget development for community nutrition interventions.

NUTR625 Sport and Exercise Nutrition (3 CH)

This course will focus on nutritional needs related to sport and exercise. Energy systems use will be considered according to the type of activity. The macronutrients, micronutrients and fluid needs will be examined. These sports nutrition concepts will be applied to recreational individuals and athletes. Ergogenic aids will be discussed. Special conditions affecting athletic performance and techniques for counseling athletes will be described.

NUTR630 Pediatric Diet Therapy (3 CH)

The course aims to provide a comprehensive understanding of the role of diet of infants and children and their requirements in health and disease. This includes the treatment of disease with nutritional and dietetic therapy including obesity, diabetes, coeliac disease, allergy, cystic fibrosis, faltering growth, and nutritional support

NUTR635 Papers and Research Proposal Writing in Nutrition Related Subjects (1 CH)

This course aims to provide the basic skills for writing research papers, searching and evaluating the scientific literature, summarizing information, identifying gaps, and finally writing research proposals in nutrition related subjects

NUTR645 Advanced Nutrition and Chronic Diseases (3 CH)

This course covers issues in modern nutrition and chronic disease. The course will focus on the major non-infectious diseases present in Westernized countries that are caused by modifiable lifestyle choices and the role that diet plays in the maintenance of health or the risk of chronic diseases, including cardiovascular, hypertension, obesity, diabetes, cancer and respiratory diseases.

NUTR650 Current Topics in Nutrition (3 CH)

This course is aiming at discussing selective current nutrition issues about topics of interest for public, government and industry. Students will be prepared to analyze and criticize scientific data to provide evidence-based conclusions

NUTR655 Thesis Research (9 CH)

This course will focus on key skills students have to acquire to be able to conduct a research project in the right manner. This will include research design, research ethics, data collection and analysis as well as scientific data collection, reporting and presentation. This course will be taken in the last semester of the program.

NUTR660 Disease-related malnutrition (UCL-MEDC0033) (2 CH)

Advanced analysis of the effect of nutritional status on metabolism and the development of disease. Topics may include the metabolic response to starvation, injury and sepsis, how disease modifies macronutrient and micronutrient requirements and antioxidant defenses, obesity - aetiology, pathogenesis in the short-term and long-term, nutrition and disorders of the intestine, liver, kidney and immune system, nutrition and intensive care.

NUTR665 Fundamentals of Nutrition and Metabolism (UCL-MEDC0034) (2 CH)

This course aims to familiarize students with the molecular basis of human metabolism and physiology in the context of clinical and Public Health Nutrition. This course will be covered in UCL (course code: GASNG002)

NUTR670 Practical Nutrition Assessment (UCL-MEDC0037) (2 CH)

This course will introduce students to the main techniques used to measure body composition and energy expenditure in clinical and community settings. One of the objectives will be to use simple experimental techniques to explore the relationship between lifestyle and body composition and between activity and energy expenditure.

NUTR675 Experimental Design and Research Methods (UCL-MEDC0039) (2 CH)

The course will provide an introduction to the theory and skills required for the successful completion of a research project. This course will be covered in UCL (course code:GASNG007)

NUTR701 Graduate Seminar in Nutritional Sciences (0 CH)

Seminars conducted by students, and faculty both internal and external to the University in areas of nutritional sciences.

NUTR702 Current Topics in Nutritional Sciences (1 CH)

The course will involve discussions of relevant publications representing cutting edge topics in nutritional sciences.

NUTR705 Advanced Community Nutrition (3 CH)

This course utilizes a theoretical framework in the application of community needs assessment, strategic planning, implementation and evaluation of nutrition/health promotion programs through the lifecycle. It analyzes the policy-making process and reviews the nutrition and related policies in the health system for reducing the double burden of malnutrition and assuring food and nutrition security. The course also analyzes theoretical principles in the application of epidemiologic research related to nutrition in addressing nutritional problems in the community at the national, regional and global levels.

NUTR707 Advanced Medical Nutrition Therapy (3 CH)

This course provides an in-depth study of the pathophysiology of nutritional disease as well as the nutritional management of persons with conditions requiring medical nutrition therapy.

NUTR710 Nutraceuticals and Functional Foods (2 CH)

This course will explore all aspects of nutraceuticals and functional foods. Constituents of functional foods and nutraceuticals, their role in health and disease, global regulatory issues, media messages, and specific research areas for functional foods and nutraceuticals will be covered.

NUTR720 Nutritional Immunology (3 CH)

The course provides students with advanced inquiry in complexity of the immune system in issues related to nutrition, interactions of nutrients and immunity and their mechanisms in various pathological conditions. Immune processes and inflammatory biomarkers in clinical conditions such as obesity, malnutrition, atherosclerosis, autoimmunity, ageing, cancer and the role of selected immunomodulatory therapies are discussed. The interplay of nutrition, gut microbiota and probiotics for optimal health outcomes, and the role of nutrigenomics in prevention of common lifestyle diseases are evaluated.

NUTR730 Cell Biology in Health and Disease (2 CH)

This course deals with the biology of cells of higher organisms: structure and function of cell membranes, cytoskeleton and mitochondria, cell growth and oncogenic transformation, transport receptors and cell signaling. The different causes of cellular stress, their consequences and the cell response to different stressful situations will be discussed. Concepts like homeostasis, cellular adaptation and cell death will be reviewed.

NUTR740 Physical Activity and Fitness (3 CH)

This course covers the application of the principles of the physiology of physical activity/inactivity to improve wellness and fitness. Assessment methods of physical activity/inactivity and fitness, in individuals and populations, will be critically analyzed. The scientific evidence of the link between physical activity/inactivity, health, diseases and aging will be discussed. The current guidelines for physical activity and the dose-response effect will be critically appraised and will be considered from the public health perspective. Determinants of physical activity/inactivity and at-risk groups or inactivity will be identified. Ecological models used to design interventions, policies and existing national physical activity promoting structures will be evaluated.

NUTR750 Selected Topics in Nutritional Sciences (3 CH)

This course aims to provide advanced discussion of selected and emerging current issues in nutritional sciences on topics of interest for the public, government, and industry. Course units/modules will be reviewed and developed each time the course is offered based on the existing gaps and interest of students.

NUTR800 Comprehensive Exam (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student's knowledge of his or her discipline, as well as the student's scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by an examination committee from the student's concerned department. It must be taken before the start of the student's fifth semester in the program. Students taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end of the student's fifth semester. A second unsuccessful attempt leads to immediate termination of the student's enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

NUTR805 Advanced Macronutrient Metabolism (3 CH)

This course covers metabolic control and regulation of macronutrients including carbohydrates, lipids and proteins in health and wellbeing and its association to various chronic disease states. The course will integrate cell biochemistry and physiology including enzyme and hormonal control of metabolism to examine the complex nature of various nutritional integrative processes. Furthermore, the relationship of macronutrients metabolic pathways in the pathogenesis of various conditions will be covered, focusing on protein malnutrition and ketoacidosis, hypercholesteremia and its effect on cardiovascular disease, carbohydrate metabolic disorders and inflammatory disorders of the gastrointestinal system.

NUTR810 Research Proposal (0 CH)

This is the mandatory research course that prepares the PhD students to develop and present their research proposal, on an original area in nutritional sciences including, but not limited to, experimental nutrition, community nutrition, human metabolism and clinical nutrition. In this course, students identify their research question, design the study to investigate the research question, in consultation with their PhD supervisor/s and advisory committee. A research proposal report will be developed by the students according to the Proposal Preparation Guidelines available at the College of Graduate Studies and will be orally presented to the students' supervisor/s and advisory committee. The successful completion of this course will provide the admission to candidacy.

Prerequisites

- NUTR800

NUTR820 Advanced Micronutrient Metabolism (3 CH)

This course is an advanced study of the interrelationships of micronutrients biochemistry, physiology (enzymes, and hormonal regulation), genetics, and nutrition. A consolidative approach to structure and function of the cell corelated to the metabolic needs and its response to the environment is taken. The course will provide a detailed analysis of evaluating the micronutrient requirements of humans in both normal and disease states. Conditions related to low intakes of Vitamins B, D and minerals Calcium and Iron will be covered.

NUTR830 Human Nutrition Assessment (3 CH)

In this course, methods of assessment of diverse nutritional factors (dietary, anthropometric, biochemical, clinical, and ecological) commonly used measurements to evaluate the nutrition status of individuals and populations throughout the lifecycle will be analyzed and critiqued. Selection of appropriate methods in research and nutrition assessment systems and the critical interpretation of the assessment data will be discussed.

NUTR900 Dissertation Research (30 CH)

This is the mandatory research course that prepares the PhD students through the dissertation and its defense on an original and independent research in areas including, but not limited to, experimental nutrition, community nutrition, human metabolism and clinical nutrition. In this course, students design and

conduct their research project then, critically evaluate their results, in consultation with their PhD supervisor/s and advisory committee.

NUTR910 Dissertation Defense (0 CH)

This the final course in the PhD curriculum in which students will prepare, submit and present their research work in an original area in nutritional sciences including, but not limited to, experimental nutrition, community nutrition, human metabolism and clinical nutrition. Students will demonstrate their Understanding of the literature in the field of study, the proper selection and execution of research methodology and a genuine contribution to knowledge in the chosen field by developing a thesis dissertation and by presenting orally their research work. The PhD dissertation must conform to the Guidelines for Thesis and Dissertation Preparation issued by the College of Graduate Studies. Students are expected to have at least two research papers considered for publication in peer-reviewed publications/journals before the final defense of the dissertation.

Clinical Psychology

PSY100 Introduction to Psychology (3 CH)

An overview of psychology: definitions, methods and fields. This course will cover history and development of psychology, research methods, the biological bases of behavior, sensation, perception, learning, memory, mental abilities, emotions, motivation, personality, adjustment, psychological disorders and treatment, and the individual in the group.

PSY105 Creative & Innovative Thinking Skills (3 CH)

This course covers creative and innovative thinking skills, focusing on the theoretical conceptualizations of creative and innovative thinking as well as the practical applications involved in fostering creative and innovative thinking. It will include the use of idea-generating techniques like SCAMPER, brain storming and mind mapping and examine how change and risk-taking behavior can influence innovative thinking. Case studies will be used to understand the creative process as it fuels innovation.

PSY201 Research Methods in Psychology (3 CH)

This course covers research methods in psychology and introduces students to the basic principles of the scientific method, the research designs as well as the skills necessary for successfully conducting a psychological research.

PSY202 Introduction to Behavioral Neuroscience (3 CH)

This course will provide students with a general introduction to the underlying biological principles and mechanisms which give rise to complex human cognitive, perceptual and emotional behavior. The course focuses on the anatomy of the nervous system, how it works to control behavior and sense the world, and what happens when it malfunctions. The laboratory hours will cover: some experimental techniques in biopsychology such as handling and care of laboratory animals, Running behavioral tasks such as spontaneous alteration, delayed matching and non-matching to sample.

Prerequisites

- PSY100

PSY205 Social Psychology (3 CH)

This course covers social influence, social cognition and social relations. This course will cover person perception, the self in the social world, attitudes; social influence processes; interpersonal attraction, personal relationships; positive social behavior (altruism and helping) and aggression; group behavior and processes

PSY303 Psychological Tests & Measurements (3 CH)

This course covers test selection, administration, interpretation, and construction applications in local populations and gives an overview on preparation and adaptation of foreign tests to suit local population, study of test validity and reliability individual and group administration and interpretation of tests in various fields, as well as the construction of simple tests.

Prerequisites

- PSY100
- STAT180

PSY304 Developmental Psychology (3 CH)

This course covers factors affecting human development, principles of development, aspects of development, bodily, mental, cognitive, social and emotional development during childhood, adolescence, adulthood, and old age.

PSY305 Cognitive Psychology (3 CH)

This course involves the scientific study of mental processes (or how the mind works). Topics include perception, attention, multiple memory systems, encoding and retrieval processes, knowledge, language, reasoning, problem solving, creativity and decision making. Students will learn the mental processes (when they study the neuropsychology of cognition) and the mental-like processes performed by computers (when they learn about artificial intelligence). Students will be connected to a CogLab to run experiments to test their own cognitive processes.

Prerequisites

- PSY100

PSY306 Abnormal Psychology (3 CH)

This is an undergraduate psychology course designed to expose students to the primary models for defining and evaluating normal and abnormal human behavior in UAE society. Students will be acquainted with the many ways in which biological, emotional, behavioral, and cognitive factors can contribute to distress or impairment, both to the individual and the people around him or her. Students will be exposed to models of how abnormal behavior can be defined, how it can be understood, and in a general sense, how it is usually treated.

Prerequisites

- PSY202 with a minimum grade D

PSY310 Research Methods in Psychology (3 CH)

This course analyzes research methods used in psychology and the acquisition of skills required to conduct simple research studies. Topics covered include scientific method, ethical issues, descriptive methods, correlation research, experimental methods, single-case, quasi-experimental, and program evaluation.

PSY312 Psychology of Learning (3 CH)

The aim of this course is to understand learning and show how the learning process is studied. The course shall place learning in its historical perspective, giving students an appreciation for the figures and theories that have shaped 100 years of learning theory research.

Prerequisites

- PSY100

PSY313 Educational Psychology (3 CH)

This course covers the principles and concepts of educational psychology. Topics include psychological principles of teaching and learning, planning and evaluation, student development, settings of class learning, intelligence and individual differences, and motivation in education and applications.

PSY314 Sensation and Perception (3 CH)

This course covers basic theory and research in sensation and perception. How we get information from the environment, and how do we make sense out of the information we receive. Topics include the five senses (touch, smell, taste, hearing, and vision). Color perception, depth perception, size perception, tactile perception, temperature perception, pain perception, olfactory perception, taste perception. Perceptual deficits and losses, perceptual development and aging.

Prerequisites

- PSY100

PSY315 Industrial Organizational Psychology (3 CH)

The main focus of this course is on understanding psychological concepts and principles in the world of work and its emphasis on the scientist-practitioner model. From the use of research methods in I/O psychology to predictions of human behaviors via psychological assessments, personnel decisions, staff training and development, performance appraisal, teamwork, employee attitudes, occupational health and work motivation are covered.

PSY316 School Psychology (3 CH)

The course covers the basic concepts of school psychology. It covers current perspectives in school psychology and its contributions to theory and practice, psychological and educational assessment of children (e.g., Roles of Diagnosis and Classification in School Psychology), and school psychological interventions (focus on children, staff, programs, and organizations).

PSY317 Psychology of Personality (3 CH)

This course covers the scientific study of normal personality development. Topics include the nature of personality theory, methods of assessment and research, and major theories.

Prerequisites

- PSY100

PSY401 Clinical Psychology (3 CH)

This is an undergraduate level course designed to familiarize students with the wide area of clinical psychology. Definition and history of the field are covered together with the various approaches used in clinical psychology. A brief overview of assessment methods, interviews, and testing skills are also covered. Various clinical interventions are discussed and current issues in the field are evaluated. Professional issues including student training, practice regulations, ethics, etc. are also highlighted. This course will also examine and evaluate various clinical concepts and practices from local cultural perspective.

Prerequisites

- PSY304 with a minimum grade D

PSY403 Experimental Psychology (3 CH)

This course examines the nature and role of experimentation in psychology, designing and conducting experiments. Topics include the role of experimentation in psychology; basic concepts, the development of experimental methods in psychology, experimental versus non experimental methods; training in designing and running experiments, analyzing data and writing the experimental report. Laboratory and field experiments are undertaken in the fields of sensation, perception, learning, memory and social behavior

Prerequisites

- STAT180
- PSY100

PSY413 Counseling Psychology (3 CH)

This course covers counseling psychology: theories and methods. This course covers definition, scope, and development of counseling psychology:; human development through the lifespan. Theories: trait-and-factor, behaviorism, client-centered, cognitive; assessment, counseling; fields of counseling especially for special groups, ethical standards.

Prerequisites

- PSY304

PSY414 Introduction to Health Psychology (3 CH)

The purpose of this course is to provide the students with an introduction to the field of health psychology which explores how psychological, social, and biological factors affect health and illness. This course covers health beliefs and behavior, illness cognitions, obesity and eating behavior, stress, illness

and coping, cardiovascular disease, cancer, living with (or management of) chronic and terminal disease and living with pain, AIDS, and health outcome measures.

PSY416 Differential Psychology (3 CH)

This course covers basic concepts and methods of individual differences, with emphasis on gender differences. It includes the nature, characteristics, distribution and determinants of individual normality and abnormality. Theories in clinical psychology; psychoanalysis, behaviorism and differences; group and individual differences in intelligence, achievement, aptitudes, attitudes, motives, and traits; and the role of the psychology of individual differences in educational and vocational fields as well as an overview and research on gender similarities and differences are also included.

Prerequisites

- PSY100

PSY417 Neuropsychology (3 CH)

Neuropsychology is a branch of neuroscience that traditionally has relied more on clinical case studies (brain damaged patients) as a source of information for identifying the functional significance of various regions of the brain. The course provides the basis for understanding/diagnosis/and treatment of most common neuropathological and neurobehavioral syndromes (e.g., traumatic brain injury, aphasia, dyslexia, cerebrovascular accidents [strokes], dementia, etc.). Prerequisite: PSY 202

Prerequisites

- PSY202 with a minimum grade D

PSY419 Seminar in Psychology (3 CH)

This seminar-based course offers an in-depth study of selected topics in human behavior. Topics vary each semester according to the wide specialization variety of faculty members.

Prerequisites

- PSY452

PSY452 Practicum (6 CH)

Developing the basic skills necessary for providing psychological services in psychological clinics or schools. In this course students will be introduced to training in interviewing, diagnosing, case study, writing case reports, rehabilitation programs, and working with a team of specialists. (Student should take this course over a complete semester. No courses are allowed to be registered during this course).

PSY454 Research Project/Internship (6 CH)

This is a practical course aiming at giving the student at the final semester a practical experience in work place, and in research design, collection and analysis of data and reporting findings. (Student should take this over a complete semester. A maximum of 6 Cr. Hrs. of courses can be registered in addition to this course).

PSY485 Integrated Capstone (3 CH)

The capstone course is a hybrid academic/practical training course in which students develop specifically conceived academic topics and integrate these with practical skills/experiences gained in a simulated clinical context role-play. The focus of the course is to introduce students to the notion of evidence based psychological therapies and how some of these are used to treat common mental health problems. As well as focusing on evidence-based therapies, the course draws on, and integrates, different areas within the discipline of psychology to illustrate and enrich the teaching.

Prerequisites

- PSY401 with a minimum grade D or PSY306 with a minimum grade D

PSY521 Advanced Clinical Psychology (3 CH)

This course takes a practical focus on clinical skills. Students will be trained to practise and develop interviewing skills, listening skills, and communication skills, as well as application of ideas around psychopathology

PSY522 Cross Cultural Issues (3 CH)

This course introduces the student to the field of culture and therapeutic process. The emphasis here is mainly on developing cultural competencies in dealing with people of different backgrounds and learning how to incorporate clinical strategies or guidleines in working with a variety of clients. There is also substantial theoretical knowledge discussed in the class. The course begins by enhancing student's self-awareness as a cultural being, exploring a multitude of ways to conduct an intake interview, learning alternative ways of assessing culturally diverse clients, incorporating cultural issues into case readings and their implications for therapy, developing treatment plans embracing different cultural contexts, and evaluating best cultural practices in the areas of help seeking, assessment, treatment and student training and supervision.

PSY523 Advanced Psychopathology (3 CH)

This course will focus on developmental and biosocial approaches to psychopathology. In addition to the ICD 10 and DSM-5, the students will be trained on comorbidity and phenomenological approaches to mental disorders. The course will also provide an overview of the research on each of the major categories of mental disorders organized around their prevalence, phenomenology and development over time.

PSY524 Adult Assessment (4 CH)

This course presents the principles and practices of the Wechsler Adult Intelligence Scale (WAIS), diagnostic interviews and self-report measures such as the Minnesota Multiphasic Personality Inventory (MMPI). Students administer, score, interpret and write reports communicating results of selected instruments. Issues related to diagnosis and treatment planning is addressed. Cultural and ethical issues relevant to assessment are topics to be explored. (Prerequisite: Tests and Measurements).

Prerequisites

- PSY303 with a minimum grade D

PSY526 Child & Family Therapy (3 CH)

This course is designed to provide a comprehensive overview of psychological interventions and their theoretical underpinnings in guiding child and family therapy practices. The course focuses on equipping students with the knowledge and skills required to understand and treat psychological issues that impact children and families. Building on this knowledge, students are trained to acquired and master skills needed to enhance family wellbeing and effectively address issues that impact children and families. Apart from focusing on challenges, crises and dysfunction that commonly impact children and families, the course will also highlight the importance of therapist as an advocate of positive changes and wellness-based counseling/psychotherapy that can promote optimal psychological wellbeing. As students progress in learning the most established and current theoretical and practical approaches in child and family therapy, they will have the opportunity to explore the current research findings that advances the knowledge and practices in the field.

Prerequisites

- PSY521 with a minimum grade D
- PSY523 with a minimum grade D

PSY527 Child Assessment (4 CH)

This course covers knowledge and skills relevant to child assessment. It explores the theoretical frameworks utilized in the development of cognitive assessment instruments and procedures, and explains the administration, scoring, and interpretation of the Wechsler Pre-school and Primary Scale of Intelligence (WPPSI), the Wechsler Intelligence Scale for Children (WISC), structured child interviews, the Mental Status Exam (MSE), objective self-report and parent report for issues such as executive function, depression, attention deficit, hyperactivity disorder and conduct problems.

Prerequisites

- PSY303 with a minimum grade D

PSY528 Psychotherapy: Theories & Techniques (3 CH)

This course focuses on the main approaches to psychotherapy such as the psychodynamic, cognitive, behavioral and humanistic therapies and techniques. More emphasis will be given to the use of videotapes of seasoned clinicians utilizing psychotherapeutic techniques. Class meeting will also focus on practicing basic skills such as therapeutic rapport, therapeutic interviewing skills, and nondirective dialogue with patients. Models for interviewing children and families would will also be learned. Students will also undertake an experiential project outside of class that will help them personally explore the psychotherapeutic process.

Prerequisites

- PSY521 with a minimum grade D
- PSY523 with a minimum grade D

PSY529 Advanced Behavioral Statistics (3 CH)

This course provides instruction in advanced methods in multivariate statistics at both conceptual and applied levels .This course will require students to designate the output designs utilized in published research. Topics: multiple regression, factor analysis, discriminate analysis, Manova, Mancova. The computers are used for data management and analysis.

Prerequisites

- STAT180

PSY621 Research Design and Methods (3 CH)

This course offers a review of research methods in clinical psychology; critical thinking uses as a main approach for the systematic process to answer questions or to test hypothesis. Write an integrative review of the selected

topic in clinical psychology literature .Evaluate methods, designs, and results of published clinical research. To understand how issues of ethnicity, culture, and diversity are important when designing clinical researches. Topics to be covered include experimental and quasi-experimental designs, observational methods, single case, research ethics, diversity issues in clinical research, Both qualitative and quantitative research strategies are covered.

PSY622 Seminar in Mental Health (3 CH)

This course is meant to enable professors to select the mental health problems and issues to be addressed. Topics include, but not limited to, mental health problems that are not covered in this MSc curriculum, contemporary mental health problems and issues, current controversies in mental health, mental health services in the UAE, major culture-bound syndromes in the UAE, and other health related problems and issues.

PSY623 Neuropsychology (3 CH)

The emphasis is on the neuroanatomy and brain-behavior relationship. The focus is on neuropsychological disorders such as disorders of perception, language, movement, and neuro-degenerative diseases. Neuropsychological assessments for different disorders will also be discussed.

PSY624 Personality Perfomance-based Measures (3 CH)

A study of the administration, scoring, and interpretation of personality and projective assessment instruments, and the rationale underlying the construction of each.

PSY626 Psychopharmacology (3 CH)

This course focuses on the effect of drugs on behavior and the nervous system, with emphasis on the interaction between biological, psychological and sociological factors on drug use. Some of the topics examined are: basic principles of pharmacology, physiological effects of drugs and difference between psychoactive drugs. The course also discusses the use of folk and herbal medicine and the interaction between them and psycho-active drugs.

PSY627 Advanced Psychotherapy (2 CH)

This course focuses on specific evidence-based psychotherapies, namely Cognitive Behavior Therapy focusing on specific disorders (CBT) and Mindfulness-based Cognitive Therapy (MBCT). Eight weeks will be assigned to train students on each of the above-mentioned therapies. Students meet once a week.

Prerequisites

- PSY528 with a minimum grade D

PSY628 Master's Thesis (3 CH)

During the completion of the master thesis, the student will gain experience across all the stages of an empirical research study in a selected area of clinical psychology. The study will allow the student the opportunity to apply the varied knowledge and skills acquired across the course of the degree. The student will select a topic of interest and identify a faculty member to provide supervision throughout the process. Generally, the Master's thesis is empirical, requiring the collection of data; however, in some circumstances, a thesis that employs a literature review-based methodology may be allowed. The thesis is examined via an oral defense.

PSY629 Individual Tests (Children) (3 CH)

The course includes a review of basic psychometrics and classification systems for child psychopathology. Focuses on different types of assessment procedures used with children as well as the assessment/diagnostic process. Attention given to specific psychological disorders of children and adolescents. The course includes supervised administration, scoring and interpretation of individual tests. Student administer, score and interpret several tests and are expected to achieve proficiency in writing comprehensive psychological reports.

PSY631 Internship I (2 CH)

A minimum of 300-clockhours of supervised experiences in a setting in which psychological services are provided. The essential purpose of the first

practicum is to ensure that interns have appropriate opportunities to apply, under supervision, the knowledge and skills acquired in the program. During this practicum interns will gain experience in providing clinical psychology services for clients and will develop skills in the range of professional and administrative activities involved in professional clinical practice.

PSY632 Health Psychology (2 CH)

An introduction to health psychology that provides a general overview of the discipline of health psychology, including its origins, concepts and methods. A number of types of intervention efforts will be explored, including risk factor modification, secondary preventive/rehabilitative efforts for chronic illness and community/ public health interventions. Some of the major areas and topics in health psychology are explored. Students will acquire skills and knowledge that should enhance their critical thinking and their understanding of the relationship of cognition, emotion, motivation, and behavior on health.

PSY633 Scientific and Professional Ethics (2 CH)

The course covers the ethical guidelines and standards related to the research and practice of psychology. Ethical, professional and legal conflicts are discussed. The goal of the course is to ensure familiarity with various laws, standards and guidelines that regulate the practice of psychology and to develop ethical problem solving skills. Special emphasis is given on developing laws and ethical practices to the needs of the local society.

PSY634 Internship II (2 CH)

A minimum of 300-clockhours of supervised experiences in a setting in which psychological services are provided.

Speech Language Pathology

SLP106 Introduction to Speech and Language Disorders (3 CH)

This course is a general introduction to developmental and acquired speech and language disorders. It provides the students with a basic understanding of the linguistic perspectives on epidemiology, etiology, symptomatology and assessment of speech and language disorders, as well as their implications for language science. Foundation clinical practice skills will be introduced (e.g., simulations) to allow students to develop their clinical skills.

SLP236 Neurology for Speech, Language & Hearing (3 CH)

This course provides an introduction to the fundamentals of neuroanatomy and physiology for communicative functions including speech, language, and hearing. The course will cover the neurological aspects of typical speech, language and swallowing functions across the lifespan and will introduce the role of the peripheral and central nervous system in communication and swallowing functions.

Prerequisites

- SLP246 with a minimum grade D

SLP246 Speech Physiology (3 CH)

This course is a study of the anatomy and physiology of the articulatory, auditory and nervous systems as involved in speech production and perception. The course familiarises the students with the aspects of human anatomy relevant to speech and language (the respiratory system, laryngeal-phonatory system, oropharyngeal–articulatory system, auditory system, nervous system) and their physiology, focusing on how the function of individual anatomy corresponds to the production and perception of speech communication, as well as presenting common disorders.

Prerequisites

- Pre/Co SLP106 with a minimum grade D

SLP256 Introduction to Audiology/Hearing Sciences (3 CH)

This course introduces students to the profession of audiology and provides an overview of auditory function and the basic principles of audiologic assessment. The course includes descriptions of the physical and psychological properties of sound and the basic anatomy and physiology of the auditory system. It additionally explains basic diagnostic and screening procedures of the auditory mechanism which aid students to recognize common auditory (and related) disorders and facilitate their management. Students also conduct a field project to interview hearing-impaired adults and audiology specialists.

SLP276 Child Language Development (3 CH)

This course will provide an understanding of typical child language development, including the acquisition of phonetics and phonology (the sound system of the language), morphology (the structure of words), and syntax (the structure of sentences). It will consider basic theories of child language development expanding the scope to the acquisition of more than one languages (bilingualism). Finally, it will discuss the conditions and symptoms associated with atypical language development and child language disorders. Foundation clinical practice skills will be introduced (e.g., simulations) to allow students to develop their clinical skills in child language development.

Prerequisites

- LNG100 with a minimum grade D

SLP286 Voice Disorders (3 CH)

This course offers students a basic introduction to the assessment and treatment of articulation and phonological disorders in children and adults. Students will develop the skills to effectively enumerate the characteristics that define and differentiate articulation and phonological disorders and the individuals who demonstrate them and to assess, plan, and implement appropriate intervention strategies for persons presenting with articulation, voice, and/or phonological disorders with functional or organic etiology.

Prerequisites

- Pre/Co LNG220 with a minimum grade D

- Pre/Co SLP106 with a minimum grade D

SLP306 Early Childhood Language Disorders (3 CH)

This course introduces students to developmental speech and language disorders in children, examining the phonological, syntactic, semantic and pragmatic aspects of these disorders including Specific Language Impairment, cerebral palsy, split palate, Down syndrome and autism. It provides students with knowledge and skills required to assess and remediate language impairments in children from the pre-linguistic level through preschool years and with an understanding of their interaction with other developmental milestones. Students are instructed in understanding language impairment, assessment, and intervention, collecting and analyzing language samples, and the skills required to assess emerging diagnostic and treatment practices in this area.

Prerequisites

- SLP106 with a minimum grade D

SLP316 Articulation and Phonological Disorders (3 CH)

This course offers students a basic introduction to the assessment and treatment of articulation and phonological disorders in children and adults. Students will develop the skills to effectively enumerate the characteristics that define and differentiate articulation and phonological disorders and the individuals who demonstrate them and to assess, plan, and implement appropriate intervention strategies for persons presenting with articulation, voice, and/or phonological disorders with functional or organic etiology.

Prerequisites

- SLP106 with a minimum grade D
- LNG220 with a minimum grade D

SLP326 Fluency Disorders (3 CH)

This course presents the theory, diagnosis and treatment of fluency and motor speech disorders throughout the lifespan. It reviews the symptomatology of these disorders, surveys theories of stuttering, and examines normal versus

abnormal fluency development and the anatomy and physiology of speech production as it relates to motor speech disorders and their treatment.

SLP336 Deglutition and Dysphagia (3 CH)

This course will provide students with the basics of the anatomy and physiology of the oral, pharyngeal, esophageal functions related to swallowing and eating. Specific knowledge of the etiologies for dysphagia will be covered. It also provides students with the framework for the physical and laboratory evaluation and treatment of dysphagia.

Prerequisites

- SLP246

SLP356 Adult Neurologic Communication Disorders (3 CH)

This course introduces students to speech and language disorders in aging adults, and highlighting the social impact and issues that they present. It provides students with knowledge and skills required to distinguish normal aging processes from disordered language, and assess and remediate language impairments of different etiologies in adults. Students are instructed in understanding language impairment, assessment, and intervention, collecting and analyzing language samples, and the skills required to address challenges specific to the aging population.

Prerequisites

- Pre/Co SLP106 with a minimum grade D

SLP366 Motor Speech Disorders (3 CH)

This is a core course for the newly proposed BA in Communication Sciences and Disorders and covers an important area within the spectrum of language disorders. It therefore constitutes an essential part of the professional

preparation for graduates of the program to become certified professionals in the fields of speech pathology and communication disorders.

SLP406 Evaluation, Diagnosis & Report Writing (3 CH)

This course will provide students with components of a comprehensive, functional assessment of an individual's speech, language, and related communication abilities. Students will learn the benefits and limitations of various assessment tools in terms of their appropriateness for the setting, individual, and the cultural context. Students will acquire decision-making processes associated with developing appropriate management programs for people with communication disorders.
Prerequisites

- SLP316 with a minimum grade D
- SLP336 with a minimum grade D

SLP416 Medical Aspects of Speech Language Pathology (3 CH)

This course constitutes a study of the medical and biophysical bases of communication disorders and the relevant medical management of such issues as part of the total treatment program within the medical setting. Students will explore the topics most commonly managed in medical settings and the clinical practices of speech language pathology that are specific to and used in medical settings and will develop expertise in clinical instrumentation.
Prerequisites

- SLP106 with a minimum grade D
- SLP306 with a minimum grade D

SLP426 Augmentative and Alternative Communication (3 CH)

This course provides students with a detailed overview of the most clinically relevant topics related to Augmentative and Alternative Communication strategies and supports. The course content covers demographic/background information, an in-depth understanding of assessment and treatment, and an overview of evidence-based paradigms associated with augmentative and alternative communication strategies across the lifespan. Students will develop

their core knowledge and skills through understanding current research, selecting and applying appropriate assessment procedures, creating treatment plans, practicing creating example AAC devices, in-class participation and activities, and performance on objective assignments. These processes will serve to ensure adequate preparation of students for assessment and treatment in clinical practices relating to AAC.

Prerequisites

- Pre/Co SLP106 with a minimum grade D
- Pre/Co SLP246 with a minimum grade D

SLP456 Practicum 2: Clinical Methods & Therapy (6 CH)

This course provides supervised clinical experience in the assessment and treatment of speech, language, and/or swallowing disorders. Students must attend a minimum of 20 hours per week of supervised assessment and intervention experience (i.e., a minimum of 5 hours a day for 4 days in the week) for a minimum of 13 weeks in the semester to ensure a minimum of 260 hours of practical training for the course
Prerequisites

- SLP106 with a minimum grade D
- LNG455 with a minimum grade D
- SLP306 with a minimum grade D

SLP466 Practicum 3: Advanced Clinical Method & Therapy (9 CH)

This course provides supervised clinical experience in the assessment and treatment of speech, language, and/or swallowing disorders. Alternatively, students may focus on curriculum and methods of determining eligibility and providing clinical services to children and adolescents with communication impairments in school settings. Students must attend a minimum of 20 hours per week of supervised assessment and intervention experience (i.e., a minimum of 5 hours a day for 4 days in the week) for a minimum of 13 weeks in the semester to ensure a minimum of 260 hours of practical training for the course.

Prerequisites

- SLP106 with a minimum grade D
- SLP306 with a minimum grade D
- SLP456 with a minimum grade D
- LNG455 with a minimum grade D

College of Science

Biology

BIOC100 Basic Biology I (3 CH)

This course aims at developing the basic concepts that form the crux of life from both structural and functional perspectives. It includes cellular functioning and organization and the transformation of energy. It also introduces the student to the continuity of life from genetic and molecular perspectives.

BIOC155 Biology Laboratory 1 (1 CH)

This laboratory course aims at introducing the students to the general biology laboratory I knowledge, skills and measurements in common use in life sciences; applying these knowledge and skills in writing of laboratory reports, using the light microscope and making measurements, using of pipettes and preparing of solutions. The major theme will be devoted to describe and analyze the molecules of life, light microscopy, fine cell structure and function, cell membranes structure and function, cell division and staining procedures. Also, students study some of the physiological concepts in animals and plants e.g. photosynthesis, respiration, and osmosis.

Prerequisites

- BIOC100 with a minimum grade D

BIOC160 Basic Biology II (4 CH)

Biology II covers diverse topics including evolution, systematic, diversity of life, plant form and function, animal form and function, and conservation biology. The course is intended to complement Basic Biology I (which covers cellular and biochemical basis of life) by covering the basic concepts relating to whole-organism topics.

Prerequisites

- BIOC100

BIOC165 Biology Laboratory 2 (1 CH)

This laboratory course aims at introducing the students to the general biology laboratory II knowledge, skills and safety; applying these knowledge and skills in writing of laboratory reports, and using of light microscope. The major theme will be devoted to describe and analyze the plant ecological adaptations, plant growth and anatomy, Animal dissection, structure and function of tissues, plants and animals diversity.

Prerequisites

- BIOC160
- BIOC155 with a minimum grade D

BIOC205 Basic Biology II (3 CH)

This course aims at covering diverse topics including evolution, speciation, systematic, diversity of plants and animals, plant form and function, animal form and function, and conservation biology. The course is intended to complement Basic Biology (which covers cellular and biochemical basis of life) by covering the basic concepts relating to whole-organism topics.

Prerequisites

- BIOC100 with a minimum grade D

BIOC214 General Biology Lab (1 CH)

This laboratory course aims at introducing the students to the basic laboratory knowledge, skills and measurements in common use in life sciences; applying these knowledge and skills in writing of laboratory reports, using of light microscope, pipetting, diluting and preparing of molar solutions. The major theme will be devoted to describe and analyze the molecules of life, cell structure and function, and plants/animals diversity, structure and function. The latter includes important physiological concepts e.g. photosynthesis in plants and homeostasis in animals.

Prerequisites

- BIOC205 with a minimum grade D

BIOC250 Basic Ecology (3 CH)

This course focuses on the science of ecology with historical background and its relationships with the other relative sciences. It examines ecosystem structure and functions, energy flow and matter transfer within the food chain among different trophic levels. The course covers the biogeochemical cycles and their components, examples of the different ecosystems in the world biomes. The course contents also cover population attributes such as density, age structure, mortality, natality and population growth rate within an evolutionary context. Community attributes such as succession, food web, community assembly and diversity are examined. A laboratory session (3 hours per week) is included in this course.

Prerequisites

- BIOC160 with a minimum grade D

BIOC270 General Genetics (3 CH)

This course aims at developing a clear understanding of genetics. It includes Mendelian genetics, modern genetics and molecular basis of genetics, the applications of genetics in the field of medicine in terms of detection of genetic diseases, prevention, treatment and other applications as well.

Prerequisites

- BIOC100 with a minimum grade D

BIOC275 Genetics Laboratory (1 CH)

This course is designed to examine the gene as a unit of transmission, a unit of function, and a unit of mutation. The course emphasizes the relationship between classical Mendelian genetics and the modern molecular understanding of gene structure and function. Illustrates the principles of genetics through student experiments; utilizes classical genetic techniques as well as molecular

techniques to study the nature of genetic material. Genetics lab meets for three hours per week.
Corequisites

- BIOC270 or BIOL270

BIOC290 Cell and Molecular Biology (3 CH)

This course aims at providing an overview of the molecular basis to cell structure and function. This course will approach this discipline by exploring a series of basic questions, which will provide a conceptual framework for dealing with our evolving understanding of cells. This course will describe classical and modern experiments provide a basis for our present understanding of how cells function at the molecular level. Upon completion of this course, the student will be able to demonstrate the competencies in the following subjects: cell organization and cell communication, cycle control and programmed cell death, DNA replication, transcription, and protein synthesis.

Prerequisites

- BIOC270 with a minimum grade D

BIOC480 Research Project (3 CH)

This course aims to cultivate investigative skills, giving students the opportunity to conduct an original scientific research project under the guidance of an experienced member of faculty. This is not a course about existing knowledge: it is a course in which students pioneer the unknown; formulating an original question, thinking through and implementing innovative ways to answer it, interpreting results, and communicating the whole investigation by means of a written report and an oral presentation.

BIOC490 Advanced Bio-applications (2 CH)

The course consists of laboratory work. This practical part of this course aims at providing students with important practical skills that benefit them in their future work as well as for future postgraduate studies. The course will consist of three modules that cover advanced techniques of the three tracks of the department: Cell and Molecular Biology, General Biology and Environmental Sciences.

Prerequisites

- BIOC480

BIOC495 Seminar (Capstone) (1 CH)

This course aims at articulating students to special topics and current literature in the biological sciences, including proper use of library resources for literature review and computer search. This course, which is designed for senior-level undergraduates, will eventually follow a journal club format. Students will learn how to critically evaluate primary research papers and present their evaluations in a group setting. These skills will be valuable for students planning to enter a graduate program in the biological sciences.

BIOE212 Biology of Invertebrates (3 CH)

This course takes an integrative approach towards understanding animals. We will explore fundamental questions about animals from the perspective of different organizational levels and experimental approaches. We will also examine a wide diversity of animals, including their ecology, phylogeny, extending our interest beyond the well-known model organisms. A three-hour laboratory component is included in this course that will include a survey of all major invertebrate groups, with special emphasis on functional morphology in relation to phylogenetic relationships.

Prerequisites

- BIOC160

BIOE214 Biology of Vertebrates (3 CH)

This course focuses on the origin and diversity of vertebrates, with emphasis on functional morphology and locomotor apparatus; solutions to problems of heat and cold, osmotic stress, and oxygen availability; sensory systems and communication; growth and development; life history and modes of reproduction. Students are introduced to the relationships between all chordates through a close examination of form and function from an evolutionary perspective. Emphasis is placed on the link with evolutionary adaptation and constraints that permitted certain groups to thrive in certain environments. A three-hour laboratory will examine specimens of all major

vertebrate groups, with special emphasis on functional morphology, phylogeny and adaptive radiation within and between major vertebrate groups.

Prerequisites

- BIOC160

BIOE230 Microbiology (3 CH)

This course aims at studying the history and scope of microbiology, and microscopy. It includes studying the structure of prokaryotic and eukaryotic cells, microbial nutrition and types of microbial growth, metabolism and energy generation, microbial control by physical and chemical agents, the bases of bacterial taxonomy and genetics and an introduction to the general characteristics and diversity of the various groups of microorganisms including bacteria, fungi, viruses, protozoa and micro-algae.

Prerequisites

- BIOC100 with a minimum grade D

BIOE240 Principles of Environmental Science (3 CH)

This course attempts to provide an overview of environmental science: the interactions between humans and the environment, with an emphasis on the natural science elements of environmental issues. More specifically, this course is an introduction to the various ways that humans depend on the earth's natural resources, and how human activities directly and indirectly affect the earth and its human and non-human inhabitants. In addition, the course will explore how policy, individual behavior, and technology can prevent, control, and reverse environmental harm.

BIOE250 Biodiversity and Evolution (3 CH)

This course aims at covering the diversity at the species, genetic, and ecosystem levels. Evolutionary processes controlling biodiversity and extinction are also explained. Topics covered include hereditary mechanisms leading to genetic diversity, description of biodiversity in different kingdoms, mechanisms leading to divergence of species and diversification, evolution of

different life history patterns, and the conditions that lead to extinction of species.

Prerequisites

- BIOC100 with a minimum grade D

BIOE310 Insect Diversity, Ecology, and Systematics (3 CH)

This course introduces students to the biology of insects. It discusses classification, ecology, structure, and function of insects. In addition, students will learn about insect diversity, their role in natural ecosystems, the basics of their physiology, development, and behavior, and the many important ways they affect human life. A three-hour laboratory component is included in this course that will emphasize functional morphology and adaptations of different insect taxa.

Prerequisites

- BIOC250

BIOE320 Population and Community Ecology (3 CH)

Community ecology allows us to understand the natural world in terms of different species interacting with each other and with their physical environments. In this course, we will explore the principles of how communities are assembled, how species influence each other through competition, predation, or mutualism, how energy and matter flow through communities, and how this all relates to the structure of communities. We will consider the stability and complexity of ecological communities, and explore the dynamics which can arise through the interactions between the component parts of an ecological community. Students will have the opportunity to apply what they learn to real environmental issues; working actively in the lab to investigate real ecological communities and propose reasoned solutions based on their own original hands-on analysis. A three laboratory component is included in this course highlighting laboratory and field based exercises examining interactions within ecological communities.

Prerequisites

- BIOC250

BIOE330 Diversity and Biology of Fungi (3 CH)

This course aims at introducing a complete idea about fungi. It includes the definition of fungi, their structure, nutrition, growth, reproduction, economic and medical importance, and a taxonomic study of the major fungal groups through studying the life cycle and properties of one or more important fungi from each group family.

Prerequisites

- BIOE230 with a minimum grade D

BIOE332 Biology of Parasites (3 CH)

The course starts by introducing the biology of parasites including the history of the discipline, its relationship, and contributions to other sciences as well as its underlying concepts and terms. A concise overview of immunology, pathology, and epidemiology are then followed to comprehend the various facets of a host-parasite relationship. The core of the course will be given to detailed discussions of some micro- and macro-parasites that cover the major parasitic groups. The aspects to be covered include taxonomy, biology, ecology, pathology, immunology, social and economic impact, life cycle and mode of transmission, epidemiology, diagnosis, and treatment. The problem of drug resistance, control, and prevention, efforts for vaccine development; will be discussed wherever appropriate. The course ends with a discussion of the interplay between parasites and their hosts. A three-hour laboratory component examining major parasite groups is included in this course.

Prerequisites

- BIOC250 with a minimum grade D

BIOE340 Biology and Diversity of Mammals (3 CH)

This course provides a survey of mammals' major taxa, where it explores the diversity, taxonomy, distribution, and status of living mammals. There will be special emphasis on the mammals of Arabia. A three-hour laboratory

component is included in this course that will examine systematics, functional morphology, and adaptive radiation in mammals.

Prerequisites

- BIOC250 with a minimum grade d

BIOE350 Plant Anatomy and Physiology (3 CH)

Students will study the processes involved in plant growth and development from cells and tissues to plant communities, the functional anatomy and adaptations of plants and the ecophysiology of natural and managed ecosystems. Students will gain an understanding of the vital link between the function of a plant and its anatomy and morphology and the transfer processes of the soil-plant atmosphere system.

Prerequisites

- BIOC160

BIOE355 Animal Anatomy and Physiology (3 CH)

This course aims at covering the interplay and communication that coordinates cells into organ systems and organisms as whole, with especial emphasis on form and function in animal groups. Different organ systems including nervous system, hormonal system, cardiovascular system, respiratory system, immune system and urinary system will be discussed emphasizing how these systems are integrated and how homeostatic is maintained during health or challenged under conditions of disease and stress.

Prerequisites

- BIOC160

BIOE360 Oceanography (3 CH)

The course is a multidisciplinary one that focuses on the main Oceanographic topics, including the principals of the different oceanic studies such as,

Physical Oceanography, Geological Oceanography, Chemical Oceanography, Biological Oceanography, and Marine pollution as well as the law of the sea.

Prerequisites

- BIOC160

BIOE370 Botany (3 CH)

A study of the basic principles of plant life. Topics of study include: Plant Essential to Human Life, structures and functions of flowering plants and their cells, tissues, flowers, fruits, and seeds, growth and development of plants from seed to maturity, pollination and fertilization. Related investigations take place during three hours of lab each week. Laboratory topics include: a microscopic study of tissues, and study the diversity of plant parts (flowers, fruits and seeds). A greenhouse is available for class use.

Prerequisites

- BIOC165

BIOE380 Desert Ecology (3 CH)

This course aims at covering the general history and evolution of desert ecosystems. Topics covered include the biological and physical factors that shaped unique adaptations of desert organisms, the interactions dominating and influencing food webs, biodiversity, human impact, and future of deserts.

Prerequisites

- BIOC250

BIOE390 Wildlife & Rangeland Management (3 CH)

This course aims at studying applications of ecology especially relevant to wildlife and rangelands. It reviews the principles that underlie ecological processes and the extent to which these are used in environmental management. The course starts with an analysis of the characteristics of wildlife populations and their management and then integrates habitat and landscape characteristics in rangeland management. The course evaluates

overgrazing by domestic animals as an important cause of rangeland degradation using examples from around the world. The course then examines wildlife and rangeland management options that can be used to maintain healthy wildlife populations.

Prerequisites

- BIOC250

BIOE391 Field Ecology (3 CH)

This course introduces students to survey methods in ecology using a hands-on approach. Through lectures, problem-solving exercises, and a major field/laboratory component, students will develop the ability to study organisms and communities in the field and utilize them in assessing environmental health.

Prerequisites

- BIOC160 with a minimum grade D

BIOE425 Principles of Ecological Modeling (3 CH)

This course aims at providing the fundamentals of ecological modeling with applications primarily to the major ecological problems and natural resources. The course provides a comprehensive and extremely clear treatment on the development, implementation, use and testing of ecological models. It embraces and covers the diverse approaches used by ecologists in expressing ecosystems interactions through model simulation and prediction approaches.

Prerequisites

- BIOC250

BIOE435 Bacteriology (3 CH)

This course aims at studying the bacterial cell, and the criteria used in the differentiation and identification of bacteria. It includes the classification of bacteria into different groups with examples of the most common genera and

species in each group, and the economic and medical importance of bacteria to man and the environment.

Prerequisites

- BIOE230

BIOE436 Molecular Ecology (3 CH)

This course provides an overview of molecular tools used in the study of ecological and evolutionary processes in natural populations and their impact on biodiversity. A hierarchical approach is used to examine ecological processes from studies involving individuals, parentage, kinship, population structure, species identity, community genomics using molecular markers. Students will become familiar with methods, their strengths and limitations as well as data analytical techniques. Discussions will include conservation genetics, applications to plant breeding and surveillance of genetically modified organisms.

Prerequisites

- BIOC250
- BIOC270 with a minimum grade D

BIOE450 Biology and Diversity of Birds (3 CH)

This course is an advanced undergraduate survey of the biology and diversity of birds. The course focuses on evolutionary biology, functional morphology, physiology, systematics, ecology and behavior. The course will explain concepts leading to understanding of evolutionary hypotheses, ecological processes, physiological and neurobiological mechanisms, and behavioral characteristics using birds as examples. It will emphasize on methods of conducting scientific research, from collecting data on birds to reading, writing, and interpreting the scientific literature, using birds as model organisms. A three-hour laboratory is included in this course that will examine diversity, functional morphology and adaptations in birds.

Prerequisites

- BIOC100 with a minimum grade D

BIOE453 Environmental Toxicology (3 CH)

The course aims at introducing a profound knowledge of the fundamental concepts of toxicity and its ecological implications. It includes a detailed study of the classification of toxicants and pollutants, the principal physiological mechanisms governing the action of these pollutants and some general aspects of pollution stress on individuals, populations and ecosystems.

BIOE454 Marine Biology (3 CH)

This course aims at developing a clear understanding of the basic concepts in marine biology as an integrated part of the student's overall curriculum. It includes physico-chemical properties of the water, marine biodiversity, plankton, nekton, benthos, seaweeds, kelp forest, coral reefs, marine reptiles, birds, marine mammals and mariculture.

Prerequisites

- BIOC250 with a minimum grade D

BIOE455 Ecology of Pathogens (3 CH)

This course aims to examine the distribution patterns of pathogens in natural conditions, quantitative aspects of sampling them, their role in host population dynamics and regulation. By examining these patterns, the course will illustrate the linkages between patterns of abundance in natural ecosystems in relation to transmission and persistence of pathogens. The role of disease in altering host distributions will be linked to conservation and human well-being.

BIOE457 Animal Behavior (3 CH)

This course is an advanced level survey of modern approaches to the study of animal behavior, emphasizing the integration of ecological, evolutionary, ethological, and physiological approaches.

Prerequisites

- BIOC250 with a minimum grade D

BIOE459 Conservation Biology (3 CH)

The course explores the diversity of life, how that diversity has changed over Earth history, and how human disturbance now threatens that diversity. We begin the course with the study of biodiversity globally. We then explore a number of conservation topics, including species conservation, global biodiversity, conservation genetics, community- and ecosystem-level conservation, habitat fragmentation, conservation reserves, and ecological restoration.

Prerequisites

- BIOC160 with a minimum grade D

BIOE598 Selected Topics (1 CH)

The course is taken only in case the courses offered within the MSc program do not satisfy the student's academic needs. This course aims at filling-in knowledge gaps in topics closely related to the students' research work and expected expertise. This course has to be based mainly on direct contacts (Faculty/Student) in which the faculty member will specifically address curricular issues and topics raised by the student's supervisor at the start of the semester. Term papers and article reviews could be incorporated within the assessment plan of the course. The research topic (ie. Thesis title) of the student is to be communicated to the instructor of this course, in order for him/her to efficiently plan for the selected topics to be covered. The students' supervisor is responsible to identify and contact the faculty member who will teach this course.

BIOE599 Independent Study (3 CH)

The course is taken only in case the courses offered within the MSc program do not satisfy the student's academic needs. This course aims at filling-in knowledge gaps in topics closely related to the students' research work and expected expertise. This course has to be based on the student's independent learning. Learning may be based on term papers, literature review and presentations on topics closely related to the specific field of study. Depth of the topics covered is a key aspect of this course. The research topic (ie. Thesis title) of the student is to be communicated to the instructor of this

course, in order for him/her to efficiently plan for the independent studies to be addressed. The students' supervisor is responsible to identify and contact the faculty member who will teach this course.

BIOE601 Environmental Sciences (3 CH)

This course is divided into two parts: First part is Environmental Geology which is designed to teach how geological phenomena such as flooding, earthquakes etc. are strongly related with many environmental issues and understanding of their influences on environmental related problems. The course will include two main sections: the first focusing on internal structure of earth, plate tectonics, mineral resources, and rocks/soils. While the second covers water resources and its management, water pollution, natural hazards, global climate changes and their relationships to the environment. Second part is Environmental Biology which will deal with the biological issues such as, ecological principles, biological resources and its hierarchical structure. In addition, it will cover different environmental biomes as well different phenomenon at the biosphere level, such as, natural disasters and anthropogenic impacts mainly, biodiversity loss, invasive species, and red tides. In addition, biodiversity, water pollution as well as management of aquatic bodies and protected areas will be covered as part of environmental conservation in light of global climate change.

BIOE602 Applied Ecology (2 CH)

This course aims at studying ecological theory and how it can be applied to environmental problems. It reviews the principles that underlie ecological processes and the extent to which these are used in environmental management. monitoring and assessment of natural resources play an important component of the applications in ecology. Applied Ecology starts with an analysis of our planet's basic natural resources – energy, water and soil; it moves on to the management of biological resources – fish, grazing lands and forests, and then to exploiting variability, pest control and measuring the effects of pollution. Finally, the course tackles conservation and management of wild species, modeling ecosystems and the restoration of ecological communities. The use of RS/GIS in monitoring and adopting proper management and conservation outcomes will be the focus of the second part of the course.

BIOE603 Field Survey and Environmental Assessment (2 CH)

This course introduces students to several of the major tools to address issues relating to field surveys and environmental assessment. Through lectures, problem-solving exercises, group assignments, the students will develop a good idea on best approaches to survey field related resources and assess evironmental indicators. The course covers scientific investigation and sampling, environmental assessment, laws and regulations, and elements of environmental assessment techniques and methods.

BIOE604 Complementary Alternative Medicine (2 CH)

According to NIH “complementary” refers to an unorthodox practice used together with conventional medicine. For example, acupuncture to help with side effects of cancer treatment. The term “Alternative” however refers to a practice that used to replace a conventional medicine. The global use of non-traditional therapeutic modalities, herbal medicines, and supplements has grown exponentially. Thus, this Master program recognizes the need to develop and incorporate CAM into the education of its environmental students and into graduate programs in general. This graduate course focuses on principles of complementary and alternative therapies including but not limited to dynamic phytotherapy and herbal medicine.

BIOE611 Environmental Science I (3 CH)

Introduction to the relationship of man and the environment. Selected aspects of current thinking and research concerning integrated and interacting relations among components of the environment and the central role of man. The impact of industrialization and urbanization on environmental quality. Effects of pollution and depletion of natural resources.

BIOE613 Environmental Science II (2 CH)

A survey of natural renewable and nonrenewable resources and natural hazards, including risk assessment and management, as well as policies designed to solve environmental problems.

BIOE615 Coastal and Marine Management (2 CH)

This course is an intensive introduction to the principles and practices of coastal zone management, with specific reference to coastal zone issues. It is pitched at immediate postgraduate / Masters student level, but is also intended as a continuing professional development course suitable for professional environmental managers and consultants. It will also be suitable as a continuing education course for others with relevant interests.

BIOE616 Genetically Modified Organisms (2 CH)

In the past few decades, our understanding of molecular biology and genetics has enabled us to transform the face of food production and to drastically increase access to human therapies, and in the near future, it may help us mitigate the looming energy crisis. This course will explore the ways in which genetically modified organisms (GMOs) have already influenced our society, examine their potential to confront the challenges that lie ahead, and delve into the biological details of what GMOs are and how they are made. Completion of Molecular Biology course is strongly recommended but not mandatory.

BIOE620 Environmental Awareness and Education (2 CH)

Environmental education is a process that allows individuals to explore environmental issues, engage in problem solving, and take action to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions.

BIOE621 Plant Research to Environmental Stresses (2 CH)

Elements of the environment favorable for plants. Stress and its nature (climatic, edaphic & biotic). Strategies of plants under stress: adaptive structural (morphological, anatomical &reproductive), and physiological (adjustments, regulation, resistance). Allelopathy and biological stress.

BIOE623 Environmental Microbiology (2 CH)

Functional aspects of microorganisms in nature. Diversity of microbial habitats. Inter-and extra microbial relationships. Transformation in geochemical cycles. Microbial toxins in the environment.

BIOE624 Sustainable Development (2 CH)

This course is designed to serve as a foundation course for graduate studies in Sustainable Development. It will introduce to students the core concepts, principles and practices of sustainable development (SD). It examines the environmental, economic, and social dimensions of SD by focusing on changing patterns of consumption, production, and distribution of resources. This course includes an international focus and examines the impact of globalization, the role of the private sector, and NGOs. This course also considers the evolving models of the economic evaluation of SD initiatives and programs.

Prerequisites

- BIOE602

BIOE625 Coastal Management (2 CH)

Characteristics of the marine environment and primary productivity. Marine resources and organisms of economic importance. Management of resources and hazards of pollution. Conservation laws and legal aspects.

BIOE626 Air Quality and Climate Change (2 CH)

This is an introductory course to air pollution. Students will gain an understanding of the types, sources and effect of air pollutants as well as the general knowledge of the legislative and regulatory approaches to air quality management. Students will also gain insight into the dispersion of air pollution in the atmosphere as well as an understanding of physical and chemical behavior of gaseous pollutants, air quality modeling and meteorological factors that contribute to air quality degradation. The course will also expose students to analytical techniques for air quality monitoring and a wide range of air pollution control technologies and legislation.

Prerequisites

- BIOE601

BIOE627 Desert Ecology (2 CH)

Course material will be a collection of book chapters and review articles. This course focuses on studying the ecology of deserts, their environments, formation and diagnostic features. It covers the desert ecology, population and community ecology, physiology and behavior. It concentrates on the principles that underline environmental adaptations and their underlying /morphological/physiological mechanisms.
Prerequisites

- Pre/Co BIOE601

BIOE629 Applied Systems Ecology (2 CH)

Systems approach applied to multivariate analysis and management of natural resource ecosystems. Simulation models and their use. Energy transformation. Dissipation of ecosystem biomass. Pathogens. Biological efficiency of consumers.

BIOE631 Environmental Pollution & Pesticides (2 CH)

Population and food production. Pesticides and human welfare. Classification of pesticides. Methods of eliminating pesticide residues. Alternative methods to pesticides. Pesticides in UAE.

BIOE633 Soil and Water Pollution (2 CH)

Background on soil and water pollution. Identifying effects of specific human activities on soil and water, systematically evaluating them, and developing practical solutions. Pollution control and agricultural production. Capacity of the soil to assimilate wastes.

BIOE636 Seminar in Environmental Science (1 CH)

Analysis of current and prospective issues in specified subject areas related to the students field of research interest. The students will present results and finding from their research or will present a review articles or recent journal publications of related topics, and also the exploration of unsolved scientific

problems and opportunities in the field, especially which related the country and to the gulf region.

BIOE649 Community Medicine (2 CH)

Public health. Prevention of occupational diseases. Epidemiology. Environmental diseases, health housing.

BIOE651 Industrial Hygiene (2 CH)

Theory and application of industrial hygiene principles to management of occupational environment. Work place environmental and hazard evaluation.

BIOE653 Human Environmental Physiology (2 CH)

Application of physiology to understand primary routes of entry of environmental insults and systems that eliminate offending agents. Homeostasis and integrated physiological regulation, respiratory system, skin, gastrointestinal system, liver, urinary system.

BIOE655 Essentials Of Toxicology (2 CH)

Health and ecological aspects of chemicals in the environment. Principles, concepts, and methods for study of effects of toxins and toxicants on biological systems.

BIOE700 Lab Rotations (3 CH)

Ph.D. students are required to take a lab rotation-based course during their first year of graduate study. Typically, students will be required to rotate through 3 to 4 laboratories (minimum of 2 in exceptionally trained students), covering the whole semester. During each laboratory rotation, the student will be exposed to methods, equipment, and experimental procedures currently in use in a particular departmental research laboratory selected by the student and through arrangement with the professor in charge of that laboratory. At the end of each rotation, students will receive a written evaluation from the rotation supervisor. These evaluations are then submitted to the program chair to become part of the student’s permanent file. It is important to note that these

evaluation letters will be considered during the comprehensive examination evaluation.

BIOE703 Applied Biostatistics (3 CH)

In this applied biostatistics course we will explore the use of statistical methodology in designing, analyzing, interpreting, and presenting biological experiments and observations. This course covers the basic applied statistics tools for the collection, analysis, and presentation of data. Central to these skills is assessing the impact of chance and variability on the interpretation of research findings and subsequent recommendations for experimental studies in biology. Topics covered include: general principles of study design; hypothesis testing; elements of experimental design; review of methods for comparison of discrete and continuous data including ANOVA, t-test, correlation, and regression as they relate to biological data.

Prerequisites

- STAT235 with a minimum grade D

BIOE710 Field Ecology (3 CH)

The course surveys the quantitative field methods in ecology. Lectures and field applications focus on research design and hypothesis testing, with an emphasis on sampling design, measurement, and statistical comparison of environmental variables, plant and animal abundance, diversity, spatial pattern, and species composition. Students will build skills in statistical analysis, scientific rigor, and critical thinking, and in the practical application of quantitative field methods in ecology. Prerequisites: At least minor in biology including ecology course(s), concurrent with Biostatistics or consent of Ph.D. committee.

BIOE720 Ecosystem Management & Sustainability (3 CH)

This course will introduce students to the advanced concepts and principles of natural resource management with an emphasis on sustainable ecosystems. Students will learn selected important ecosystem management issues, including genetic diversity in ecosystem management, landscape-level conservation, single-species land management, and the skill and art of keeping fragile ecosystems in balance. Highly complex ecosystem management approaches will be assessed by the students. Additionally, different case

studies will be presented to demonstrate how ecological concepts and principles can be applied to the sustainable management of ecosystems. Students will also have a chance to critique and suggest innovative solutions to challenges faced by various ecosystems.

BIOE730 Topics In Ecology and Environmental Sciences (3 CH)

This course focuses on exposing students to current topics relating to ecology and environmental sciences. Up-to-date weekly readings will be the core of this course. Students will be required to present and critique publications and their importance to the field. Such course is primarily intended to develop in the students' ability to use the published literature as the primary source of information. Integration of such information into a cohesive body of knowledge will be assessed. The ability of the student to report, present and review published work will be also tested. The ultimate aim for this course is for the student to develop a research problem(s) and ways to address it through proper scientific methodologies.

BIOE731 Aquatic Ecology (3 CH)

This course will cover the fundamentals of aquatic science bringing together the physical, chemical, and biotic aspects of lake, river, and estuary systems including how humans are changing aquatic ecosystems and management techniques for the use and conservation of these resources. Topics covered during the class will include the structures and function of aquatic systems; the dynamics of the pelagic and littoral zones, human impacts and environmental change, and monitoring and management of aquatic ecosystems.

BIOE740 Wildlife Disease Ecology (3 CH)

This course will provide an introduction to the field of wildlife disease ecology. Emphasis will be placed on the diversity of parasites and pathogens of wildlife, with an examination of ecological interactions between hosts and parasites from an individual and population-level perspective. This course will also examine strategies used by parasites to exploit hosts, strategies used by hosts to evade parasites, host-parasite coevolution, community ecology of disease, drivers of emerging infectious diseases and the role of disease in wildlife conservation. Prerequisites: Topics in Ecology and Environmental Sciences or consent of Ph.D. committee.

BIOE759 Conservation Biology (3 CH)

It examines patterns of species diversity on earth, comparing past and present extinction of species and assemblages, and identifies the major threats to flora and fauna in the Anthropocene. The course then takes a closer look at selected major threats such as overexploitation, habitat fragmentation and destruction, impact of invasive species etc. The course also examines areas in conservation biology like restoration ecology, conservation genetics, demographic analyses to guide wildlife management and conservation policy. Students will be required to read, understand and discuss research articles covering all aspects of conservation biology.

BIOE765 Global Environmental Changes (3 CH)

The course covers both the physiochemical and biological nature of change and the effects and consequences of natural and human-induced change on ecosystems, humans, and human infrastructures. The unifying theme of this course is consideration of both natural and human-induced environmental change, with emphasis on the latter.

BIOE782 Desert Ecology (3 CH)

The course material will cover book chapters. This course focuses on studying the ecology of deserts, their environments, formation and diagnostic features. It covers the desert ecology, population and community ecology, physiology and behavior. It concentrates on the principles that underlie environmental adaptations and their underlying /morphological/physiological mechanisms.

BIOG315 Fundamentals of Physiology (3 CH)

This course aims at studying the fundamental concepts of major plant physiological processes. It includes applications of plant enzymology and metabolism with a detailed approach to plant respiration and photosynthesis. It also aims at discussing the organization, control and integration of the different animal body systems. Starting with the unifying theme of homeostasis, the course lays the foundation for integrating organ systems. The two systems (endocrine and nervous) that play a major role in regulating homeostasis are thoroughly discussed. At the end of this part, the skeletal muscular system is discussed.
Prerequisites

- BIOC205

BIOG321 Histology (3 CH)

This course aims at studying the histological structure of organs. It includes histological, histophysiological, biochemical and molecular principles, theoretical and practical applications of different types of microscopic preparations, as well as modes of detection, recording and quantification of cellular and molecular components of tissues.
Prerequisites

- BIOC205

BIOG333 Entomology (3 CH)

This course aims at introducing students to the world of insects with reference to their position in the animal kingdom and their phylogeny. It includes insect classification, factors affecting their distribution, external and internal anatomy as well as their physiology, metamorphosis and life cycles of some selected insect species.

Prerequisites

- BIOC205

BIOG434 Bacteriology (3 CH)

This course aims at studying the bacterial cell, and the criteria used in the differentiation and identification of bacteria. It includes the classification of bacteria into different groups with examples of the most common genera and species in each group, and the economic and medical importance of bacteria to man and the environment.

Prerequisites

- BIOE230 with a minimum grade D

BIOG450 Plant Physiology (3 CH)

This course aims at studying the advances and applications of plant biochemistry and metabolism. It includes applications of plant enzymology and metabolism with a detailed approach to plant respiration and photosynthesis, plant-water relations and stomatal behavior, and physiological responses of plants to stressful environments including oxygen stress, salinity stress and aridity stress which are common in local habitats.

Prerequisites

- BIOG315

BIOL210 Animal Biology (3 CH)

This course aims at studying the biology and taxonomy of invertebrates and vertebrates of the animal kingdom. It includes the phyla: Porifera, Cnidaria, Platyhelminthes, Nematoda, Mollusca, Annelida, Arthropoda, Echinodermata and Chordata which includes lower chordates, fishes, amphibians, reptiles, birds and mammals with specific examples from each group selected for a detailed study.

Prerequisites

- BIOC100

BIOL215 Plant Biology (3 CH)

This course aims at introducing plant classification and the morphological and anatomical characteristics of different plant parts. It includes kingdoms Monera, viruses, Protista, Fungi, Bryophytes, Pteridophytes, Conifers and flowering plants; cell structure and tissue types; morphology and anatomy of root, stem, and leaf and secondary growth of root and stem.

Prerequisites

- BIOC100

BIOL222 Introduction to Cognitive Neuroscience (3 CH)

The course is an introduction to cognitive neuroscience. It introduces students to the anatomy and biology of the brain and nervous system, particularly those that are generally considered to be heavily involved in human language. Core topics covered include brain anatomy, mechanisms of neurotransmission and synaptic communication, structure and function of sensory and motor systems, and brain development and plasticity. The course also explores the neural basis of some complex brain processes closely related to Linguistic science, in particular the biological aspects of language development, learning and memory. In addition, language-related disorders resulting from brain dysfunction and injury will be covered

BIOL225 Practical Plant Biology (1 CH)

This practical course aims at developing a clear understanding of plant kingdom components such as prokaryotes, fungi, algae, bryophytes, pteridophytes, gymnosperms and flowering plants. It includes cell structure, function and diversity, morphological and anatomical structure of roots, stems and leaves.

Prerequisites

- BIOL215 with a minimum grade D

BIOL250 Basic Microbiology (3 CH)

This course aims at studying the characteristics of main microorganisms and their relation to environmental pollution. The studied microorganisms include bacteria, fungi, viruses, protozoa, and algae. It includes studying the structure of prokaryotic and eukaryotic cells, microbial nutrition, types and mathematics of microbial growth, metabolism, energy generation, and the bases of bacterial taxonomy and genetics. It also includes pathogens, waterborne communicable diseases, and common biological indicators. Laboratory tests include bacterial analysis like membrane filter, multiple tube fermentation, and microscopic examination. Engineering applications include microbial control by physical and chemical agents and common microbial processes used in treatment systems.

BIOL270 General Genetics (2 CH)

This course aims at developing a clear understanding of genetics. It includes Mendlian genetics, modern genetics and molecular basis of genetics, the applications of genetics in the field of medicine in terms of detection of genetic diseases, prevention, treatment and other applications as well.

Prerequisites

- BIOC100

BIOL500 Internship (6 CH)

The student spends 8 weeks of training in an approved training site. (This course is conducted over half a semester (8 weeks) during the third year of study. Offered condensed courses should be taken during the other half of the semester).

BIOM229 Cell Biology I (2 CH)

This course aims at studying the cell compartments, starting from the nucleus to the cell membrane. It includes description of the structure and function of organelles and the cytoskeleton as well as the genetic diseases affecting the cell functions.

Prerequisites

- BIOC100 with a minimum grade D

BIOM260 Introduction to Neurosciences (3 CH)

The course is an introduction to neuroscience. It introduces students to the anatomy and biology of the brain and nervous system. Core topics covered include brain anatomy, mechanisms of neurotransmission and synaptic communication, structure and function of sensory and motor systems, and brain development and plasticity. The course also explores the neural basis of some complex brain processes like language development and learning and memory.

Prerequisites

- BIOC160 with a minimum grade D

BIOM335 Molecular Biology of Genes (3 CH)

This course aims at developing a deeper understanding of gene regulation in eukaryotes and prokaryotes. This course will describe how the genetic information is decoded by transcription and translation to form proteins and how organisms control these processes to ensure that the correct proteins are produced in the correct cells at the correct times and in the correct amounts. This course will examine the mechanisms of transcription initiation, RNA splicing and processing, protein synthesis, activators and attenuators. This course will also examine the effects of catalytic and regulatory RNA in gene regulation. Finally, lectures will also cover the following topics: eukaryotic chromosome structure and its modifications, mechanisms of chromatin-mediated regulation of gene expression, and epigenetics. Research methods that have been applied to achieve our current understanding of these processes will be discussed.

Prerequisites

- BIOC290

BIOM339 Virology (2 CH)

This course aims at understanding the basics of virus definition, structure, nomenclature and classification. It includes mode of infection, replication, lysogenic, virus-host interaction, common viral diseases and viral vaccines.

Prerequisites

- BIOE230

BIOM350 Developmental Biology (3 CH)

This course aims at integrating the knowledge of different fields in order to understand the cellular and molecular mechanisms of the processes of the

embryonic development in vertebrates and invertebrates. This course will focus on the description of a certain number of modes of development and, on the analysis of the expression and regulation of genes controlling the morphogenesis of the embryo. The students will discuss and interpret the key classical experiments on which the principles of developmental biology are founded. The models of animal developmental biology will be introduced with all the fundamental notions of this discipline. The principle stages of embryogenesis will be illustrated and the classical experiments proving the existence of organizer centers of morphogenesis will be analyzed. The mechanisms by which the layers of embryonic tissues move will be discussed. A certain number of molecules responsible of development will be described and examples of their roles in the cascades of genetic interactions during organogenesis and cellular differentiation will be detailed.

Prerequisites

- BIOC290

BIOM370 Introductory Bioinformatics (3 CH)

Bioinformatics is an interdisciplinary topic that encompasses biology, computer science, mathematics and statistics. With the advent of high throughput technologies, large amount of biological data is being generated that provides us rich information about life around us. This course will introduce students to the basic concepts and methods in this field. Topics covered will include sequence databases, sequence searching, sequence alignment, phylogenetics and genome assembly. Each topic will be accompanied by a hand-on computer laboratory session. Furthermore, students will be briefly introduced to how bioinformatics can be used to study human disease.

Prerequisites

- BIOC290

BIOM380 Genomics (3 CH)

This course aims at understanding the principles of genomic and relevant areas. The course will describe how genome is sequenced, analysed and stored. The course will demonstrate the genome of different form of life, comparative genomics, genomes of different kingdoms, evolution of genomes, and system biology. The will will empohasize on genomic information is used to

understand biology. The course also aims at appreciating the ethical, legal and social implications of genomic scoiences.

Prerequisites

- BIOC290 with a minimum grade D

BIOM390 Introduction to Epigenetics (2 CH)

Chromosomes are always subject to changes in structure and organization which can affect gene expression. These epigenetic modifications can be results of DNA methylation, histone modifications (acetylation, methylation…), chromatin remodeling complexes, and the binding of non-coding RNA (Xist). Epigenetic modifications are either inherited or accumulated throughout a life of an organism. This course is intended to introduce students to the molecular mechanisms underlying epigenetic inheritance. The role of epigenetics in biological processes such as imprinting, X-inactivation, cellular identity and cellular memory will be discussed. The relationship between epigenetic alteration and disease will be reviewed.

Prerequisites

- BIOM335 with a minimum grade D

BIOM399 Molecular Biology (2 CH)

This course aims at providing the student to the in depth principles of molecular biology that serve as an underlying cornerstone for all biological activities. It includes introduction of DNA's structure, its organization into higher structure, the characteristics that allow DNA to serve as an information molecule, and replication processes. Furthermore, it provides detail insight on the expression and control of bacterial genes with regard to protein-DNA interaction, RNA splicing, post translation modification, gene regulation and the biology of cancer in terms of gene regulation.

Prerequisites

- BIOC270 with a minimum grade D or BIOL270 with a minimum grade D

BIOM420 Molecular Basis of Cell and Tissue Development (3 CH)

The aim of this course is to bring to students the knowledge of fundamental aspects of the Extracellular Matrix (ECM) and its importance for tissue function, wound healing and tissue repair. The students will also acquire basic knowledge on tissue-tissue interactions, and overlapping cellular and molecular pathways that exist in multiple tissues. Understand the concept of a cell cycle, and how it plays an important role in different types of organisms. Evaluate the relative contribution of mutations in tumor suppressor genes and proto-oncogenes in the development of cancer.

Prerequisites

- BIOC290

BIOM430 Cellular Biochemistry (3 CH)

This course is designed to provide students with essential and fundamental aspects of the composition and function of bioorganic macromolecules in living systems. The course is divided into five sections: (i) chemical building blocks of cells (carbohydrates, lipids, amino acids, and nucleic acids) and their functional integration into macromolecules with particular emphasis on (ii) protein structure and function will be focused in this course. We will also focus on (iii) how cells obtain energy from nutrients (e.g. carbohydrates and lipids) and how these processes are regulated. On the fourth (vi) part of the course biomembrane structure will be studied in details and (v) an overview of membrane transport will be covered at the end of this course. Throughout the course, cellular and biochemical techniques that enable the study of cellular macromolecules in biomedical research will be discussed.

Prerequisites

- BIOC290 with a minimum grade D

BIOM433 Biotechnology & Genetic Engineering (3 CH)

This course aims at providing the student with the wealth of knowledge developed in the field of genetic engineering. This course introduces the student to a series of logical ordered recombinant genetic principles. Furthermore, the course is specifically formatted to allow the student the

flexibility to follow any one of numerous and interlinking paths through molecular biology concepts, principles and key recombinant genetic methods or approaches toward numerous defined destinations and horizons. The topics include enzymes for molecular cloning, visualization of nucleic acids, and construction of vectors (plasmid, bacteriophage, YAC, etc.). These topics are followed by DNA sequencing, probe construction for gene identification or labeling specific regions of the genomes, construction of genomic and cDNA libraries. Expression of foreign genes in various systems is described. PCR amplification is introduced with its potential applications in research, molecular diagnostic and forensic sciences.

Prerequisites

- BIOM335

BIOM435 Human Molecular Genetics (3 CH)

This course aims at introducing the students to the human genomic sciences quantitative simplicity and qualitative complexity. This has placed a greater burden in understanding the nature of gene function, molecular etiology of diseases, and therapy. However, the challenge is creating an excitement for the scientific community. This era, unlike its predecessor, provide numerous new possibilities for studying the molecular genetics of human. This course deals with these issues in problem-solving oriented fashion. The topic includes genes in pedigrees and population, cell communication, and the basic science of studying the molecular basis of human genetics. Human molecular pathology is addressed to exploit different genetic disease models. Genetics in forensic sciences, genetic testing and counseling are also covered.

Prerequisites

- BIOM335

BIOM445 Macromolecules Structure Function and Bioinformatics (3 CH)

This course will introduce the students to bioinformatics database and bioinformatics tools that can be used to study macromolecular sequence, structure and function. Additionally, students will also be introduced to the concepts of microarrays and microarray data analysis. Furthermore, students

will be briefly introduced to how bioinformatics can be used to study human disease.

Prerequisites

- BIOC290

BIOM461 Tissue Culture (3 CH)

This course aims at understanding the fundamentals of plant and animal tissue culture. It includes sterilization techniques, media preparation and culture of plant tissues, protoplasts, anthers, preparation of animal primary culture, cell line, DNA transfection and cell fusion.

Prerequisites

- BIOC205

BIOM462 Immunology (3 CH)

This course mainly covers the fundamental principle of immunology including hematopoiesis; tissues and cells of the immune system; complement, cytokines; innate immunity; humoral and cell-mediated immune responses; immunoglobulin structure, function and biosynthesis; genetics and generation of diversity in antibody and T cell receptors, lymphocyte activation, major histocompatibility complex and antigen presentation. The course deals briefly with the role of the immune system in controlling diseases, including how the immune system deals with infection; inflammation; allergy and hypersensitivity; tissue graft rejection, clinical tissue matching; the immune system vs. cancer; autoimmune diseases; AIDS. Also, this course briefly covers topics on some common immunological experimental approaches that are used in research and diagnostic laboratories.

Prerequisites

- BIOC290 with a minimum grade D

BIOM470 Molecular Physiology (3 CH)

This topical course deals with the physiological processes at molecular level that are peculiar to higher plants and animals. The course consists of two parts: First part will include the molecular basis of the (i) structure of plants and plant cells, (ii) energy dynamics in plant cells, (iii) water and nutrient transport, (iv) growth and development (v) responses to environmental stresses and (vi) metabolic engineering of natural products. The second part will cover molecular and cellular mechanisms of cell communication within the major integrated systems and their physiological processes in human and animal. This will focus on the endocrine, the nerve, the vascular, and the muscular systems by covering two structural and functional aspects. The first aspect is related to the properties of biomembranes with a particular emphasis on signal transduction and transport across membranes. For this, tangible examples of different types of cell membranes (intestinal mucosa, renal tubules, muscle cells, nerve cells, and retinal cells) will be studied. The second aspect will be on the molecular mechanisms of the endocrine system and hormone action addressing the major endocrine components and glands such as pituitary, thyroid, pancreas, adrenal glands and gonads with examples of endocrine dysfunction and diseases including diabetes, thyroid disorders, obesity, and fertility.

Prerequisites

- BIOC290 with a minimum grade D

BIOM481 Molecular Evolution (3 CH)

The change in the sequence of macromolecules like DNA, RNA and proteins over several generations is termed as molecular evolution. This course will introduce students to principles of such molecular evolutionary processes and how it can be evaluated. It will also provide knowledge and skills in phylogenetic analysis and how this can be used to study molecular evolution.

Prerequisites

- BIOC290 with a minimum grade D

BIOM489 Molecular Biology Techniques (1 CH)

This course aims at developing the basics of gene cloning as well as introducing the recent development in molecular biology and bio-computing. It includes introduction to general molecular biology techniques, gene cloning, and bio-computing.

Prerequisites

- (BIOC290 or BIOL270)
- BIOC275 with a minimum grade D

BIOM492 Special Topics (Cell & Mole) (1 CH)

This course aims at providing the flexibility in the choice of biological themes to be given each time the course is offered. The precise topic has to be specified when the course is offered in a particular semester. In this manner the course could be tailored to the needs and interests of a particular group of students which enables the faculty members to cover a wide range of topics in keeping up with recent advances in the field of Biology.

Prerequisites

- BIOC290

BIOM508 Advanced Gene Expression (3 CH)

The objective of this course is to tackle the basic principles and advanced aspects of prokaryotic and eukaryotic molecular biology with topics such as DNA structure, transcriptional and translational mechanisms, and mechanisms of gene expression, activation and inactivation of whole chromosome.

BIOM512 Advanced Genetic Engineering (3 CH)

Course content covers nucleic acids and protein detection methodologies, multifunctional vectors and gateway cloning system, protein production in eukaryotes and prokaryotes, Construction and screening of genomic and cDNA expression library, differential and substractifs screening, applications of the PCR: RACE-PCR, Q-PCR, reverse PCR, differential display, in vitro and in vivo footprinting, site directed mutagenesis. In vivo transgenesis strategies (gene

over-expression and gene Knock out), conditional knock out, inducible expression system, applications in gene therapy and in biotechnology.

BIOM516 Advanced Molecular Biology Techniques I (3 CH)

This is mainly a laboratory exercise course designed to help students become more familiar with common molecular techniques. Lectures will cover basic principles and applied aspects of molecular studies, and recent advances in genomics and proteomic techniques. Practical classes will include DNA/RNA isolation, hybridization, sequence analysis, various PCR reactions, library construction and screening, protein isolation, and plant transformation.

BIOM525 Applications of Bioinformatics (3 CH)

Techniques commonly used to depict biological implications from molecular sequence data. This course will start with introduction to sequence retrieval and identification using databases (e.g., Genbank and EMBO), pairwise sequence comparisons and multiple sequence alignments and conserved sequence pattern, recognition (e.g., gene identification in genomic data, RNA secondary structure prediction). Phylogenetic analysis will be presented in detail (e.g., distance, parsimony, maximum likelihood, and Bayesian methods). tools, phylogenetic analysis.

BIOM541 Environmental Biotechnology (3 CH)

This course focuses on fundamentals of molecular biology and biotechnology for environmental applications. The major topics include activated sludge processes, stoichiometry, bioenergetics, anaerobic digestion, biological nitrogen and phosphorus removal, molecular microbiology tools, biofouling, antibiotic resistance, and biofuels.

Prerequisites

- BIOM512 with a minimum grade D
- BIOM516 with a minimum grade D

BIOM544 Epigenetics & Cell Different (3 CH)

Epigenetic control genome expression in eukaryotes (plants, yeast and mammals). Histone code, histone variants, chromatin remodeling complexes, microRNA , DNA methylation, spatial and functional compartmentation of the genome in the nucleus

Prerequisites

- BIOM508 with a minimum grade D

BIOM552 Molecular & Genetic Aspects of Plant Responses to Pathogens (3 CH)

This course discusses the aspects of the nature of disease resistance and response mechanisms in plants. Special emphasis is placed on emerging concepts and paradigms that underlie a wide variety of plant-pathogen interactions, and how the knowledge gained from these studies is being used to devise effective and environmentally safe strategies of plant protection. Topics include history, breeding, and genetics of disease resistance, physiology, biochemistry, and molecular genetics of disease resistance and response mechanisms and emerging concepts in this rapidly advancing area and its contribution to plant biotechnology.

BIOM555 Biotechnology Applications in Forensic Science (3 CH)

This course is designed to give a student a thorough knowledge and understanding of modern biology, together with an insight into forensic science. The course provides a firm foundation in biochemistry, molecular biology, cell biology and human biology, together with an introduction to the role of the forensic scientist and the analytical investigations carried out in forensic laboratories.

Prerequisites

- BIOM600 with a minimum grade D

BIOM571 Seminar in Biotechnology & Molecular Biology (1 CH)

This course will be delivered through discussion of current research and development findings emphasizing the myriad of applications of the fields of Biotechnology and Molecular Biology. Seminars will be delivered by faculty members, guest speakers, visiting scientists and industry professionals.

BIOM572 Graduate Seminar (1 CH)

This course includes discussion of current topics of interest within the broad domain of molecular biology and biotechnolgy; seminar and/or lecture format. Seminars will be delivered by the students.

BIOM600 Advanced Molecular Biology Techniques II (3 CH)

This course will present a variety of molecular biology techniques that are frequently used in the field of biotechnology. It focuses on how to apply these technologies to a specific research question. In addition to hand on experience in techniques such as real-time PCR, Westerns, cell analysis, sequencing, reporter gene analysis, cDNA synthesis and proteomic gel analysis; the students should be able to record and analyze scientific data, write scientific report and appreciate and design solution to scientific problems.

Prerequisites

- BIOM516 with a minimum grade D

BIOM700 Laboratory Rotations (3 CH)

Ph.D. students are required to take a lab rotation-based course during their first year of graduate study. Typically, students will be required to rotate through three to 4 laboratories (minimum of 2 in exceptionally trained students), each of which lasts about three months. During each laboratory rotation, the student will be exposed to methods, equipment, and experimental procedures currently in use in a particular departmental research laboratory selected by the student and through arrangement with the professor in charge of that laboratory. At the end of each rotation, students will receive a written evaluation from by the rotation supervisor. These evaluations are then submitted to the program chair to become a part of the student's permanent file. It is important to note that these evaluation letters will be considered during the comprehensive examination evaluation.

BIOM720 Advanced Genetics (3 CH)

This course tackles advanced principles and recent findings in genetics including: cell, molecular and direct approaches to genetic analysis and genetic interactions; chromosomal organization and aberrations; transposable elements; mutations, paramutation and epigenetics; extranuclear inheritance; genetic manipulations; gene discovery; ESTs and global gene expression analysis, proteomics, metabolic profiling, comparative genomics and genome evolution.

BIOM730 Molecular Basis of Diseases (3 CH)

The course provides the students with a fundamental understanding of the molecular mechanisms and pathways underlying various pathological conditions in humans and plants. Attention will be given to the molecular mechanisms and processes at the level of the cell and tissue characterizing and/or leading to the most important human diseases (cancer, diabetes, neurodegenerative diseases) and plant diseases. This includes the signaling pathways, cellular/subcellular changes, gene expression pattern, identification of mutations, and chromosome abnormalities and other genetic alterations as well as cytogenetics, preimplantation genetic diagnostics, prenatal molecular diagnosis. For plants, various other aspects of disease resistance and response mechanisms in plants may also be covered. Finally, recent advances in the therapeutic approaches and strategies will also be covered.

BIOM735 Applied Immunobiology (3 CH)

Students will be exposed to applied aspects of immunology. Students will be given concept of fundamental principles of immunology including hematopoiesis; tissues and cells of the immune system; complement, cytokines. Major Topics covered include: Innate and adaptive immunity, how immune system is coordinated to combat infections, actors, Important aspects of cell receptors, VDJ recombination and DNA repair structure of the antigenic receptors, superantigen, as well as variability of the antigenic receptors. Dysfunction and pathologies: Immune subversion by malignant tumors, immune subversion by viruses, inherited immune deficiency, control of autoimmunity.

Prerequisites

- BIOM462 with a minimum grade D
- BIOM793 with a minimum grade D

BIOM740 Molecular Physiology (3 CH)

This course will tackle signal transduction mechanisms used by membrane ion channels and receptors that detect the microenvironmental cues and transmit the signals to downstream effectors. Integrated molecular approach will be used so that the students gain a better and more fundamental understanding of the molecular signaling cascades employed under physiological conditions. Attention may be given to signaling in pathophysiology as well. Modern molecular/structural techniques (patch clamp, protein crystallization, molecular genetics, and expression cloning and protein purification) will be introduced along with each topic.

Prerequisites

- BIOM462 with a minimum grade D
- BIOM793 with a minimum grade D

BIOM745 Selected Topics in Biotechnology (3 CH)

Through student's presentations, group discussion and assignments, selected biotechnological biological topics, such as immunotherapy, applications of CRISPR-Cas9 gene editing in human disease and plant/crop genome editing and microbial biotechnology will be explored. For each topics, the material will be presented in form of assignment, presentation and group discussion. In addition, ethical issues in animal and plant biotechnology will be discussed. The major goal for this course is for the PhD student to develop a research issues and ways to address them through adequate scientific methodologies.

BIOM787 Developmental Biology (3 CH)

A survey of molecular and cellular mechanisms involved in growth and development of organisms is explored. Topics to be covered include fertilization and early cell lineage, body axis formation, gastrulation, neural induction and patterning, segmentation, and other aspects of pattern formation including organogenesis of branching organs, limb development and regeneration.

BIOM793 Advanced topics in Cellular and Molecular Biology: A literature review (3 CH)

Topics will be chosen by the instructors' along with the registered students. The main aim of this course is to give a chance to students to analyze, present and discuss the most recent and significant findings, through research manuscripts, in the field of cellular and molecular biology. Topics might be subject to a yearly change. Such course is primarily intended to develop in the students their ability to use the literature review as the primary source of information, evaluating it critically, and integrating it in to a cohesive body of knowledge. The ability of the student to present and review work will be tested.

BIOM794 Genomics (3 CH)

This course primarily covers prokaryotic and eukaryotic genomes. Experimental strategies and analytical challenges of modern genomics research, theory and mechanics of data analysis are thoroughly discussed. Structural, functional, and comparative genomics are also explored.

Prerequisites

- BIOM793 with a minimum grade D

BION100 Biology and its Modern Application (3 CH)

This course provides a general educational knowledge of biology and its applications. The course covers the scope of biology and the meaning of life from a biological perspective. Moreover, it gives a holistic idea of the living cell as the basic unit of life and highlighting the advances in the area of gene manipulation. It discusses the classification, characteristics, adaptations and the value to humans of the major groups of living organisms; namely microorganisms, plants and animals. The course apex is the medical, agricultural and industrial applications of biology that affect everyone's daily life.

Chemistry

BCHM345 Experimental Biochemistry (1 CH)

The aim of this course is to introduce basic biochemical laboratory techniques, with emphasis on protein biochemistry. The students will learn to use standard biochemistry lab instruments such as pH meters, spectrophotometers, pipettes, microplate readers. Standard protein purification and characterization techniques, enzyme activity assays, as well as immunoassays (ELISA) will also be taught.

Prerequisites

- BCHM362 with a minimum grade D

BCHM361 Biochemistry I (4 CH)

This course will cover the structure and function of different biological molecules, including proteins, carbohydrates, lipids and nucleic acids. Topics covered include living cells; chemical and physical properties of water and buffers; amino acids; sugars; nucleotides; levels of protein structure and stability; protein purification; introduction to steady-state kinetics; enzyme mechanism; controlling enzymatic activity and inhibition; glycolysis; pyruvate metabolism; the TCA cycle; electron flow and oxidative phosphorylation; fatty acid catabolism; structure of nucleic acids; DNA replication and DNA polymerase; transcription; translation and the genetic code. The experimental part provides students with a range of techniques and methodology including sequential configuration, chromatography and electrophoresis for the isolation, separation and characterization of biomolecules; protein determination and enzyme activity assays

Prerequisites

- CHEM115 with a minimum grade D
- CHEM241 with a minimum grade D

BCHM362 Biochemistry II (3 CH)

The aim of this course is to apply the basic knowledge gained in Biochemistry (CHEM 361) course to specific metabolic reactions and certain physiologically important biomolecules. The course covers bioenergetics, photosynthesis, regulation of carbohydrate metabolism, biosynthesis of glycoproteins, mechanisms of transport through membranes, immunoglobulins and immunity, blood clotting proteins, and biochemical communications.

Prerequisites

- CHEM361

BCHM418 Research Project (3 CH)

In this course, a student carries out a research project under the academic supervision of a faculty member in the Department. The aim of the course is to provide students with an opportunity (after a successful review of the chemical literature) to apply their biochemical knowledge and skills to an area of research without the restrictions of a planned practical. The course is offered to students who have a solid chemistry background, good laboratory skills and have an interest in scientific research. The student is expected to devote a set number of hours per week to research as discussed with his/her academic supervisor. At the end of the project, the student is required to submit a report on his/her research results, present a poster and give a short oral poster presentation based on his/her project.

BCHM462 Clinical Biochemistry (3 CH)

The aim of this course is to enable students to understand and critically evaluate the pathophysiology and investigation of human disease by studying selected topics across the fields of Clinical Chemistry and Haematology. This course evaluates the contribution of laboratory investigations to the diagnosis, treatment and prevention of disease in key areas such as renal disease, diabetes, anaemia, and haematological malignancies.

Prerequisites

- BCHM362 with a minimum grade D

BCHM471 Protein Structure and Function (2 CH)

The aim of this course is to study three principal aspects of proteins - physical properties, interaction with other biomolecules, and biochemical function - with an emphasis on levels of protein structure, folding conformation, biosynthesis, ribosome assembly, targeting, protein degradation, protein/DNA interactions and gene expression, membrane proteins and receptors, signal transduction, muscle action proteins.

Prerequisites

- BCHM362 with a minimum grade D

BCHM472 Protein Structure and Function (3 CH)

The aim of this course is to study three principal aspects of proteins - physical properties, interaction with other biomolecules, and biochemical function - with an emphasis on levels of protein structure, folding conformation, biosynthesis, ribosome assembly, targeting, protein degradation, protein/DNA interactions and gene expression, membrane proteins and receptors, signal transduction, muscle action proteins.

Prerequisites

- BCHM362 with a minimum grade D

BCHM481 Special Topics Biochemistry I (2 CH)

This course aims to cover selected topics dealing with the recent advances in the field of genomics (genes related issues) and proteomics (protein related issues). The course will also discuss the current knowledge on cellular signal transduction, and link it with the actions of hormones, clinical biochemistry, as well as some types of cancer. Special attention will be paid to nuclear hormone receptor and G-protein coupled receptor signaling pathways. Students will be required to read up on primary literature and make an oral presentation to the whole class on a chosen topic.

Prerequisites

- BCHM362

BCHM482 Special Topics Biochemistry II (2 CH)

This course aims to cover selected topics that are not discussed in other courses that of current importance such as effects of environmental pollutant on biochemical metabolism, drug and antibiotic metabolism, antibodies and immunochemistry, biotransformation and detoxification.

Prerequisites

- BCHM481 with a minimum grade D

BCHM483 Special Topics in Biochemistry I (3 CH)

This course aims to cover selected topics dealing with the recent advances in the field of genomics (genes related issues) and proteomics (protein related issues). The course will also discuss the current knowledge on cellular signal transduction, and link it with the actions of hormones, clinical biochemistry, as well as some types of cancer. Special attention will be paid to nuclear hormone receptor and G-protein coupled receptor signaling pathways. Students will be required to read up on primary literature and make an oral presentation to the whole class on a chosen topic.

Prerequisites

- BCHM362 with a minimum grade D

BCHM484 Special Topics in Biochemistry II (3 CH)

This course aims to cover selected topics that are not discussed in other courses but are of current importance such as effects of environmental pollutant on biochemical metabolism, drug and antibiotic metabolism, antibodies and immunochemistry, biotransformation and detoxification.

Prerequisites

- BCHM362 with a minimum grade D

CHEM111 General Chemistry I (3 CH)

Matter and measurement. Atoms, molecules and ions. Chemical stoichiometry. Acids-Bases and oxidation-reduction reactions. Oxidation numbers and the balancing of equations. The electronic structure of atoms and the periodic table of elements. Periodic properties of the elements. Basic concepts of chemical bonding and molecular geometry. Gases. Intermolecular forces. Solubility and Concentration units.

CHEM112 General Chemistry II (2 CH)

Thermochemistry. Reactions in aqueous solutions. Gaseous equilibrium. Acids and bases. Ionic equilibria. Qualitative analysis. Electrochemistry. Rates of reactions.

Prerequisites

- CHEM111 with a minimum grade D

CHEM113 General Chemistry II for Science Students (3 CH)

The main concepts covered in this course include colligative properties, thermochemistry, thermodynamics, electrochemistry, chemical kinetics, chemical equilibria, acid-base equilibria, additional aspects of aqueous equilibria, and nuclear chemistry.

Prerequisites

- CHEM111 with a minimum grade D

CHEM115 General Chemistry Lab (1 CH)

Introduction to the elementary laboratory techniques. It includes principles of chemical calculations, techniques of qualitative analysis with special emphasis on applications of chemical equilibria.

Corequisites

- CHEM112

CHEM175 Chemistry Lab I for Engineering (1 CH)

Chemistry Lab 1 for Engineering is an introduction to elementary laboratory techniques. It includes the principles of chemistry calculations, techniques of quantitative and qualitative analysis.

Prerequisites

- Pre/Co CHEM111

CHEM181 Chemistry in the Modern World (3 CH)

The role of chemistry in important issues of modern life is examined including the economic, social, health and ecological impact of chemistry. Chemical concepts are presented through examining various topics such as environment, ecology, nutrition and health.

CHEM211 Professional & Transferable Skills (1 CH)

The aim of this course is to provide chemistry students with a wide range of generic, transferable skills, essential in and beyond the chemistry profession and to prepare students adequately for the Internship program and later professionally in the work-place. The course involves several different chemistry-specific components, including general study skills, communication skills both written and oral, critical-thinking exercises, group and project work, project management, time management and chemical information retrieval. Students are also given hands-on experience in tailored IT packages for chemistry, chemistry-specific computational programs, including chemical structure modeling etc. The module is delivered by Chemistry faculty through a combination of interactive active learning workshops, group work, presentations and hands-on sessions in the computer laboratory.

Prerequisites

- CHEM112 with a minimum grade D

CHEM222 Analytical Chemistry (4 CH)

The course introduces to students the fundamental aspects of analytical chemistry. It deals with various classical analytical chemistry methods that include volumetric and gravimetric analysis. Volumetric methods cover acid-base reactions, complexmetric, redox and precipitation reactions. The course also introduces students to various types of errors in chemical analysis and methods of their evaluations. Kinetic methods of analysis, non-chromatographic separation, and sample preparation will be also discussed. Applications to selected real analytical problems such as pharmaceutical analysis will be discussed. The associated laboratory experiments provide experience in applying these methods in chemical determinations

Prerequisites

- CHEM113 with a minimum grade D
- CHEM115 with a minimum grade D

CHEM231 Inorganic Chemistry I (3 CH)

This course involves topics in basic inorganic chemistry which cover the structure and bonding in molecules, the chemistry of the oxoanions and oxoacids, solvents, solutions, acids and bases and the chemistry of selected main group elements and their associated compounds. The course covers the following areas explicitly: the structure of atoms, atomic orbitals in wave mechanics; periodic properties of the elements; structure and bonding in molecules: introduction, molecular orbital theory: homo and heteronuclear diatomics, polyatomics, multicentre MO, electron-deficient molecules, ?-donor and acceptor ligands; elements of symmetry, symmetry operations and point group symmetry determination; ionic solids: lattice and close-packing concepts, ionic radii, lattice energy calculations and correlation to properties solubility, hardness etc.; metallic substances: metallic bonding, band theory, conductivity, semiconductors, insulators, defects, preparation of new materials through doping, metallurgy; solvents, solutions, acids and bases; chemistry of the main-group elements.

Prerequisites

- CHEM251 with a minimum grade D

CHEM241 Organic Chemistry I (3 CH)

Introduction to organic chemistry. Nomenclature, isomerism, sources, methods of preparation, physical properties, reactions and mechanisms of: alkanes, alkenes, alkynes, alicyclic hydrocarbons, alkyl halides, alcohols and ethers. Stereochemistry and optical activity. IR and UV-Vis spectroscopy.

Prerequisites

- CHEM111 with a minimum grade D

CHEM242 Organic Chemistry II (3 CH)

Nomenclature, methods of preparation. Physical properties. Reactions and mechanisms of the following organic compounds: aldehydes, ketones, carboxylic acids, esters, amides, anhydrides and other acid derivatives and aromatic compounds. Introduction to carbohydrates, proteins and lipids. Introduction to NMR spectroscopy and mass spectrometry.

Prerequisites

- CHEM241 with a minimum grade D

CHEM245 Organic Chemistry Lab I (1 CH)

Characterization of some organic compounds using physical and spectroscopic techniques, study of the chemical properties of some aliphatic and aromatic compounds containing functional groups.

Prerequisites

- CHEM115 with a minimum grade D

Corequisites

- CHEM241

CHEM251 Physical Chemistry I (3 CH)

The First law of thermodynamics. Thermo-chemistry, Second law of thermodynamics. Entropy and free energy. Third law of thermodynamics. Absolute zero. Chemical potential. Phase equilibria. Statistical thermodynamics.

Prerequisites

- MATH105 with a minimum grade D
- CHEM112 with a minimum grade D

CHEM2706 Materials Science (3 CH)

This course aims at studying basic concepts and fundamentals of material science and engineering in order to develop the understanding that how structure, properties, and processing relationships are established and used for different types of materials. Topics covered are bonding, internal micro-and macro structure, crystallography, material defect; mechanical, thermal, electrical, magnetic, and optical properties of materials; strengthening mechanisms and failure analysis; micro-structural deign of materials.

Prerequisites

- CHEM111 with a minimum grade D
- CHEM175 with a minimum grade D

CHEM282 Organic Chemistry for Non-Majors (3 CH)

Introduction to structure. Nomenclature. Physical properties. Preparation, reactions of hydrocarbons and functional groups containing organic compounds. The laboratory component includes the purification, isolation, characterization and study of the properties of typical organic compounds.

Prerequisites

- CHEM111 with a minimum grade D

- CHEM115 with a minimum grade D

CHEM283 Biochemistry for Non-Majors (3 CH)

The chemical and physical properties of biological compounds. Theories of enzyme action and the factors affecting them. The practical component includes the isolation and study of biological properties of some biological compounds.

Prerequisites

- CHEM282 with a minimum grade D

CHEM321 Instrumental Analysis I (4 CH)

This course aims primarily at developing the fundamental understanding of theory and applications of instrumental analytical techniques. The topics covered include spectrochemical, electrochemical and chromatographic techniques. The associated laboratory practical component provides extensive experience in applying these techniques to the chemical analysis of different samples.

Prerequisites

- CHEM221 with a minimum grade D

CHEM331 Inorganic Chemistry II (3 CH)

This course introduces the basic principles of coordination chemistry involving the following areas: introduction, chemical nomenclature, stereochemistry and isomerism of coordination compounds; theories of bonding in coordination compounds; the Jahn-Teller Effect; magnetic properties of transition metal complexes; electronic spectroscopy, term symbols and the spectrochemical series; thermodynamic aspects: formation constants, hydration enthalpies, ligand field stabilization energies, chelate effects; tautomerism, stereochemical nonrigidity and fluxionality; synthesis and types of reactions of complexes; lanthanides and actinides; mechanisms of inorganic reactions.

Prerequisites

- CHEM231 with a minimum grade D

CHEM332 Chemistry of Elements (3 CH)

This course covers fundamental properties of main group elements and their compounds. Concepts related to main group elements discussed in this course include extraction methods, structures, properties, and reactivity. The course also briefly covers the coordination and organometallic chemistry of s- and p-block elements. Selected inorganic materials of the d-block elements and their technological applications will be also discussed with emphasis on nanomaterials.

Prerequisites

- CHEM231 with a minimum grade D

CHEM337 Practical Inorganic Chemistry (1 CH)

This practical course covers the preparation and identification of a variety of main group and transition metallic compounds. The experiments include important inorganic synthetic techniques and methods of spectroscopic characterization.

Prerequisites

- CHEM321 with a minimum grade D
- CHEM331 with a minimum grade D

CHEM345 Organic Chemistry Lab II (1 CH)

This experimental course covers multiple step syntheses of selected organic compounds and the characterization of their functional groups by spectroscopic analysis.

Prerequisites

- CHEM245 with a minimum grade D

Corequisites

- CHEM242

CHEM351 Physical Chemistry II (3 CH)

This course covers two areas of physical chemistry, namely kinetics and quantum mechanics. The first part deals with chemical kinetics and the topics include the study of rate of chemical reactions and of the molecular processes by which the reaction occurs, differential and integral expressions with emphasis on multi-step as well as single-step first-order phenomena, expressing mechanisms in rate laws, consecutive elementary reactions, steady state approximation, reactions approaching equilibrium, collision theory, complex reactions, catalysis, photochemical reactions, molecular reaction dynamics, and diffusion controlled reactions. The second part deals quantum mechanics and the topics included are fundamental principles of quantum theory, such as Schrodinger equation, wave functions, quantum mechanical operators, quantum mechanics of a particle-in-a-box model.

Prerequisites

- CHEM251 with a minimum grade D or (CHEM113 with a minimum grade D and GENG220 with a minimum grade D and CHME322 with a minimum grade D)

CHEM355 Physical Chemistry Lab I (1 CH)

The main objective of this course is to provide students with the necessary training on the use of modern techniques and instrumentation in thermodynamics, electrochemistry, kinetics and surface chemistry.

Prerequisites

- CHEM115 with a minimum grade D
- (CHEM251 with a minimum grade D or (CHME322 with a minimum grade D and GENG220 with a minimum grade D)

CHEM356 Physical Chemistry Lab II (1 CH)

This course involves experimental and computational techniques in physical chemistry. The course contents include: infrared and visible-ultraviolet spectroscopic experiments for chemical analysis, identification of molecular

structure, determination of molecular geometry, and chemical kinetics; molecular modeling and simulations; computational chemistry, which includes quantum mechanical and semi-empirical methods.

Prerequisites

- CHEM355 with a minimum grade D
- Pre/Co CHEM351 with a minimum grade D

CHEM377 Instrumental Analysis for Chemical Engineering (1 CH)

The course deals with the fundamental concepts and applications of instrumental techniques in chemical analysis. The course covers some atomic and molecular spectroscopic tecniques as well as chromatographic methods of analysis.

Prerequisites

- CHEM112 with a minimum grade D

CHEM418 Research Project (3 CH)

In this course, a student carries out a short research project under the academic supervision of a faculty member in the Department. The aim of the course is to provide students with an opportunity after a successful review of the chemical literature to apply their chemical knowledge and skills to an area of research without the restrictions of a planned practical. The student is expected to devote a set number of hours per week to research as discussed with his or her academic supervisor. At the end of the project, the student must submit a report on his/her research results, present a poster and give a short oral presentation based on the work.

Prerequisites

- CHEM337 with a minimum grade D
- CHEM345 with a minimum grade D
- CHEM361 with a minimum grade D
- Pre/Co CHEM356

CHEM419 Internship (6 CH)

The student spends 8 weeks of training in an approved training site. (This course is conducted over half a semester (8 weeks) during the third year of study. Offered condensed courses should be taken during the other half of the semester).

CHEM422 Instrumental Analysis II (3 CH)

This is a theoretical course aims to introduce students to the fundamentals aspects, general principles and analytical applications of atomic and molecular mass spectrometry, infrared spectroscopy, nuclear magnetic resonance spectroscopy, atomic X-ray spectrometry and hyphenated techniques. Moreover, an introduction to surface analytical techniques as well as automation in analytical laboratories will be discussed.

Prerequisites

- CHEM321 with a minimum grade D

CHEM423 Environmental Chemistry (3 CH)

Environmental chemistry is the chemistry of the natural processes in air, water, and soil. It is concerned principally with the chemical aspects of problems created by human beings in the natural environment. Environmental analytical chemistry deals with separation and identification of countless complex biological, environmental and industrial samples. The two topics are highly important for the conservation of the earth's environment and makes it suitable for the coexistence of all living organisms. This course introduces students to the concepts of environmental chemistry and environmental analytical chemistry. The course deals with topics like toxic chemicals, pollution prevention, properties of water and waters bodies, fundamentals of aquatic acid base chemistry, atmospheric chemistry, atmosphere and hazardous substances, hazardous wastes and their effects on living organisms, stratospheric chemistry, ozone layer, air analysis, water analysis and speciation analysis. The course will also discuss different methods used for analyzing environmental samples.

Prerequisites

- CHEM321 with a minimum grade D

CHEM441 Polymer and Petroleum Chemistry (3 CH)

This course introduces students to polymer chemistry, polymerization reaction mechanisms (step-growth polymerization and chain-growth polymerization via radical and ionic intermediates), methods for molecular weight determinations and characterization of polymers. It will also briefly introduce students to petroleum chemistry, refining operation, and petrochemicals as the raw material for all petro-plastics and its future impact on the polymer manufacturing industry.

Prerequisites

- CHEM242 with a minimum grade D or BCHM362 with a minimum grade D

CHEM442 Introduction to Medicinal Chemistry (3 CH)

This course introduces students to the importance of medicinal chemistry in our lives and the fascination of working in the field which overlaps the disciplines of chemistry, biochemistry, and pharmacology. The course will focus on the syntheses and mechanisms of action of certain drug families such as antibiotic, anti-cancer and anti-viral compounds. The course will also discuss the importance of functional groups in drugs and shed light on drug design and their metabolic pathways in the body.

Prerequisites

- CHEM242 with a minimum grade DBCHM361 with a minimum grade D

CHEM445 Spectroscopic Identification of Chemical Compounds (1 CH)

This practical course is designed to equip the student with basic strategies and techniques for the elucidation of molecular structure. It takes the students through a number of modern spectroscopic techniques mass spectrometry and infrared spectroscopy, nuclear magnetic resonance and ultraviolet/visible spectroscopy for the identification and quantification of chemical compounds. The emphasis is on practical applications. The course teaches the student what specific information can be obtained by each technique, proper sample preparation, proper instrumental use and interpretation of spectra. On successful completion of this course, the student will be able to select the most

suitable spectroscopic methods to logically deduce the structures of unknown molecules.

Prerequisites

- CHEM242 with a minimum grade D
- CHEM321 with a minimum grade D
- CHEM345 with a minimum grade D

CHEM446 Spectroscopic Identification of Compounds (3 CH)

This course is designed to equip student with the basic knowledge and techniques for elucidating structures of organic compounds. Modern spectroscopic techniques such as ultraviolet/visible spectrometry, mass spectrometry, infrared spectroscopy, nuclear magnetic resonance spectrometry will be discussed for the identification and quantification of organic compounds. The course also teaches students proper sample handling, instrument use and interpretation of spectra. On successful completion of this course, students will be able to deduce structures of unknown simple organic molecules.

Prerequisites

- CHEM242 with a minimum grade D
- CHEM321 with a minimum grade D

CHEM453 Electrochemistry (3 CH)

The course is intended to cover the principles of electrochemistry and its applications; topics such as ionic interaction, conducting properties of electrolytes, interfacial phenomena and double layer, thermodynamics and kinetics of electrochemical reactions and electrode processes (kinetics), and applications. Applications include Pourbaix diagrams and their constructions, fuel cells, re-chargeable batteries, and corrosion.

Prerequisites

- CHEM251 with a minimum grade D

CHEM454 Nuclear and Radiation Chemistry (3 CH)

This course covers topics like radioactivity, nuclear structure, stability and properties, radioactive decay, nuclear transformations, nuclear reactions, sources of ionizing radiation, detection and measurement of nuclear radiation, nuclear reactors, application of radioactive substances in various fields, nuclear waste disposal, fundamentals of radiation chemistry, radiation chemical yield, chemical dosimetry and effects of radiation on matters such as gases, water, aqueous solutions, organic liquids and solids.

Prerequisites

- CHEM321 with a minimum grade D
- CHEM351 with a minimum grade D

CHEM480 Research Project II (3 CH)

CHEM 480 is an experimental based elective research project course for undergraduate chemistry and biochemistry students. The course provides students the opportunity to develop their skills of project planning, methodology development, data analysis and results dissemination as well as employability skills required for labour market. In this course, students will run research projects under academic supervisions from faculty members in the department. Research work could be an advancement of their work started in their research project I course (CHEM 418 or BCHEM 418), or a new more advanced research topic. Students enrolled in this course are required to develop their research proposals independently or with help of their supervisors. At the end of the project, students are required to submit reports, present posters and give oral presentations on the results of their research projects.

Prerequisites

- CHEM418 with a minimum grade D or BCHM418 with a minimum grade D

CHEM522 Analytical Spectroscopy (3 CH)

Advanced treatment of spectroscopic techniques and instrumentation. Atomic and molecular absorption, emission, and scattering processes and their application to quantitative chemical analysis are outlined.

CHEM523 Separation & Chromatographic Techniques (3 CH)

Theoretical and practical aspects of gas and high performance liquid chromatographic methods; supercritical fluid chromatography and capillary electrophoresis. Related instrumentation and selected applications are discussed.

CHEM524 Electroanalytical Techniques (3 CH)

Review of the relevant thermodynamic, kinetic, and electronic principles of electrochemical techniques used for analysis and for the characterization of inorganic and organic systems.

CHEM526 Chemical Instrumentation (3 CH)

Electronics as applied to chemical instrumentation; design and construction of instruments used in chemical research, analysis, recording, and control

CHEM531 Advanced Organic Synthesis (3 CH)

The course is an intensive integrated course of study to introduce students to advanced concepts, reactions, and techniques in contemporary organic chemistry. Focus on multi-step synthesis of diverse target molecules.

CHEM533 Organic Reaction Mechanisms (3 CH)

A mechanistic view of free-radical reactions, polar reactions, dipolar reactions, pericyclic reactions, frontier molecular orbital theory.

CHEM534 Catalysis in Organic Chemistry (3 CH)

The course deals with basic catalysis, metal-mediated reactions, enzyme catalysis and organocatalysis. Applications of transition metal organometallic compounds in catalysis and organic synthesis will also be discussed.

CHEM535 Polymer Chemistry (3 CH)

An introduction to the chemistry of polymers, including synthetic methods, mechanisms and kinetics of macromolecule formation, and polymer characterization techniques.

CHEM541 Advanced Biochemistry I (3 CH)

The course will build on the basics of biochemistry the students should already be familiar with and cover in detail various biochemical topics that are of current interest. Specifically the course will be comprised of three separate modules – advanced protein structure and function (including protein purification & enzymology), metabolism of pollutants (including oxidative stress and reactive oxygen species), and cellular signaling. The students will also be exposed to primary literature in the above mentioned areas of biochemistry and they will be asked to make a class presentation reviewing, presenting, and critiquing a published paper on environmental toxicology.

CHEM551 Advanced Inorganic Chemistry I (3 CH)

Advanced course in inorganic chemistry focusing on one of the following topics: Transition metal organometallic chemistry, bioinorganic chemistry, inorganic cluster chemistry, solid state inorganic chemistry.

CHEM552 Solid State Inorganic Chemistry (3 CH)

Develops foundation of basic surface science concepts and techniques. These concepts include structure of clean and adsorbate covered surfaces, chemical bonding of adsorbates, energy transfer mechanisms on surfaces, and catalyzed surface reactions.

CHEM561 Advanced Physical Chemistry I (3 CH)

Advanced course in physical chemistry focusing on one of the following topics: Chemical Thermodynamics, Statistical Thermodynamics, Molecular Spectroscopy, Chemical Dynamics, Quantum Chemistry, Materials Surface Characterization

CHEM562 Statistical Thermodynamics (3 CH)

Ideal and non ideal systems, State functions and their relationships with molecular systems, Ensembles, Partition functions of molecules, Application of Fermi Dirac and Bose Einstein statistics

CHEM598 Selected Topics (3 CH)

This course is designed for students, who want to gain a better understanding and more comprehensive knowledge in a study area for which a course does not exist in the curriculum. The course is offered in a standard lecture format. While there are quizzes, a midterm and a final examination for the course, there is also one term paper that the students will write and orally present. The term paper can be designed as a joint project paper among students taking the class.

CHEM608 Surface and Interface Analysis (3 CH)

The course will cover the methods used for surface and interface analyses and characterizing their properties, composition and structure. Techniques based on interactions of light beams, electron beams and ion beams with matter will be reviewed in terms of its theoretical background, components, applications as well as limitations and advantages. Samples' preparation for each technique and examples of problem solving in different fields using surface analysis will be provided.

CHEM609 Mass Spectrometry (3 CH)

This course aims to introduce students to the general principles, basic aspects, and analytical applications of molecular mass spectrometry. It will discuss the different ionization methodologies and sample introduction methods. Different types of mass analyzers will be introduced where the advantages and limitations of each type will be pointed out. Vacuum and detection systems will be presented. Hyphenated systems such as gas chromatography mass spectrometry (GC-MS) and Liquid chromatography mass spectrometry (LC-MS) will be discussed. Tandem mass spectrometry (MS/MS) and fragmentation mechanisms of organic compounds will be introduced as tools for structure elucidation. Applications of mass spectrometry in analyses of different samples will be discussed.

CHEM612 Nanochemistry (3 CH)

An interdisciplinary investigation of matter at the nanoscale, heterogeneous catalysis, nanoencapsulation, colloidal chemistry, physical characterization of nanoparticles and quantum dots.

CHEM613 Photochemistry (3 CH)

Experimental and theoretical aspects of chemical reactions induced by visible and Ultraviolet radiation. Fluorescence and chemiluminescence.

CHEM614 Organometallic Chemistry of the Transition Metals (3 CH)

This course investigates transition metal organometallic chemistry in depth. Although, the main focus of the course is organometallics of transition metals, it starts with an introduction on main group as well as transition metal organometallic compounds. The course then investigates, in relation to transition metal organometallics, the following topics: structure and bonding, ligands, synthesis, reactions, structure-reactivity relationships, and applications of organometallic complexes in organic synthesis and industrial catalysis.

CHEM615 Chemical Sensors and Biosensors (3 CH)

This course aims to introduce graduate students to the area of chemical sensors and biosensors. Topics to be covered include: structure and properties of various recognition materials and reagents; physicochemical basis of various transduction methods; auxiliary materials used in the constructions of chemical sensors and biosensors; advanced manufacturing methods; and versatility of sensors' constructions. Selected applications of some electrochemical, optical, mass and thermometric sensors in biomedical, industrial and environmental fields are to be discussed

CHEM616 Advanced Topics in Physical Chemistry (3 CH)

Includes chemical reaction dynamics, electrochemistry and interface kinetics, advanced corrosion and inhibition theories and mechanisms, modern nuclear and radiation chemistry, atmospheric chemistry.

CHEM636 Seminar (2 CH)

This is a course in oral communication for graduate students in Chemistry. It is intended to provide graduate students with experience in the presentation of scientific data and help the student in the later defense of a proposal or a thesis. Presentations may be based on published peer reviewed publications or on original research, conducted by the student or within the student's laboratory. In addition, students will attend lectures of guest speakers both from within the chemistry department as well from other departments.

CHEM641 Advanced Biochemistry II (3 CH)

Chemical composition of living matter and the chemistry of life processes. Characterization of amino acids, proteins, carbohydrates and lipids; enzymology and co-enzymes; metabolism of carbohydrates; biological oxidations. Metabolism of lipids, amino acids, and nucleotides; membrane biochemistry; biosynthesis of DNA, RNA, and proteins; gene regulation.

CHEM651 Advanced Inorganic Chemistry II (3 CH)

Advanced course in inorganic chemistry focusing on one of the following topics: Chemical Applications of Group Theory, Chemistry of f-block elements, Identification and Characterization of Inorganic Compounds, Nanoscale Materials.

CHEM661 Advanced Physical Chemistry II (3 CH)

Advanced course in physical chemistry focusing on one of the following topics: Chemical Bonding and Spectra, Nuclear and Radiation Chemistry, Heterogeneous Catalysis and Colloid Chemistry.

CHEM673 Petroleum & Petrochemical Pollution (2 CH)

Manufacturing processes and refinery. Separation processes. Polymerization and alkylation processes. Oil products and coke. Pollution problems and control. Safe storage. Transport and handing.

CHEM674 Biochemistry of Toxins & Pollutants (2 CH)

Presentation of contemporary concepts on the biochemistry of toxins and pollutants. Destructive action of toxins on biological cycles of living species. Biochemical mode of action of insecticides.

CHEM675 Environmental Chemistry (2 CH)

Application of chemical principles and techniques to specific environmental problems and chemical interrelationship among these problems. Air and water pollution. Organic and inorganic pollutants. Tools of removal and recovery of pollutants. New methods of environmental detection and sampling.

CHEM677 Corrosion Science For Environments (2 CH)

Theory and practice of the relevant corrosion processes to specific environmental problems. Corrosion in reinforced concrete, pipelines, power plants.... etc. Selection of construction materials. Corrosion control and continuous monitoring for health and safety.

CHEM701 Advanced Analytical Chemistry (3 CH)

This course will introduce students to the advances in methods used for chemical analysis of different substances. The course will cover advances in spectroscopic, electro analytical and/or chromatographic techniques. Applications related to analyses of chemical, biological and environmental samples will be considered

CHEM703 Advanced Protein Biochemistry: Structure and Function (3 CH)

This course analyzes protein structure function relationships. Students will investigate how a proteins sequence gives rise to structure and how the structure then relates to function. Topics in evolution, domains, motifs, stability, folding and degradation of proteins as well as relationships between structure and catalytic properties of enzymes will be discussed. Students will read and discuss the current scientific literature and use modern visualization tools to investigate structure/function.

CHEM705 Modern Physical Chemistry (3 CH)

Includes classical and statistical thermodynamics, chemical kinetics, advanced molecular quantum mechanics and spectroscopy, elements of computational chemistry.

CHEM712 Selected Topics in Analytical Chemistry (3 CH)

This course is offered into two modules cover subjects related surface and interface analyses and chemical sensors and biosensors. Module A: The course will cover the methods used for surface and interface analyses and characterizing their properties, composition and structure. Techniques based on interactions of light beams, electron beams and ion beams with matter will be discussed in terms of its theoretical background, components, applications as well as limitations and advantages. Samples' preparation for measurement by each technique as well as examples of problem's solving using surface analyses will be provided in different fields. Module B: This course aims to introduce graduate students to the area of chemical sensors and biosensors. Topics to be covered include structure and properties of various recognition materials, and reagents, physicochemical basis of various transduction methods, auxiliary materials used in the construction of chemical sensors and biosensors, advanced manufacturing methods and versatility of sensors' constructions. Selected applications of some electrochemical, optical, mass and thermometric sensors in biochemical, industrial and environmental fields are to be discussed.

CHEM722 Advanced Organic Chemistry and Biocatalysis (3 CH)

The course is an intensive course of study to introduce students to advanced concepts, reactions, and techniques in contemporary organic and bioorganic chemistry. Focus will be on name reac¬tions, and on multi-step synthesis of diverse target molecules. Aside from traditional chemistry, biotechnological approaches will also be covered. The physical and kinetic properties of enzymes that permit their use for the synthesis of chemicals will be discussed, along with state-of-the-art examples of how enzyme-based systems have been successfully applied for the synthesis of commercially relevant molecules.

CHEM723 Selected Topics in Organic Chemistry (3 CH)

Module A: The course gives a mechanistic view of free-radical reactions, polar reactions, and pericyclic reactions with an insight to Frontier Molecular Orbital theory. It provides an overview of bonding theories. Energetics of reactions are discussed, also.

CHEM724 Selected Topics in Biochemistry (3 CH)

The chemical industry is currently exploring alternative approaches to chemical synthesis, which are renewable, sustainable and environment-friendly. Industrial biotechnology, in particular, holds great promise for solving societal challenges and meeting the global demands for food, fuel, and materials, while reducing the environmental impact. This course will cover the increasingly important role of the biochemical sciences for the synthesis of chemicals. In particular, we will look at various aspects of this fast-growing technology which encompasses techniques from several research areas including genetic engineering, metabolic engineering, protein engineering and synthetic biology. We will look at the biochemical principles that underpin them, along with recent case studies that demonstrate the production of industrially relevant target chemicals including biofuels, bioplastics, and specialty chemicals.

Prerequisites

- CHEM283 with a minimum grade D

CHEM733 Molecular Structure and Bonding (3 CH)

This course describes modern theories of chemical bonding, with an emphasis on molecular quantum mechanics, and their application in the prediction and interpretation of molecular properties. Topics include applications of group theory, valence bond theory, and molecular orbital theory in the study of structure, reactivity, electronic spectra, vibrational spectra, rotational transitions and electrochemical properties of main group and transition metal compounds.

CHEM734 Selected Topics in Inorganic Chemistry (3 CH)

This course studies subjects related to synthesis, structure, properties and applications of solid materials. The topics that are discussed in this course include: structure and bonding in solids, crystals and crystalline solids, preparative methods, characterization and physical properties of solids. The

course also discusses selected solid materials and their applications with emphasis on nano-materials in advanced applications such as electronic and catalysis.

CHEM735 Selected Topics in Physical Chemistry (3 CH)

Electrochemistry and interface kinetics, advanced corrosion and inhibition theories and mechanisms.

CHEM740 Advanced Spectroscopic Methods (3 CH)

Elucidation of molecular structure utilizing IR, UV, and NMR spectroscopy, mass spectrometry, and other methods.

CHEM741 NanoChemistry (3 CH)

The course is interdisciplinary covers the chemistry of materials at the nanoscale. It provides detailed background on the preparation, characterization, and applications of selected strategic nanomaterials.

Prerequisites

- CHEM111 with a minimum grade D
- CHEM112 with a minimum grade D

Corequisites

- CHEM241 with a minimum grade D

Geosciences

GEOA358 Hydrogeology (3 CH)

The course teaches the basic concepts of hydrogeology using examples from the UAE. Topics include: the hydrologic cycle, origin and age of groundwater, properties and kinds of aquifers, groundwater exploration, drilling, design, development and completion of water wells, principles of groundwater flow and pumping tests, physical and chemical properties of groundwater, recent developments in groundwater studies, and water resources in the UAE.

GEOA372 Geophysics (3 CH)

This course aims to develop a clear understanding of the principles of geophysics. It includes: reflection and refraction seismic waves, seismic data processing and interpretations, gravity measurement and applications of Newton's Law, gravity survey field procedures and interpretation. Magnetic parameters, field procedures and interpretations. Electrical properties of rocks, Ohm's Law, field resistivity measurements and geoelectrical interpretations.

GEOA458 Geology Of UAE (3 CH)

The course describes the essential features of the Geological setting and structural framework of the Arabian Peninsula. It includes: the sedimentary sequences Palaeozoic-Cenozoic and the effect of tectonic movements and water depth variation on sedimentary facies. Introduction to the Geology of the UAE, structural and tectonic setting, evolution of Rub Al Khali and Ras Al-Khaima basins. Evolution of the islands in UAE. Stratigraphic sequence facies and palaeogeography of the UAE. Oil exploration history, hydrocarbon characteristics, and oil fields.

GEOA462 Hydro Geochemistry (3 CH)

The course aims at giving the students the basic principles of inorganic geochemistry and water hydrochemistry. The course contents cover chemical differentiation of the earth, metals and non-metals, geochemistry of sedimentary rocks, clay minerals, carbonate deposits, isotope geochemistry, geochemical equilibrium, environmental pollution and its sources, water

chemistry, acidity- alkalinity, saltwater intrusion, rock-water interaction, hydrochemical evolution.

GEOA490 Mineral Exploration (3 CH)

The course is intended to teach and improve the understanding of the minerals exploration issue. The basic elements of geological, geophysical and geochemical tools and data required for mineral explorations are described. The general techniques and procedures used in mineral prospecting are discussed. The types of mineral resources and/or industrial minerals occurring in the UAE and/or Gulf regions will be outlined with real examples enhance where possible. Field excursion to a practical site may also be included as an additional course tools.

GEOA495 Selected Topics (3 CH)

Through this course, faculty members are given the chance to teach new or timely subjects that are not covered in other courses.

GEOL 641 Earthquake Mechanism (3 CH)

The course covers broad subjects with emphasis on long-lived basic principles of earthquake mechanism. The recent technological progress in instrumentation, computer, and high-quality data has made it very easy to perform seismotectonic research (K1). The course first consolidates students' knowledge and understanding of the concepts of modern global tectonics (K1, K2). The keys structural elements and seismic characteristics of the tectonic divergent, convergent and transform plate margins are presented. The tectonic evolution of the Arabian Plate is reviewed. The course then explores the dynamics of the solid Earth from theoretical and observational seismology and seismotectonics in relation to earthquake hazard and mitigation (S1, S2). It provides an in-depth study of earthquake seismology and earthquake hazard. Procedures for Interpreting earthquake seismograms and determination of earthquake focal mechanisms are given, with special attention to the seismicity of the UAE via local seismological network data (S3, S4). Part of the course assessment includes oral presentation and report (S6).

GEOL100 Physical Geology (3 CH)

This course aims to provide the students with fundamental knowledge about the Earth's origin, composition, structures and history. Information about the different geological processes and plate tectonics are also introduced.

GEOL110 Planet Earth (3 CH)

The course is designed to all university students in order to provide them with general education knowledge about our planet; its past, present and future changes. The course will include three main sections; the first focusing on Earth evolution in time and space, the second covers the Earth materials and Earth shaping processes and the third deals with natural hazards and the future of earth sciences. The course will be based on lectures, computer assisted exercises, multimedia presentations and seminars.

GEOL215 Mineralogy (3 CH)

This course aims to develop a clear understanding and basic concepts of crystallography and mineralogy. Crystal system, symmetry, lattice, defect, twining, mineral groups, and mineral optical properties are well discussed. Petrographic microscope parts and uses, thin-section, opaques, isotropic and anisotropic minerals and related characteristics are included. Uniaxial and biaxial minerals are also defined with their different appearance. The course is associated with a laboratory part that forms the main practical application of the course items.

Prerequisites

- GEOL100 with a minimum grade D
- PHYS105 with a minimum grade D
- CHEM111 with a minimum grade D

GEOL220 Structure Geology (3 CH)

This course introduces the students to the principles of Structural geology, including the essential types of structural data, and how to measure and record them. It briefly treats primary structures before proceeding to explain the evolution of the important deformation (secondary) structures. The analysis of data to reveal the form and time relations of the largest crustal structures is

then presented. The significance of plate tectonics for resource exploration will also be mentioned.

Prerequisites

- GEOL100 with a minimum grade D
- MATH105 with a minimum grade D

GEOL260 Paleontology (3 CH)

This Paleontology course is divided into two parts: the first deals with Micropaleontology and concentrates on selected forams, ostracods, nannofossils and etc.... The second part instructs students in the essentials of Invertebrate Macropaleontology, with emphasis on sponges, corals, bryozoa, brachiopods, molluscs, echinoids and arthropods. Students are trained to identify and describe key fossils to genus level using microscope and hand lens and to determine their relative age. Additional skills include fossil sketching and literature search. Some applications of Paleontology to hydrocarbon exploration are presented. Invertebrate Paleontology is the study of ancient invertebrates, typically defined as any organisms without backbones and divided into Micropaleontology (is the study of microscopic fossils) and Macropaleontology (fossils which can be studied with naked eye and using hand lens).

Prerequisites

- GEOL100 with a minimum grade D
- BIOC100 with a minimum grade D

GEOL300 Igneous and Metamorphic Rocks (3 CH)

This course presents a broad review of igneous rocks, emphasising their tectonic associations, interrelationships and petrogenesis as well as an introduction to the principles that govern mineralogical mineral assemblages and reactions in metamorphic rocks. After successful completion of this course you will have an integrated understanding of the range, composition and petrogenesis of the major igneous and metamorphic rock groups and will be able to identify them in thin section and deduce their tectonic association and mode of origin. You will review metamorphic facies, facies series and their distribution, as well as the thermal and tectonic controls on metamorphism. You will become familiar with the key skills used to aid the interpretation of

metamorphic rocks: AKF, AFM diagrams and Thompson projections (for pelites) and petrogenetic grids and you will learn how to interpret these.

Prerequisites

- GEOL215 with a minimum grade D
- GEOL220 with a minimum grade DSTAT210 with a minimum grade D

GEOL340 Sedimentation and sedimentary rocks (3 CH)

The course aims to develop the skills of students with a firm understanding of the basic principles and concepts of sedimentation and sedimentary rocks in relation to depositional and post-depositional processes and products. It includes studying both modern and ancient sedimentary environments on continents and in marine systems. The course provides introduction to the environments, processes and classification of sediments and sedimentary rocks. The topics cover information about weathering, erosion, sedimentation and formation of rocks. Field and laboratory techniques used in the analyses of sediments and sedimentary rocks are presented. Description of all varieties of sedimentary rocks and their economic uses are discussed with examples from the UAE region.

Prerequisites

- GEOL215 with a minimum grade D
- GEOL260 with a minimum grade D

GEOL345 Engineering Geology (3 CH)

This course is aimed to acquaint students with the fundamental concepts of engineering geoscience and applications in engineering constructions and infrastructure planning such as tunnels, dams, bridges etc. In addition, the course will provide methods and techniques commonly used in collecting and testing geological units and classify the data for engineering applications.

Prerequisites

- GEOL340 with a minimum grade D

GEOL350 Economic Geology (3 CH)

Economic geology: Study the genesis and geology of ore deposits including base- and precious-metals, gems and other materials of commercial value, such as salt, gypsum, and building stone. This course concerned with the distribution of mineral deposits, factors controlling the formation of these deposits, the economic considerations involved in their recovery, and an assessment of the reserves available.. It applies the principles and methods of various other fields of the geologic sciences, most notably geophysics, structural geology, and stratigraphy. Its chief objective is to guide the exploration for mineral resources and help determine which deposits are economically worthwhile to mine. . Discuss how society uses each material, the environmental implications of doing so, and the remediation steps necessary to minimize the associated environmental impact.

Prerequisites

- GEOL300 with a minimum grade D

GEOL370 Geophysics (3 CH)

This course is designed to give a comprehensive knowledge of geophysics focusing mainly on the theory of potential field methods and their applications. The course covers the gravity and magnetic methods as well as the electric and electromagnetic methods. The course subject will focus on the application of these methods in subsurface structure studies, groundwater prospecting, mineral prospecting, engineering and environmental studies.

Prerequisites

- MATH110 with a minimum grade D
- PHYS110 with a minimum grade D
- GEOL215 with a minimum grade D
- GEOL220 with a minimum grade D

GEOL390 Stratigraphy (3 CH)

Stratigraphy is the study of all rock strata, and their organization into mappable units based on their properties. Students will be instructed in elementary lithostratigraphy and biostratigraphy, and introduced to other stratigraphic method (chronostratigraphy, magnetostratigraphy, sequence stratigraphy,

seismic stratigraphy, etc.). Practical aspects of this course include stratigraphic section measurement, correlation, lithofacies and biofacies analysis. Applications of stratigraphy to hydrocarbon exploration are discussed.

Prerequisites

- GEOL340 with a minimum grade D

GEOL395 Seismic Methods (3 CH)

This course introduces the students to the theory and applications of Exploration Seismology. The course is concentrated on the reflection and refraction techniques. The course focuses on the field survey and data acquisition, data processing and interpretation in terms of structural and stratigraphic features. The course introduces the students to processing of seismic data on computer with emphasis on exploring and characterizing petroleum reservoirs using seismic reflection methods.

Prerequisites

- GEOL370 with a minimum grade D

GEOL398 Seismology and Plate Tectonics (3 CH)

This course covers the theory of plate tectonics and examines the geology of earthquakes, the global pattern of seismicity and seismicity associated with the tectonic settings. It focuses on the regional seismicity and the seismicity of UAE both historical and recent. Special attention will be given on the interpretation of seismic waves, fault mechanism, identification of events from observatory records, and assessing seismic hazards in the region.

Prerequisites

- GEOL370 with a minimum grade D

GEOL400 Remote Sensing and GIS (3 CH)

This course introduces the basic principles of remote sensing and fundamentals of GIS. This includes introduction to electromagnetic radiation and targets; reflectance of terrain features; target signature; color composition;

digital image processing and interpretation; photo geological examples from the United Arab Emirates.

Prerequisites

- GEO312 with a minimum grade D
- GEOL340 with a minimum grade D
- STAT210 with a minimum grade D

GEOL410 Geochemistry (3 CH)

This course presents an exposition of the impact of chemistry and its laws on the spatial distribution of elements in the various spheres of the Earth. It introduces theories on the origin of the elements which compose the Earth, and the Solar System. The geochemistry of isotopes and radionucleides. Geochemistry of the three types of rocks on the Earth's crust. Thermodynamics of elements. Geochemical exploration. Geochemical balance, and finally environmental geochemistry as a modern discipline.

Prerequisites

- GEOL300 with a minimum grade D
- GEOL340 with a minimum grade D

GEOL415 Petrophysics (3 CH)

This course covers the importance of the petrophysical properties of reservoir rocks, such as porosity, permeability, resistivity, and water saturation. It provides the basic background to well logging and reservoir characterization. The course aims at the achievement of profound understanding of the major petrophysical properties of reservoirs, and provides the theoretical knowledge required for log analysis and reservoir characterization. The course leads to bridges the gap between geologic and engineering understanding of reservoir rocks, and give a better understanding of the relation between rocks and fluids.

Prerequisites

- GEOL340 with a minimum grade D
- GEOL370 with a minimum grade D

GEOL425 Hydrogeology (3 CH)

This course is an introduction to the groundwater and the problems associated with it. The course is aimed to provide the students the basic aspects of hydrogeology such as hydrological cycle and properties of aquifer. In this course, principles of groundwater flow and soil moisture and groundwater recharge will be covered. The course covers also water chemistry and water quality and introduces the different field methods used in hydrogeology exploration and groundwater modeling. This course will help prepare students for either a career in hydrogeology or in other areas of environmental science and engineering where a strong background in hydrogeology is needed.

Prerequisites

- GEOL340 with a minimum grade D
- GEOL370 with a minimum grade D

GEOL428 Space and Terrestrial Planets (3 CH)

The course aims at introducing principles of cosmology and the formation of galaxies and planets in space and time as well as components of space in our solar system and planetary composition. Methods used to probe space and atmosphere of terrestrial planet will be presented. Special focus will be given to the composition and landscape features of terrestrial planets (Mars, Mercury and Venus) and comparison with those found on Earth.

Prerequisites

- GEOL340 with a minimum grade D
- GEOL370 with a minimum grade D

GEOL430 Environmental Geoscience (3 CH)

This course deals with the principles of environmental geoscience as an integral part of the students' curriculum. It includes renewable and non-renewable resources, minerals, fossil fuels and water, conservation measures. Natural hazards including volcanic activity, earthquakes, floods, regional subsidence and landslides. Mitigative measures. Pollution of air, surface and subsurface water, and soil. Waste disposal in a Geologic context. Man's modification of the physical environment. Environmental management.

Prerequisites

- GEOL410 with a minimum grade D

GEOL440 Nuclear Geoscience (3 CH)

The course aims at introducing the principles of radioactivity and radioactive isotopes, including modes of occurrence in nature and sources for industrial production. Exploration methods for radioactive isotopes and processes of formation will also be introduced. In addition, methods used in the survey and selection of repository sites for the storage of spent nuclear fuel and nuclear waste will be presented.

Prerequisites

- GEOL410 with a minimum grade D

GEOL445 Geoinformatics (3 CH)

This course uses geocomputation and geovisualization for analyzing geoinformation. It combines geospatial analysis and modeling, development of geospatial databases and geosciences oriented information systems design. Topics will cover following fields: environmental geodatabases; water geodatabases; soil geodatabases; minerals geodatabases; hydrocarbons geodatabases; etc. Furthermore, analysis of geodatabases using spatial analysis tools and functions will be covered. It is expected that at the end of the course students will be able to build discipline-oriented geodatabases and implement geospatial projects to solve spatial problems about Earth and its resources, using available geospatial data. Case studies from the United Arab Emirates will be selected.

Prerequisites

- GEOL400 with a minimum grade D

GEOL460 Petroleum Geoscience (3 CH)

This course introduces the principles and concept of hydrocarbons formation in sedimentary rocks. The course provides comprehensive integration hydrocarbons from the sources to generation, migration and trapping. The course will introduce methods and techniques used to evaluate hydrocarbons potential of sedimentary basins. Introduction of applications related to hydrocarbons exploration, accumulation and exploitation will also be presented. The course aims at teaching the theories and hypothesis related to the formation of hydrocarbons. At the same time the mechanisms of hydrocarbon generation, migration and trapping are learned. Students will learn also about the different methods used in hydrocarbon exploration. Students will learn about the role of geological condition in the hydrocarbon exploration. At the end of the course non-conventional petroleum resources will be presented.

Prerequisites

- GEOL370 with a minimum grade D
- GEOL390 with a minimum grade D
- GEOL410 with a minimum grade D

GEOL463 Geophysical Exploration (3 CH)

This course aims at delineating subsurface Geology including layer succession, types of structures, petrophysical parameters of different layers, types of fluids and their quantity, buried ores, etc. The most important type of these methods are the seismic methods, especially the reflection seismic. A precise determination of the attitude of subsurface layers, structures, water tables, bearing capacity of different soil materials for civil engineering purposes, and the fluid zonation in oil traps is the main duties of the surface and borehole seismic surveys. Gravity, magnetic and electric methods play a secondary role in geophysical exploration for oil, groundwater and other land-resources.

GEOL470 Research Project (3 CH)

This course is designed to enhance the student research and innovation capability in geosciences. This course may also involve field and laboratory activities as well as literature survey. Report and presentation are required.

Prerequisites

- GEOL425 with a minimum grade D
- GEOL460 with a minimum grade D

GEOL475 Geology Of UAE (3 CH)

The course Geology of the UAE will focus on the geological features and history of the Arabian Plate, upon which UAE is situated. It is an overview of the geological evolution of the exposed and deep (subsurface) geology (stratigraphy, structure, economic importance, etc.) of the UAE. A highlight of the course is treatment of the UAE- Oman Semail Ophiolite, which is one of the largest and best exposed ophiolites in the world. The course includes field visits to key geological sites and requires an individual student-written report on aspects of the geology of the UAE.

Prerequisites

- GEOL300 with a minimum grade D
- GEOL340 with a minimum grade D
- GEOL370
- GEOL390 with a minimum grade D

GEOL499 Field Geology (3 CH)

The course aims to develop practical skills in field Geology and field surveying. It includes training in the use of a range of field instruments, field trips to selected areas, practical methods of Stratigraphy and facies analysis, ophiolite Stratigraphy, metamorphic rocks and metamorphism, structural Geology and regional tectonics, sabkha environments and salt domes.

Prerequisites

- GEOL400 with a minimum grade D
- GEOL430 with a minimum grade D
- GEOL470 with a minimum grade D

GEOL500 Internship (6 CH)

The training programme is coordinated by both the Department, academic supervisor and the faculty training committee. The programme is continuously monitored and reviewed by a field supervisor staff member at one of the various geological organizations in the United Arab Emirates. (This course is conducted over half a semester (8 weeks) during the third year of study. Offered condensed courses should be taken during the other half of the semester).

Prerequisites

- Pre/Co GEOL499 with a minimum grade D

GEOL521 Geochemistry for Environment and Mineral Exploration (3 CH)

The aim of this course is to understand and apply the fundamentals of geochemistry in evaluating methods for mineral exploration and the associated environmental impact (K1, K2). Several analytical techniques such as XRD, XRF, SEM, ICPMS and interpretation and modelling software including Matlab and IGPET will be used to promote application of IA (S1-S6). The course will cover lectures and laboratory and field experiences. By the end of this course students will be able to define the basic principles and methods used in geochemical exploration and survey and environmental impact (S2) Students will also be familiar with the different types of geochemical distribution aureoles, including primary, secondary and flow dispersions, and their relation to ore deposits and environment. mineralogical/geochemical data to determine and interpret the areas of anomalies (S4) and/or a possible association of an environmental effect (S1). Part of the course assessment includes oral presentation and report (S6).

GEOL526 Groundwater Environmental Assessment (3 CH)

This course aims at introducing the principle used for the evaluation of groundwater potentials and the impact on the environment (K1, S1). The course provides techniques used for the identification and assessment of groundwater during strategic planning for natural resources. Spatially distributed hydrological modelling using Geoinformatics techniques will be introduced (K2, K3, S1, S2). Case studies from arid to semi-arid on groundwater environmental assessment procedures and practices will be addressed. Students finishing the course will gain experience in assessment strategies and approaches commonly applied in groundwater policies and in writing scientific reports (S6).

GEOL528 Remote Sensing (2 CH)

Aerial and space photography. Electromagnetic spectrum. Techniques, electronic processing and enhancement. Sequential photography. Landsat satellites and others. Pattern recognition and classification. Applications in resource and pollution studies: geological, soil, hydrological, agricultural, forests, rangeland, coastal zones, urban and rural landuse. Identification, monitoring and warning against pollution and natural hazards.

GEOL532 Non-Seismic Methods (3 CH)

This course aims to present advanced applications in non-seismic methods (potential field, electrical, electromagnetic) for the purposes of subsurface imaging (K1, K2, S1) and resource exploration (S2). The students will develop skills in the methods of measurement techniques and data acquisition (S3) and data correction/processing and modeling (S4). Particular attention is paid to inversion and modeling of the geophysical data in 2D and 3D, including reference to the application of Artificial Intelligence in geophysical data analysis. Part of the course assessment includes oral presentation and report (S6).

GEOL541 Geology of Petroleum Plays (3 CH)

An integral approach to petroleum plays and a review of worldwide petroleum provinces is proposed (K1). This course aims at introducing properties and processes associated with development of hydrocarbon reservoir and seal (cap) rocks (K1). Particular focus will be given to tools and methods that are used to evaluate and define characteristics of reservoirs and seal formation (S1, S2). Students finishing the course will develop skills in recognition of potential reservoir and seal rocks as well as in identifying most suitable methods to be used for fingerprinting rock properties which form an essential component in exploration and production of hydrocarbons (S1, S3). Part of the course assessment includes oral presentation and report (S6).

GEOL565 Environmental Geochemistry (2 CH)

Application of principles and techniques of geochemistry to mineral and oil exploration. Mobility, dispersion, pathfinders and anomalies. Soil, water, rock, and plant surveys. Analytical techniques and field methods. Critical heavy

metals influencing health of man, animals and plants. Medical implications. Identification and monitoring of air, water and soil pollution. Geochemical maps.

GEOL574 Energy Resources (2 CH)

This course is prepared to help students maximize learning and understanding the subjects in energy and its resources. The major concepts of this course cover the basic relationship between geology and Earth resources, conventional energy sources such as coal, oil and natural gas, sustainable energy such as solar, biomass, fuel cells and etc., minimizing the environmental degradation while extracting, usage of earth natural resources as energy sources, and possible future energy resources.

Prerequisites

- BIOE601 with a minimum grade D

GEOL575 Engineering Geology (2 CH)

Geotechnical studies. Surface structures in the fields of civil engineering and agriculture. Coastal zones. Site selection, foundation problems. Landslides. Design and construction of underground structures. Extraction of water, petroleum and natural gas. Military applications. Failure of structures. Engineering codes.

GEOL581 Applied Paleontology in Hydrocarbon Exploration (3 CH)

This course builds on the students' knowledge of the main micro and macrofossil groups, particularly foraminifera, ostracods, calcareous nannofossils and pollen grains and spores (palynomorphs), siliceous microfossils (Radiolaria), sponges, coelenterates, bryozoan, brachiopods, molluscs, echinoids, trilobites, graptolites and trace fossils (S2). The course will further develop the students' ability to recognize the essential characteristics of the general and apply that knowledge to petroleum exploration through integrated field, laboratory and case study exercises (K1, S1, S2,). The students will also be taught the significance of paleontology in biostratigraphic, paleoenvironmental and paleoclimatic research. Specific applications to basin hydrocarbon exploration and reservoir biostratigraphic zonation will be highlighted. Part of the course assessment includes oral presentation and report (S6).

GEOL585 Spatial Analysis using GIS and Remote Sensing (3 CH)

This course explores methods of analyzing spatial data in the interactive and graphical environment of a GIS and remote sensing (K3). The course draws on related theory in spatial statistics, geo-statistics, geographical analysis and cartographic modeling as well as teaching students how to enhance and process satellite images (S1, S2)). It is expected that at the end of the course students will be able to extract the necessary information and integrate Geo-data types related to land forms, environment, water, and hydrocarbon exploration. Part of the course assessment includes oral presentation and report (S6).

GEOL618 Exploration Geophysics (3 CH)

The aim of the course is to acquaint the students with the advanced theoretical and interpretation techniques of the different exploration geophysical methods and the problem recognition in exploration mainly in Petroleum Exploration (K1, K2). The course concentrates mainly on the explanation and functioning of the different methods (S2, S3, S4). The course also covers the data acquisition and processing. In addition to the comparison and correlation with other geophysical and geological data. Part of the course assessment includes oral presentation and report (S6).

GEOL620 Carbonate and Evaporite Depositional Systems (3 CH)

This course aims to provide advanced methods for the characterization of carbonate and evaporate depositional systems and the techniques used in interpreting and understanding primary and secondary modifications (K1, K2, S1, S2). A special focus will be given to features of depositional environments and in particular to the sabkha system of the UAE (K1). Part of the course assessment includes oral presentation and report (S6).

GEOL631 Engineering Rock Mechanics (3 CH)

This course introduces the principles of engineering rock mechanics including data collection and assessment. The course stipulates how structures such as dams, tunnels, caverns, etc. built on or in rock masses critically depend on the rock mass properties and interaction between the rock mass and the engineered structure (K4). This course also focuses on description and

representation of a rock mass, stress and strain in a rock mass and deformation and failure of a rock mass. These principles are simply applied to rock engineering applications such as rock slope stability analysis, design of underground structures in rocks (S3). Part of the course assessment includes oral presentation and report (S6).

GEOL632 Remote Sensing and GIS for Biodiversity Monitoring (2 CH)

The scope of this course is to use remote sensing and GIS techniques and technologies for mapping, measuring and monitoring biodiversity. The theoretical backgrounds as well as the practical implementation of RS/GIS for biodiversity research and conservation application are taught. The remote sensing data analysis, GIS database building as well as the integration with biodiversity data and the spatial statistics including spatial modelling are introduced and mainly done with Erdas Imagine and ArcGIS softwares.

GEOL654 Earth Climate Evolution, Geoinformatics and Environmental Hazards (3 CH)

This course will focus on Evolution of the Earth's climate during geological time and factors that cause climatic changes and related environmental hazards (K1, S1). The course will use GeoInformatics techniques and software (S3, S4) for interpretation of geodatabase building (K2, S5) and analysis. Tools commonly used for the identification of climate and paleoclimate changes and associated environmental hazards, such as sea level rise, drought and floods (K2, S3, S4, S5) will be presented. Part of the course assessment includes presentation and report (S6).

GEOL671 Planetary Sciences (3 CH)

This course deals with the exploration of terrestrial planets in respect to planetary resources and their analogues on Earth. It takes the Earth as a reference to understand development of surface features on terrestrial planets and their related dynamic, physico-chemical, and morphological processes. The course introduces different methods used in the exploration of Earth and terrestrial planets including different specialties of Earth Sciences. The main objective is to introduce students to the geological histories, and geological processes, of other planets and to illustrate how this knowledge has led to our current understanding of the origin and evolution of the solar system. The course is designed to give students the basic introduction to planetary geology, with particular emphasis on the geology of Mars.

Prerequisites

- PHYS105 with a minimum grade D
- PHYS110 with a minimum grade D
- MATH105 with a minimum grade D
- MATH110 with a minimum grade D

GEOL680 Selected Topics (3 CH)

This course is designed to meet students' needs to enhance and support his/her research skills and knowledge. Basic Knowledge competencies and computational skills that may not have been satisfactorily covered by core and elective courses, will be emphasized during this course. K1-K4, S1-S6 will be more emphasized during this course.

GEOL710 Advanced Topics in Plate Tectonics (3 CH)

The course provides a selection of classic examples of tectonic divergent (Atlantic passive margin and mid-ocean ridge spreading axis), transform (strike-slip and transpressive plate boundary), and convergent (Andean and Mariana-type subduction, arc-arc, arc-continent, and continent-continent collisions) plate boundaries for detailed treatment. The origins and evolution of key tectonic elements such as ocean basins, transform faults, oceanic trenches, volcanic island arcs, back-arc basins, continental rifts, continental shelves, orogenic mountain ranges etc. are explored.

GEOL720 Modeling and Geoinformatics (3 CH)

The course aims to enable students to use computer-based innovative techniques for the analysis and modeling of geospatial data. GPS, GIS, Digital Image Processing, and Geo-database building will be explained and used for problem solving and modeling. The course consists of three interrelated parts: a theoretical part which focuses on the concepts, a practical part which aims at developing hands-on skills in using software tools, and an application oriented part in which participants learn how to design and carry out sequential data processing steps for solving typical application problems in Geoscience. It is expected that at the end of the course students will be able to build models integrating various types of Geospatial data related to land forms, environment, water, hydrocarbon exploration, etc.

GEOL730 Geology, Environment and Society (3 CH)

This course examines the important modern issues of environmental and social dimensions that lie within the geological sphere of study. The main topics covered in this course deal with energy sources and waste products, water for populations and industry, mineral and industrial material resource prospects and challenges, land use, land management, seismic assessment, coastal and sabkha issues, environmental engineering, climate and desertification issues.

GEOL740 Geophysical Instruments & Data Acquisition (3 CH)

The aim of the course is to acquaint the PhD students with the different geophysical field techniques and technical problem recognition. The course covers explanation and functioning of the geophysical instruments including magnetometer, gravimeter, geoelectric instruments both electromagnetic and electric, and seismic. The course also covers the data acquisition and first step processing. The course aims at acquainting the students with the principles, data acquisition and processing of gravity, magnetic and geoelectric methods. The roles of these methods in the earth science investigations will be demonstrated.

GEOL745 Seismology & UAE Seismicity (3 CH)

The course aims to provide an understanding of the dynamics of the solid Earth from theoretical and observational seismology and seismotectonics in relation to earthquake hazard and mitigation. It provides an in-depth study of earthquake seismology and earthquake hazard. The course includes procedures for Interpreting earthquake seismograms and determination of earthquake focal mechanisms. Special attention is given to the seismicity of the UAE by considering the local seismology network data. The keys structural elements and seismic characteristics of the tectonic divergent, convergent and transform plate margins are presented. The tectonic evolution of the Arabian Plate is reviewed. The course then explores the dynamics of the solid Earth from theoretical and observational seismology and seismotectonics in relation to earthquake hazard and mitigation. It provides an in-depth study of earthquake seismology and earthquake hazard. Procedures for Interpreting earthquake seismograms and determination of earthquake focal mechanisms are given, with special attention to the seismicity of the UAE via local seismological network data.

GEOL750 Diagenesis, Stratigraphy, & Reservoir Evaluation (3 CH)

This course aims to introduce principles of diagenesis in sedimentary rocks and the effects of diagenetic processes and sequence stratigraphy on petroleum reservoirs with respect to basin architecture, relative sea level change and history. Concepts of stratigraphy, including, litho-bio-chemo-stratigraphy and sedimentology of clastic and nonclastic rocks will be introduced. Diagenetic processes cause changes in the porosity and permeability of sedimentary rocks that are controlled by the sequence stratigraphic secessions order and geometry. These changes impact the development of petroleum reservoirs and systems through changes in the permeability and porosity that directly related to oil migration and exploitation. The course will also introduce the students to sequence stratigraphic correlation on local, regional and global scale.

GEOL755 Formation Evaluation (3 CH)

This course aims to provide introduction of geological, geophysical, petrophysical and geochemical methods used in the evaluation of petroleum bearing sedimentary rocks. Principles of petroleum systems and elements particularly source, migration, reservoirs, traps and seals will be provided. The course will also include evaluation of geological risk and optimization in exploration prospects through correlation between the different elements of the petroleum system. The course also will provide tools in petrophysics including well logging information and evaluation of petrophysical parameters, covering Porosity, Permeability, Formation evaluation and water and oil saturation, and Capillary pressure curves and wettability. These goals will be achieved by using advanced digital correlation matrices of the different geological, geophysical and geochemical parameters

GEOL760 Computer Applications in Geosciences (3 CH)

The course introduces students to the fundamentals of computing and to their practical applications in geosciences. Students will be trained on how to: define and create thematic layers from remote sensing and field spatial data; classify remote sensing data and extract information about earth surface; build geo-databases in a GIS environment; populate geodatabases, retrieve geo-data from geo-databases; import geo-data from external sources (e. g, existing databases, internet sites, ancillary data, etc.). The software used are ArcGIS from ESRI, Ltd, with Spatial Analyst and 3D analyst extensions for processing vector data models & ERDAS Imagine for raster data models and digital image processing. Students will be trained on using remote sensing data such as: satellite imagery of moderate to high resolutions (examples: Landsat, WV-2 &

3, Pleiades, Sentinel1 & 2, etc.); DEMs (available 15m and 5m for urban areas); GPS data (field survey); old maps (scanned 1: 25,000 topo maps) and other ancillary data. All mentioned data will be integrated in a unified coordinate system in geo-databases. This course is complementary and a co-requisite to the course (GEOL 720: Modelling and GeoInformatics) offered as a core course AND is intended to provide students, who have little to no experience in remote sensing and GIS, with necessary foundations to run smoothly the Modelling and GeoInformatics (GEOL 720) course. Students will acquire more experience and familiarize themselves with more remote sensing and GIS data analysis through hands-on exercises, home assignments and project implementation.

Prerequisites

- GEOL720

GEOL767 Advanced Geochemistry (3 CH)

The course covers detailed distribution, abundance and behavior of various elements in different parts of the earth. This mean abundance and behavior of trace element and their analysis, mobility and migration. This course focused on trace element geochemistry including a review of partition coefficients and theoretical approaches to understanding trace element partitioning during partial melting and fractional crystallization. Geochemical analyses including varieties of different instrumentation and techniques of different analytical methods. These methods include X-ray Fluorescence (XRD), inductive coupled plasma mass-spectrometer (ICP-MS), thermal ionization mass-spectrometer (TIMS), X-ray diffraction method (XRD), electron microprobe (EPMA) and sensitive resolution mass-spectrometer (SIMS). Throughout the course, lectures are interspersed with papers that are to be read by students and discussed during class. A listing of papers to be discussed is included but unfortunately the interactive class discussions emerging from reading these papers cannot be reproduced in a Web-based course. In addition, part of the course will comprise a seminar format that will require students to use the knowledge gained to evaluate and discuss geochemical topics.

Prerequisites

- GEOL410 with a minimum grade D

GEOL770 Environmental Mineralogy (3 CH)

Minerals are the essential earth solid materials made of chemical elements that occur in almost every environment. Therefore, any environmental impact, protection or treatment is strongly connected directly or indirectly to these materials. This course will explain this connection and reveal how mineralogy is a key of many environmental issues. It is planned to cover more or less following topics: The scope of environmental mineralogy, geochemical distributions of elements, heavy-metals, minerals and soil development, minerals and human health, conservation, landfills and containment control, mineral marine sediments, mine and nuclear wastes mineralogy, and the role of mineralogy in waste management and remediation strategies will be discussed with examples from UAE where possible.. Some geochemical analyses, methods or techniques may also be outlined when necessary. Although textbooks are the main reference of the course, related journal papers or published articles may be added to be presented and discussed during the class time.

GEOP322 Igneous & Metamorphic Petrology (3 CH)

This course begins with a review of the classification of igneous rocks, followed by a study of the field occurrences, mineralogy, textures, compositions and origins for the major extrusive and intrusive rock associations. As the semester proceeds, experimental evidence is evaluated which can shed light on the origin and crystallization of magmas. During the second half of the term, metamorphic rocks, processes, and structures are considered from a field, laboratory, and experimental perspective. Igneous and metamorphic rocks and processes are considered at all scales, from global plates, mountain ranges, large outcrops, and hand-samples, through microscopic and submicroscopic observations.

GEOP431 Seismic Stratigraphy (3 CH)

The aim of this course is to identify the key elements of seismic reflection patterns, amplitudes and frequencies essential to a specific basin stratigraphic and facies analysis that lead to oil and gas play definition. It gives clues about the methods of analyzing environments of deposition, type of rocks, Sedimentary sequences, fluid content and contacts, palaeo-sea level change and the Geologic history.

GEOP469 Petroleum Geochemistry (3 CH)

The main objectives of this course is to introduce many of the basic concepts used by geochemists in obtaining information on the origin and history of crude oil, bitumen, petroleum and natural gas, to evaluate the source rocks of oil, to develop the concept of biomarkers and to interpret GC and GC/MS chromatograms.

GEOP495 Selected Topics (3 CH)

Through this course, faculty members are given the chance to teach new or timely subjects that are not covered in other courses.

GEPW357 Hydrogeology (3 CH)

The course teaches the basic concepts of hydrogeology using examples from the UAE. Topics include: the hydrologic cycle, origin and age of groundwater, properties and kinds of aquifers, groundwater exploration, drilling, design, development and completion of water wells, principles of groundwater flow and pumping tests, physical and chemical properties of groundwater, recent developments in groundwater studies, and water resources in the UAE.

Prerequisites

- GEOL330 with a minimum grade D

Mathematical Sciences

MATH105 Calculus I (3 CH)

Elementary functions, limits, continuity, limits involving infinity, tangent lines, derivative of elementary functions, differentiation rules, chain rule, implicit differentiation, linear approximation, l'Hospital rule. Graph sketching (extrema, intervals of monotonicity, concavity), optimization. Antiderivatives, definite integrals, Fundamental Theorem of Calculus, integration by substitution, area between curves, improper integrals.

MATH110 Calculus II (3 CH)

Integration techniques (by parts, by use of trigonometry, by partial fractions), volume and area of solids of revolution, arc length. Parametric curves: velocity vector, enclosed area, arc length. Curves in polar coordinates: enclosed area, conic sections. Sequences, series, convergence tests, alternating series, absolute convergence, power series, Taylor series, Fourier series.

Prerequisites

- MATH105 with a minimum grade D

MATH1110 Calculus I for Engineering (3 CH)

Differential calculus of functions of one variable: functions of one variable, techniques of differentiation, derivatives of trigonometric, exponential, and logarithmic functions, chain rule, implicit differentiation, maximum and minimum values, increasing, decreasing and concave functions, inverse trigonometric functions, hyperbolic functions, some engineering applications. Integral calculus of functions of one variable: definite and indefinite integrals, techniques of integration (integration by substitution, integration by trigonometric substitutions, integration by parts, integration by partial fractions), applications of definite integrals in geometry, some engineering applications.

MATH1120 Calculus II for Engineering (3 CH)

Differential calculus of functions of several variables: vectors, vector valued functions, functions of several variables, partial derivatives, chain rule, gradient and directional derivatives, extrema of functions of several variables. Quadratic surfaces. Vector fields and line integrals, double integrals in Cartesian and polar coordinates, triple integrals in Cartesian, cylindrical and spherical coordinates.

Prerequisites

- MATH1110 with a minimum grade D

MATH115 Calculus for Business & Economics (3 CH)

This course introduces the concepts of differential and integral calculus useful to students in business, economics. Among the topics studied are: curve sketching for some functions relevant to business and economics applications, derivatives and techniques of differentiation, exponential growth, anti-derivatives and methods of integration, definite and indefinite integrals with applications. The course also covers topics on partial derivatives and matrices, in addition to many applications in Business and Economics.

MATH120 Contemporary Applications of Math (3 CH)

Problem solving, fair divisions, Mathematics of Apportionment, Euler circuits, network, scheduling methods, population growth, symmetry, fractal geometry.

MATH140 Linear Algebra I (3 CH)

Systems of linear equations, matrices and determinants. Vector spaces, inner product spaces. Matrix representations of linear operators. Eigenvalues, eigenvectors, and Cayley-Hamilton Theorem.

Prerequisites

- MATU1435

MATH205 Set Theory and Logic (3 CH)

Compound and simple propositions, truth table, quantifiers, propositional calculus, methods of proof. Sets and operations on it. Cartesian products, relations, equivalence relation, order relation. Functions. Cardinality.

Prerequisites

- MATH110 with a minimum grade D
- MATH140 with a minimum grade D

MATH210 Calculus III (3 CH)

Euclidean space: dot product, cross product, lines, planes, surfaces. Parametric curves in space. Functions of several variables: limits, continuity, partial derivatives, tangent plane, linear approximation, chain rule, gradient, directional derivative, extrema, Lagrange multipliers. Double integrals, applications (area, volume, center of mass), change to polar coordinates. Triple integrals, change to cylindrical and spherical coordinates. Vector fields, line integrals, conservative fields, Green's theorem.

Prerequisites

- MATH110 with a minimum grade D
- MATH140 with a minimum grade D

MATH215 Introduction to Analysis (3 CH)

Properties of R. Completeness of the line, supremum and infimum, Cantor's nested intervals theorem. Sequences, limits and their properties, monotone sequences, Bolzano-Weierstrass Theorem, Cauchy criterion, properly divergent sequences. Series, absolute and conditional convergence, tests of convergence. Topological properties of R, Metric spaces and general topology.

Prerequisites

- MATH205 with a minimum grade D

MATH2210 Differential Equations for Engineering (3 CH)

Ordinary differential equations: first order differential equations: separable; homogeneous, linear, Bernoulli, exact-integrating factors. Second order linear differential equations: homogeneous equations with constant coefficients; undetermined coefficients method; variation of parameters method; Euler's Equation; Non-homogeneous equations; higher order linear equations; Solving Homogeneous and Non-Homogeneous Systems of Differential Equations using eigenvalues and eigenvectors. Laplace transforms: basic properties; solving initial value problems using Laplace; solving integral equations; solving systems of differential equations by Laplace transform.

Corequisites

- MATH2220 with a minimum grade D

MATH2220 Linear Algebra for Engineering (3 CH)

Solving systems of linear equations, matrices and determinants; Vector spaces, inner product spaces; Eigenvalues, eigenvectors, diagonalization; Least Squares fitting; Some engineering applications.

Prerequisites

- MATH1110 with a minimum grade D

MATH246 Number Theory (3 CH)

Divisibility, Euclidean algorithm, prime numbers, the Fundamental Theorem of Arithmetic, the Sieve of Eratosthenes. Congruence, Diophantine equations, Chinese Remainder Theorem. Fermat's theorem, Wilson's theorem, Euler's theorem.

Prerequisites

- MATH205 with a minimum grade D

MATH260 Foundation of Geometry (3 CH)

Euclid's postulates and plane geometry. Von-Neumann postulates. The parallel postulate. Affine geometry and geometry on the sphere. Projective and hyperbolic geometries. Klein-Beltrami and Poincare models of the plane. Pappus and Desargues theorems. Transformations: automorphisms, motions, similarities, and congruence.

Prerequisites

- MATH1120 with a minimum grade D or MATH110 with a minimum grade D

- MATH140 with a minimum grade D

MATH275 Ordinary Differential Equations (3 CH)

First order differential equations: examples, separable equations, homogeneous and exact equations, integrating factor and Bernoulli's equation, linear equations, initial value problems. Higher order differential equations: linear equations, linear independence and Wronskian matrices, existence and uniqueness of solutions. Particular solutions: the method of undetermined coefficients, the method of variation of parameters. Laplace transforms and initial value problems. Series solution of differential equations. System of equations and their matrix form.

Prerequisites

- MATH110 with a minimum grade D
- MATH140 with a minimum grade D

MATH305 Mathematics For Teachers I (3 CH)

Introduction to mathematical logic, sets, operation on sets, the set of natural numbers, the set of integers, the set of rational numbers, graphical representation of numbers, decimal representation of numbers, other bases, divisibility, solution of arithmetic problems, applications.

Prerequisites

- MATU1415

MATH310 Real Analysis (3 CH)

Functions, limits of functions, limits involving infinity, continuity, uniform continuity, Extreme Value Theorem, Intermediate Value Theorem, monotone and inverse functions. Differentiation, Mean Value theorem, L'Hospital's rule, Taylor's theorem. Riemann integral, the Fundamental Theorem of Calculus

Prerequisites

- MATH215 with a minimum grade D

MATH313 Advanced Calculus (3 CH)

Vector-valued functions of n variables: limits, continuity, Jacobian matrix, differentiability, general chain rule. Implicit Function Theorem for many variables. Scalar-valued functions of n variables: multidimensional Taylor series, Hessian, optimization, constrained optimization. Multiple integrals: Jacobian, change of variables formula, improper integrals. Parametric surfaces: tangent plane, area, integrals over a surface. Vector Calculus: vector fields, divergence, curl, surface integrals of a vector field, Stokes' and Gauss' theorems.

Prerequisites

- MATH210 with a minimum grade D

MATH315 Complex Analysis I (3 CH)

Complex numbers: properties and representations. Complex functions: limits, continuity, and the derivative. Analytic functions: Cauchy - Riemann equations, harmonic functions, elementary analytic functions. Integration in the complex plane: complex line integrals, Cauchy integral theorem, Morera's theorem, Cauchy integral formula; Maximum principle. Liouville's theorem and the fundamental theorem of algebra.

Prerequisites

- MATH210 with a minimum grade D
- MATH205 with a minimum grade D

MATH320 Numerical Analysis I (3 CH)

Error analysis: solutions of non-linear equations in one variable, bisection, fixed point, and false position methods, Newton and secant methods; Solution of a system of linear equations: Gaussian elimination method, Cholesky factorization method. Iterative methods: Interpolation: Lagrange, divided differences, forward, backward, and central methods. Numerical differentiation, two, three and five point formulas. Numerical integration, trapezoidal, Simpson's rules and composite quadrature.

Prerequisites

- MATH205 with a minimum grade D

MATH321 Linear Programming (3 CH)

General Linear Programming Problem. Geometric method. Simplex method. Revised Simplex method. Computer implementations. Duality. Parametric linear programming. Interior point methods. Applications including: transportation problem, inventory problems, blending problems and game theory.

Prerequisites

- MATH205 with a minimum grade D

MATH335 Mathematics for Teachers II (3 CH)

Geometrical figures in plane and space and their properties. Areas and volumes of geometrical figures; unitary and non-unitary linear transformations and their properties. Ratio, proportion, percentage and their practical applications. The geometric problem: construction and solutions methods.

Prerequisites

- MATH305 with a minimum grade D

MATH340 Abstract Algebra 1 (3 CH)

Groups: examples, subgroups, cyclic subgroups; cosets and Lagrange's theorem; Cyclic groups and permutation groups. Normal subgroups, quotient groups; homomorphisms and isomorphisms; Direct products of groups. Rings: examples, sub rings, ideals, quotient rings, integral domains, Fields. Ring homomorphisms and isomorphisms.

Prerequisites

- MATH246 with a minimum grade D

MATH341 Linear Algebra II (3 CH)

Linear Transformations: Isomorphisms of vector spaces, representation by matrices, and change of basis. Eigenvalues and eigenvectors: diagonalization and triangularization of linear operators. Inner product spaces: Orthogonalization and Rieze representation theorem. Self-adjoint operators: the Spectral theorem, Bilinear and quadratic forms.

Prerequisites

- MATH205 with a minimum grade D

MATH342 Graph Theory (3 CH)

Definition of a graph. Examples, paths and cycles: Eulerian and Hamiltonian graphs. Application to shortest path and Chinese postman problems, trees, applications, including enumeration of molecules, planar graphs, graphs on other surfaces, dual graphs. Coloring maps, edges, vertices. Digraphs, Markov chains, Hall's marriage theorem and applications. Network flows.

Prerequisites

- MATH205

MATH344 Introduction to Cryptography and Coding Theory (3 CH)

This course introduces students to the principles and practices which are required for secure communication: cryptography and cryptanalysis, including authentication and digital signatures. Mathematical tools and algorithms are used to build and analyze secure cryptographic systems. Basic notions of coding theory will be also covered

Prerequisites

- MATH246 with a minimum grade D

MATH372 Partial Differential Equations (3 CH)

Definitions and concepts: general and particular solutions. Elimination of arbitrary constants and functions. First order equations (the method of characteristics). Second order equations: classifications (hyperbolic, elliptic, parabolic), the normal form. Boundary value problems: the heat equation, the wave equation, Laplace equation. Methods of solutions: separation of variables, the Fourier and Laplace transforms.

Prerequisites

- MATH210 with a minimum grade D
- MATH275 with a minimum grade D

MATH374 Dynamical Systems and Applications (3 CH)

One dimensional discrete dynamical systems. Steady states, stability, periodic points. Chaos. Lyapunov exponents. Symbolic dynamics. 2-dimensional systems. Mandelbort set. Fractals. Applications in ecology population growth, Predator-prey and competition models. Applications in medicine fractal structure of the lung, heart rat variability.

Prerequisites

- MATH210 with a minimum grade D
- MATH275 with a minimum grade D

MATH391 Financial Mathematics (3 CH)

Introduction to the concepts of financial markets and products. Financial derivatives, options, futures and forwards. Pricing, hedging and no arbitrage concepts. The Binomial model. Introduction to stochastic calculus, Stochastic processes, Markov property, martingales. Brownian motion, stochastic integration, stochastic differential equations, Ito's Lemma. Black and Scholes formula, delta hedging. Numerical Methods for finance, Finite Difference Methods, Monte Carlo simulation. Optional topics: Value at Risk, Greeks, Implied volatility, implementation of pricing formulas in VBA for Excel, interest rate models, exotic options, path dependent options, Asian options.

Prerequisites

- MATH275 with a minimum grade D
- STAT230 with a minimum grade D

MATH413 Complex Analysis II (3 CH)

Sequences and series of complex numbers, Power series, Taylor and Laurent expansions, differentiation and integration of power series, application of the Cauchy theorem: Residue theorem, evaluation of improper real integrals, conformal mappings, mapping by elementary functions.

Prerequisites

- MATH315 with a minimum grade D

MATH422 Numerical Analysis II (3 CH)

Approximation theory: Orthogonal and Chebyschev polynomials, rational and trigonometric polynomials, multiple integrals, initial value problems: Taylor's methods, multistep and Runge-Kutta methods, boundary value problems: shooting, finite difference and Rayleigh-Ritz methods.

Prerequisites

- MATH320 with a minimum grade D
- MATH275 with a minimum grade D

MATH443 Abstract Algebra 2 (3 CH)

Rings: introduction to rings properties and subrings; Integral Domain (ID), fields and characteristic of a ring; Ideals and factor rings; ring homomorphisms, polynomial rings and factorization of polynomials; Divisibility in ID and Unique Factorization Domain (UFD). Fields: the Fundamental Theorem of Fields; Splitting Field; Zeroes of Irreducible polynomial; Algebraic extension of Fields; Finite Fields; Introduction to Galois Theory.

Prerequisites

- MATH340 with a minimum grade D

MATH462 Introduction to Topology (3 CH)

Topological spaces, Bases and sub-bases, subspaces, finite product spaces, continuous maps, homomorphisms, Hausdorff spaces, metric spaces, compactness and connectedness, separation axioms.

Prerequisites

- MATH215 with a minimum grade D

MATH470 Mathematical Modeling (3 CH)

The modeling process, dimensional analysis, model fitting techniques, discrete models difference equations, logistic equation. Continuous models using derivatives for example: predator-prey, population, harvesting, models. Discussion of stability, phase plane. Applications using Mathematica.

Prerequisites

- MATH275 with a minimum grade D or MATH2210 with a minimum grade D

MATH471 Control Theory & Applications (3 CH)

Introduction and motivation. Problem formulation. Systems models: linear and nonlinear systems. Optimal control problems arising from different fields. Calculus of variation with application to system modeling. Limitation of calculus of variation leading to modern control theory. Time optimal control, attainable state, reachable sets, and Bang-Bang principle. Pontryagin minimum principle and transversality conditions. Linear quadratic control problems. Optimal linear state feedback control. Applications: 3-axis attitude control of communication

satellites, road building and fisheries problems, geo-synchronous satellites, speed controls of electric motors.

Prerequisites

- MATH275 with a minimum grade D
- MATH320 with a minimum grade D

MATH495 Research Project (3 CH)

Students are supervised during their formulation of research proposals. Instructors direct their students in carrying out different tasks leading to the execution of the projects. Students are required to give presentations regarding their achievements, and the written final reports are submitted for evaluation.

Corequisites

- MATH500

MATH500 Internship (6 CH)

The Internship training program is coordinated by both the department, academic supervisor and the faculty training committee. The program is continuously monitored and reviewed by a field supervisor staff member at one of the institutions, establishments, or work sites in the United Arab Emirates. (This course is conducted over half a semester (8 weeks) during the third year of study. Offered condensed courses should be taken during the other half of the semester).

Prerequisites

- Pre/Co MATH495 with a minimum grade D

MATH510 Real Analysis (3 CH)

Sequences of functions, the uniform norm, uniform convergence. Series of functions and tests for uniform convergence. Limits superior and inferior. Lebesgue outer measure and Lebesgue measure, measurable subsets, Borel

measurable sets, non-measurable sets. Measurable functions. Integration of non-negative functions, Levi’s monotone convergence theorem, Fatou’s lemma, Integrals of measurable functions. Lebesgue’s dominated convergence theorem. Riemann integral versus Lebesgue integral.

MATH515 Complex Analysis (3 CH)

Complex derivative, Cauchy-Riemann equations, conformality, power series and Abel's theorem. Complex integration, exactness and independence of path, Cauchy's theorem for disks, Cauchy's integral formula, higher derivatives, applications. Taylor's finite development, zeroes of analytic functions, classification of isolated singularities, Casorati-Weierstrass theorem. Argument principle, open mapping theorem. Maximum modulus principle, Schwarz' lemma. Chains, cycles, simple connectivity, homology, general form of Cauchy's theorem, periods and residues, the residue method. Compactwise convergence and Weierstrass' theorem, Hurwitz's theorem, Taylor's expansion, Laurent expansion. Mittag-Leffler’s theorem. Infinite products and absolute convergence, Weierstrass’s factorization theorem. Riemann conformal mapping theorem. Montel's theorem. Special functions (gamma, zeta). Introduction to Harmonic analysis.

MATH520 Numerical Analysis (3 CH)

Error analysis. Solutions of linear systems: LU factorization and Gaussian elimination, QR factorization, condition numbers and numerical stability, computational cost. Least squares problems: the singular value decomposition (SVD), QR algorithm, numerical stability. Eigenvalue problems: Jordan canonical form and conditioning, Schur factorization, the power method, QR algorithm for eigenvalues. Iterative Methods: construction of Krylov subspace, the conjugate gradient and GMRES methods for linear systems, the Arnoldi and Lanczos method for eigenvalue problems.

MATH522 Numerical Methods in Differential Equations (3 CH)

Theory and implementation of numerical methods for initial and boundary value problems in ordinary differential equations. One-step, linear multi-step, Runge-Kutta, and extrapolation methods; convergence, stability, error estimates, and practical implementation, Study and analysis of shooting, finite difference and projection methods for boundary value problems for ordinary differential equations. Theory and implementation of numerical methods for boundary value problems in partial differential equations (elliptic, parabolic, and hyperbolic).

MATH540 Algebra I (3 CH)

Group theory: definitions, subgroups, permutation groups, cyclic groups, quotient groups, homomorphism, the isomorphism and the correspondence theorems. Ring theory: definitions, rings homomorphism, ideals, quotient rings, fraction fields, polynomial rings, Euclidean domain, and unique factorization domain. Field theory: algebraic field, extensions.

MATH541 Number Theory (3 CH)

Basics of number theory: divisibility, unique factorization, congruence arithmetic, Chinese remainder theorem, integers modulo n, Finite fields, Fermat's little theorem, and Wilson's theorem. Introduction to Algebraic number theory: the Pell equation, the Gaussian integers, Quadratic integers, and the Four square theorem. Quadratic reciprocity and quadratic congruence with composite modules.

MATH561 General Topology (3 CH)

Fundamentals of point set topology: topological spaces, neighborhoods of points, basis, subbases, and weight of spaces. Continuous maps and homeomorphisms, closed and open mappings, quotient mappings. Metric and normal spaces, accountability and separation axioms. Product spaces and quotient spaces. Compactness and connectedness of spaces and properties. Complete metric space and function spaces.

MATH570 Theory of Partial Differential Equations (3 CH)

The theory of initial value and boundary value problems for hyperbolic, parabolic, and elliptic partial differential equations, with emphasis on nonlinear equations. More general types of equations and systems of equations

MATH573 Dynamical Systems & Chaos Theory (3 CH)

Discrete time dynamical systems. Continuous time dynamical systems. Invariant manifolds, homoclinic orbits, local and global bifurcations. Hamiltonian systems, completely integrable systems, KAM theory. Different

mechanisms for chaotic dynamics, symbolic dynamics, Applications in physics, biology and economics.

MATH616 Functional Analysis (3 CH)

Banach Spaces, The Banach Fixed Point Theorem; Bounded Linear Operators and functionals; Hilbert Spaces; Representation of functionals on Hilbert Spaces; Compact linear operators in Banach Spaces; Spectral Theory of Bounded Self-Adjoint Linear Operators in Hilbert Spaces.

MATH633 Mathematics Seminar (1 CH)

In the first part of the course, introductory research talks will be delivered by faculty members. Ethics issues related to mathematical research will be also discussed. In the second part, each student will give a talk in a research topic of his/her choice.

MATH640 Algebra II (3 CH)

Group theory: Sylow theorems, Jordan–Holder theorem, solvable group. Ring theory: unique factorization in polynomial rings and principal ideal domain. Field theory: rules and compass constructions, roots of unity, finite fields, Galois theory, solvability of equations by radicals.

MATH690 Selected Topics (3 CH)

A variety of topics and current research results in Mathematics will be presented by faculty members to students.

MATH695 Independent Studies (3 CH)

Graduate students will study topics related to their Ph.D. thesis independently. The selection of these topics will be with the consent of advisor.

MATH710 Functional Analysis (3 CH)

Normed Spaces; Banach Spaces; Compactness and Finite Dimension; Bounded Linear Operators; Operator Spaces; Inner Product Spaces; Hilbert Spaces; Orthonormal Sets and Sequences; Representation of Functionals on Hilbert Spaces; Self-Adjoint; Unitary and Normal Operators; Zorn's Lemma; The Hahn-Banach Theorem; Adjoint Operator; Reflexive Spaces, The Baire Category Theorem; The Uniform Boundedness Theorem; Strong and Weak Convergence; Numerical Integration and Weak-* Convergence; The Open Mapping Theorem; The Closed Graph Theorem; The Banach Fixed Point Theorem; Spectral Theory of Bounded Linear Operators and Compact Linear Operators in Normed Spaces; Spectral Theory of Bounded Self-Adjoint Linear Operators in Hilbert Spaces.

MATH715 Advanced Measure Theory (3 CH)

Outer Measure; The Caratheodory-Hahn Theorem; Measurable Functions; Integration of Measurable Functions; Fatou’s lemma and Convergence Theorems; Abstract Measure Spaces; Product Measures; Fubini’s Theorem; Abstract L_p Spaces; The Completeness of L_p (X,μ); The Riesz Representation Theorem for the Dual of L_p (X,μ).

Prerequisites

- MATH510

MATH716 Introduction to Operator Algebras (3 CH)

Banach and Hilbert spaces. Bounded operators on Hilbert spaces, Algebras of operators, The von Neumann algebras, compact and Hilbert-Schmidt operators. Abstract C*-algebras and main examples, The Continuous Functional Calculus Theorem, polar decomposition, Gelfand-Naimark Theorem.

Prerequisites

- MATH616

MATH720 Numerical Methods for Partial Differential Equations (3 CH)

Numerical quadrature, Spectral Methods: Collocation, Tau and Galerkin methods, Elliptic Problems and the Finite Element Method: conservation of heat, behavior of solutions, Two-point boundary value problems and the Laplace and Poisson equations, variational and the Galerkin finite element methods, Convergence, finite difference method, Method of Lines, Numerical

stability, stiffness and dissipativity, convergence, Finite difference schemes, consistency, Stability, dissipativity, dispersion, convergence.

Prerequisites

- MATH522

MATH740 Advanced Algebra (3 CH)

Modules, quotient modules, module homomorphisms, direct sums, free modules, tensor products. Vector spaces, matrices, dual spaces, determinants. Modules over principal ideal domains, rational canonical forms, Jordan canonical form. Modules over group rings, Schur lemma, Wedderburn theorem, character theory, orthogonality relations.

Prerequisites

- MATH640

MATH741 Advanced Number Theory (3 CH)

Estimates of arithmetic functions, the prime number theorem, Dirichlet series, Dirichlet theorem on primes in arithmetic progressions. Integer partitions, Euler formulas, Jacobi triple product formula. Algebraic numbers, algebraic integers, quadratic fields, units and primes in quadratic fields.

MATH743 Cryptography (3 CH)

Public key cryptosystems (RSA, Rabin, ElGamal), discrete logarithm, Diffie-Hellman key exchange, primality testing, factoring algorithms, multivariate cryptography, other systems, signature schemes, secret sharing, hash functions, identification.

Prerequisites

- MATH540 with a minimum grade D

MATH744 Coding Theory (3 CH)

Block codes, linear codes, generator and parity check matrices, dual codes, weight and distances, weight enumerators, Hamming codes, Golay codes, Reed-Muller codes, Kerdock codes, bounds on codes, theory of cyclic codes, BCH codes, Reed-Solomon codes, quadratic residue codes, generalized Reed-Muller codes, codes over Z4.

MATH745 Finite Fields and Applications (3 CH)

Fields, finite fields, field extensions, trace and norm functions, bases, polynomials, primitive polynomials, irreducible polynomials, linearized polynomials, applications of finite fields, linear codes, multivariate cryptography.

Prerequisites

- MATH740

MATH746 Finite Groups (3 CH)

Characteristic subgroups, Nilpotent and Solvable Groups, Semidirect and Central products; Automorphisms as Linear Transformation. Representations of Finite Abelian Groups, Complete Reducibility, Clifford's Theorem, G-Homomorphism and Representation of direct and central products, Character Theory: Frobenius Groups, Coherence and Brauer's characterization of Characters.

Prerequisites

- MATH540

MATH747 Module and Ring Theory (3 CH)

Free module, Projective module, Injective module, Flat modules, Homological dimensions, Noncommutative localization, von Neumann regular rings and generalizations, Frobenius and quasi-Frobenius rings, Morita theory.

Prerequisites

- MATH640

MATH760 Topology (3 CH)

Topological spaces, basis, subbases, continuous maps and homeomorphisms, product and quotient topology, metric and normed spaces, connectedness, local connectedness, compactness, local compactness, compactification, countability axioms, normal spaces, Uryshon metrization Theorem, Tietze Extension Theorem, manifolds, complete metric space and function spaces, Metrization Theorem and paracompactness.

Prerequisites

- MATH561

MATH761 Algebraic Topology (3 CH)

Fundamental group and covering spaces, simplicial and singular homology theory with applications, cohomology theory, duality theorem. Homotopy theory, fibration, relations between homotopy and homology, obstruction theory, and topic from spectral sequences, cohomology operations, and characteristic classes.

Prerequisites

- MATH760

MATH763 Knot Theory and Applications (3 CH)

Knots and links, isotopy, Reidemeister moves, numerical invariants, 3-colorings, Braids, Alexander's Theorem and Markov moves, Jones and bracket polynomials, Tait's conjectures, Alexander-Conway polynomial, HOMFLY and Kauffmann invariants, Tangle equations and Applications.

MATH764 Differential Manifold (3 CH)

n-dimensional Euclidean Space, curves and surfaces, coordinate charts, manifolds, smooth maps, immersion and imbedding, sub-manifolds, partitions of unity, tangent vectors and cotangent vectors, tangent bundles, Riemannian manifolds, tensor and exterior algebra, differential forms, exterior differentiation, de Rham cohomology, Lie groups, quotient spaces.

MATH770 Advances Partial Differential Equations II (3 CH)

Method of characteristics, Formation of shocks for the inviscid Burger's equation, Explicit formulas for solutions of the linear wave equation (d'Alembert, Kirchoff, Poisson) , Cauchy-Kowalevski theorem •, Review of Gronwall's inequality, Sobolev spaces, Picard iteration, definition of an initial value problem, local well-posedness, global well-posedness, Green's theorem, Review of Fourier analysis, Vector fields, Energy estimates, Finite speed of propagation, Klainerman-Sobolev inequality (preceded by a review of Sobolev embeddings), Local well-posedness for quasi-linear wave equations and global well-posedness in a subcritical situation, Symmetric hyperbolic systems, Small data global well-posedness for quasi-linear wave equations on R^n , n ≥ 4 Small data global well-posedness for quasi-linear Klein-Gordon equation on R^3, Null forms and small data global well-posedness for quasi-linear wave equations on R^3.

Prerequisites

- MATH670

MATH771 Integral Equations and Calculus of Variations (3 CH)

Integral Equations: Definition of Integral Equations, Kinds of Kernels, Volterra and Fredholm Equations, Method of Successive Approximations, Applications to O.D.E's, Green's Functions, Complex Form of Fourier and Laplace Transforms, Singular Integral Equations, Symmetric Kernels, Eigenvalues and Eigenfunctions, Fundamental Properties of Eigenvalues and Eigenvectors, Hilbert-Schmidt Theorem, Rayleigh-Ritz Method for Finding the First Eigenvalue. Calculus of Variations: Maxima and Minima, Euler Equation, Constraints and Lagrange Multipliers, Hamilton's Principle, Lagrange Equations.

MATH772 Theory of Ordinary Differential Equations (3 CH)

Initial Value Problem: Existence and Uniqueness of Solutions; Continuation of Solutions; Continuous and Differential Dependence of Solutions. Linear Systems: Linear Homogeneous And Nonhomogeneous Systems with Constant and Variable Coefficients; Structure of Solutions of Systems with Constant and Periodic Coefficients; Higher Order Linear Differential Equations; Sturmian Theory, Stability: Lyapunov Stability and Instability. Lyapunov Functions; Lyapunov's Second Method; Quasilinear Systems; Linearization; Stability of an Equilibrium and Stable Manifold Theorem for Nonautonomous Differential Equations.

MATH773 Dynamical Systems and chaos theory (3 CH)

Discrete time dynamical systems. Continuous time dynamical systems. Invariant manifolds, homoclinic orbits, local and global bifurcations. Hamiltonian systems, completely integrable systems, KAM theory. Different mechanisms for chaotic dynamics, symbolic dynamics. Applications in physics, biology and economics.

Prerequisites

- MATH275 with a minimum grade D

MATH774 Stochastic Calculus for Finance (3 CH)

Stochastic process; Brownian motion; Martingales; Ito's integral; Ito's formula; Stochastic differential equations; Geometric Brownian motion; Arbitrage and SDEs; The diffusion equation; Representation theorems; Risk-neutral measures, Change of measure and Girsanov’s theorem; Arbitrage and martingales; The Feynman-Kac connection.

MATH777 Numerical Methods for Finance (3 CH)

Numerical differentiation (Forward, Backward, central), Measuring the error, Numerical instability, Finite difference methods, Monte-Carlo methods, the Euler-Maruyama and Milstein's higher order methods for Stochastic Differential Equations. Applications to finance such as the simulation of asset prices, Monte Carlo Evaluation of European options, numerical solution for the Black-Scholes PDE.

MATH795 Independent Studies (3 CH)

Graduate students will study topics related to their MSc. thesis independently. The selection of these topics will be with the consent of advisor.

Physics

COSC501 Research Methods (1 CH)

This course covers several topics essential for researchers such as the choice and statement of a research problem, searching the literature, elementary scientific methods, obtaining scientific information, principles of research design and communication of scientific information.

COSC502 Ethics of Scientific Research (1 CH)

This course focuses on a variety of topics emanating from the application of modern technology, which directly or indirectly affects human life. Issues such as scientific integrity and plagiarism will also be discussed, particularly in relation to the student's overall scientific personality.

COSC701 Research Methods II (2 CH)

This course provides PhD students with an in-depth view of the Scientific Method. In addition, a number of relevant topics such as Science's Presupposition, Deduction and Induction, Parsimony and Efficiency; kinds of experiments and discoveries, difficulties and Strategies in Scientific Research, Fallacies in the name of Science, Aspects of Scientific Life and Manners, Scientists and different types of scientific minds will be discussed.

COSC702 Ethics of Scientific Research II (1 CH)

At the beginning of the course, a general introduction of ethics in research is given, stressing the importance of the basic tenants of responsible research conduct. The course discusses the principles of ethics underlying decisions made in the areas of medical research, biotechnology and environmental usage and protection. The new challenges of research ethics in the age of the Internet are deliberated. The question will be asked whether there is a “universal” understanding of ethics or whether ethical understanding is influenced by cultural settings. Moreover, it will be explored how the

significance and “worth” of research can be evaluated and whether this can and should be done by the general public.

COSC800 Comprehensive Exam (0 CH)

Every PhD student must pass a Comprehensive Examination (CE) designed to evaluate the breadth and depth of the student’s knowledge of his or her discipline, as well as the student’s scholarly potential. The CE consists of a written and an oral part and will be prepared, administered, and evaluated by an examination committee from the student’s concerned department. It must be taken before the start of the student’s fifth semester in the program. Students taking the CE must be in good academic standing after completion of the required coursework. The CE may be repeated only once, no later than the end of the student’s fifth semester. A second unsuccessful attempt leads to immediate termination of the student’s enrollment in the PhD program. The CE course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student’s academic transcript.

COSD910 Dissertation Defense (0 CH)

Student defends his/her research dissertation in the form of an oral presentation in a public session, followed by a closed session, before a Dissertation Examination Committee, which includes internal and external examiners. The outcome of the overall evaluation of the dissertation is based on two main parts: (1) the Committee’s evaluation of the dissertation document and (2) the Committee’s evaluation of the dissertation defense. The final result shall be one of the following: (1) Approve dissertation as presented, (2) Approved with minor revisions, (3) Re-examine after making major revisions, or (4) Rejection of dissertation and dismissal. The Dissertation Defense course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student’s academic transcript.

COSR699 Thesis (6 CH)

Each student should select a topic for his/her thesis and earn the required credit hours of research work under the supervision of an advising committee. The advising committee can be formed from two or three supervisors; one of them is the main advisor who must be a faculty member from the University. In case where a supervising committee consists of three members, two of them must be from the University. The student must defend his/her thesis in front of

a 3-member examination committee; the thesis major advisor, a faculty member from the University, and an extern examiner appointed by the Dean of Graduate Studies upon recommendation of the thesis main advisor and approval of the Program Executive Committee.

COSR810 Research Proposal (0 CH)

Student prepares a concise and complete Research Proposal that clearly defines the research problem and objectives, and outlines the research methodology and a plan that the student will follow for the dissertation work. The proposal should be completed under the direction of the student's supervisor and must be approved by the Advisory Committee. The proposal's content and format must follow the PhD Research Proposal Preparation Guidelines issued by the College of Graduate Studies. The Research Proposal course is non-credit rated, while a Pass or Fail result for each attempt will be recorded on the student's academic transcript.

COSR900 Dissertation Research (30 CH)

Student conducts high quality academic research under the direction of his/her supervisor. Student and supervisor shall meet on regular basis and discuss progress and issues related to the student's dissertation research. Furthermore, the student writes an annual report based on a meeting with supervisor and Advisory Committee, in which a review is conducted to determine progress, identify problems, and project dates for completion of various tasks. The research shall represent original contribution to human knowledge in the particular academic field and is presented in a written research dissertation of a publishable standard. The document shall also demonstrate the candidate's acquaintance with the literature of the field and the proper selection and execution of research methodology. The physical form of the dissertation must comply with the regulations stated in the Thesis and Dissertation Preparation Guidelines, issued by the College of Graduate Studies.

COSS633 Seminar (2 CH)

Analysis of current and prospective issues in specified subject areas related to the students field of research interest. The students will present results and finding from their research or will present a review articles or recent journal publications of related topics, and also the exploration of unsolved scientific problems and opportunities in the field, especially which related the country and to the gulf region.

COSS711 Seminar I (1 CH)

Graduate students will receive training in the preparation and presentation of scientific data. Students will learn successful techniques and concepts for creating and delivering scientific oral presentations. They will develop confidence in presenting information as well as critique and analyze presentation styles and effectiveness. Each graduate student should present one seminar per semester.

COSS722 Seminar II (1 CH)

Advanced study of contemporary topics in Science: Graduate students will summarize, present and discuss latest publications and review articles in the classroom. Attend seminars presented by guest speakers. Each graduate student should present at least one latest publication and one review article related to their field of dissertation research as seminar presentation per semester.

COSS733 Journal Club (1 CH)

Graduate students will participate in all departmental seminars and journal clubs and attend seminars presented by guest speakers. Each graduate student should present and discuss data obtained from their dissertation research ore present one seminar per semester in advanced topics of contemporary Science.

PHYS100 Astronomy (3 CH)

This general education course aims at developing a clear understanding of the basics of astronomy. It deals with: Getting to Know the sky, Figuring out how things work, The Family of the sun, The Sun, our very own Star, Learning about Stars, Understanding Stars, Galaxies and Cosmology.

PHYS101 Conceptual Physics (3 CH)

This general education course aims at developing a clear understanding of the physical concepts which play an important role in our daily life. It deals with the following subjects: Mechanics and Laws of Motion, Properties of Matter, Heat, Electricity and Magnetism, Waves and Vibrations, Sound and Light.

PHYS105 General Physics I (3 CH)

This course aims at developing a clear understanding of the basic concepts in physics. The course includes: physics and measurements, vectors, motion in one and two dimensions, Newton's laws of motion and their applications, work and energy, rotational dynamics, rolling motion, conservation of angular momentum.

PHYS110 General Physics II (3 CH)

This course aims at developing a clear understanding of the basic physics concepts in electricity and magnetism. It includes: Coulomb’s law, electric fields, Gauss's Law, electric potential, capacitance and dielectrics, resistance, direct current circuits, magnetic fields, electromagnetic induction.

Prerequisites

- PHYS105 with a minimum grade D

PHYS135 General Physics Lab I (1 CH)

This course aims to Develop a clear understanding of the basic concepts in classical mechanics; Consolidating the manual skill in dealing with laboratory equipment; Developing skills of using computers in analysis of the computer interfaced experiments; It includes: Fine measurements, force table, motion on an inclined plane, verification of newton’s second law, simple pendulum, circular motion.

Corequisites

- PHYS105

PHYS140 General Physics Lab II (1 CH)

This course aims to develop a clear understanding of the basic concepts in electricity and magnetism; It includes: Coulomb's Law, equipotential surfaces and electric field lines, Ohm's Law, Kirchhoff's Rules, resistance and resistivity, potentiometer, capacitors, RC time constant, magnetic fields, oscilloscope, electromagnetic induction.

Prerequisites

- PHYS135

Corequisites

- PHYS110

PHYS200 Introduction to Space Sciences (3 CH)

This course will serve to give an overview of the domain of Space Sciences. It is intended to lay the foundations of what Space Sciences entail. It will start off with an outline of the characteristics of Earth as a planet and then it will take students immediately beyond Earth, the upper atmosphere and the magnetosphere of the Earth will be introduced. In addition to Earth as a planet, the formation of Solar System, planetary science: terrestrial & jovian planets, planetary atmosphere and interiors will also be discussed. Followed by that some basic features of space above the Earth and the concepts of gravity will be highlighted. Then, a brief history of human space exploration will be given, leading to an outline of the space age we live in today. The course will be concluded with a broad account of what science is done from space.

Prerequisites

- PHYS105 with a minimum grade D
- MATH105

PHYS205 Intermediate Physics Lab I (1 CH)

This course aims at developing a clear understanding of the basic concepts in waves, vibrations and optics. It includes: free damped oscillations, forced oscillations, interference of sound waves, standing waves, combination of two

waves at right angles, combination of two waves with different frequency, spherical mirror and thin lenses, the optical spectrometer, interference of light waves, Mickelson interferometer, Newton’s rings, diffraction of light waves and polarization of light waves.

Corequisites

- PHYS235

PHYS210 Intermediate Physics Lab II (1 CH)

This course aims at developing an understanding of the basic experiments in thermal and modern physics. It includes: thermometer, Stefan-Boltzmann's law, thermal radiation, photoelectric effect, electron diffraction, magnetic hysteresis, Faraday effect, Frank-Hertz experiment, Zeeman effect, beta-particle detection, and x-ray diffraction

Prerequisites

- PHYS140

Corequisites

- PHYS250PHYS220

PHYS220 Thermal Physics (3 CH)

This course aims at developing an understanding of the main concepts, fundamental laws, and applications of classical thermodynamics. It includes definitions of the most important thermodynamic properties, including temperature, pressure, equation of state, internal energy, work, thermodynamic potentials, free energy functions and entropy, as well as, introducing the three fundamental laws of thermodynamics that govern every physical system in the universe. In addition, this course develops a working knowledge of some practical applications of thermodynamics in daily life, including air conditioners, refrigerators, and car engines.

Prerequisites

- PHYS105 with a minimum grade D

PHYS231 Electronics Fundamentals (3 CH)

A review of the basic concepts of direct current circuits, and the fundamental laws of alternating current circuits. The effects of resistance, inductance, and capacitance in AC circuits are analyzed. The course discusses the principals of semiconductor materials followed by thorough analysis of semiconductor-based devices such as diodes, bipolar junction transistors, field-effect transistors, and operational amplifiers. The course emphasizes on structure, operation, biasing, and applications up to digital control. In addition to the theoretical part of the course, hands on experiments on electronic devices and their applications are implemented in the course to provide experimental skills and enhance comprehension of the theoretical material.

Prerequisites

- PHYS110 with a minimum grade D

PHYS235 Waves and Optics (3 CH)

This course aims at developing clear understanding of basic concepts in vibrations, waves, light and optics. It includes oscillatory motion, wave motion, sound waves, superposition and standing waves, electromagnetic waves, the nature of light, laws of geometric optics, image formation by lenses and mirrors, some optical instruments, interference, diffraction and polarization of light

Prerequisites

- PHYS105 with a minimum grade D

Corequisites

- PHYS205

PHYS250 Modern Physics (3 CH)

This course discusses the progress of modern physics. It introduces students to the foundations and principles of modern physics. The course will discuss some of the problems faced physicists at end of the nineteenth century. The course will provide a valuable theoretical introduction and an overview of the fundamental applications of the principles of modern physics in our world. Topics include the special theory of relativity, particle-like properties of light, wave-like properties of particles, early atom models, Basics of quantum mechanics, elementary particles, and Universe.

Prerequisites

- MATH105 with a minimum grade D
- PHYS105 with a minimum grade D

Corequisites

- PHYS210

PHYS255 Mathematical Physics (3 CH)

This course aims at developing the mathematical techniques and skills needed for advanced physics courses. The course covers the following topics: vector analysis, complex analysis, Fourier series and transforms with applications, series solutions to ODEs, and special functions.

Prerequisites

- MATH110 with a minimum grade D
- PHYS105 with a minimum grade D

PHYS262 Classical Mechanics (3 CH)

The course aims at studying the classical kinematics and dynamics of the point-like objects and the rigid bodies. It includes: particle kinematics in various coordinate systems, particle dynamics, central-force motion, non-inertial systems, rigid-body dynamics, introduction to Hamilton and Lagrange dynamics.

Prerequisites

- MATH275 with a minimum grade D or PHYS255 with a minimum grade D

PHYS270 Celestial Mechanics (3 CH)

This course will begin with the development of an understanding of Kepler's laws of orbital motion and dynamics of objects in space. After that, the framework of celestial coordinate systems will be built followed by the 2-body/3-body problem. A description of the 6 orbital Parameters will be given after that. Then the fundamentals behind the Lagrange's planetary equation will be presented, followed by an outline of the possible orbital perturbations. Some examples of natural & artificial orbits will be discussed and finally orbit and trajectory design for various space science objectives will be discussed.

Prerequisites

- MATH275 with a minimum grade D or MATH2210 with a minimum grade D

PHYS310 Space Missions (3 CH)

This course will be aimed at presenting an overview of a space mission as whole. The elements of a space mission will be introduced from a design and analysis point of view. Followed by that the space segment and the ground segment will be discussed as two main domains of a space mission, leading to an outline of space mission operations. The course will end with a few case studies (e.g. the GPS network, Telecom missions [ArabSat], science missions [MRO, Juno, Cassini]) of existing space missions.

Prerequisites

- PHYS110

PHYS312 Statistical Physics (2 CH)

This course aims at developing a clear understanding of the basic concepts in physics as an integrated part of the student's overall curriculum. It includes:

statistical equilibrium, statistical distributions: Maxwell-Boltzmann, Fermi-Dirac, Bose-Einstein, and various applications.

Prerequisites

- PHYS220 with a minimum grade D

PHYS316 Spacecraft Instrument Science (3 CH)

The contents of this course will develop an introduction to various subsystems of a spacecraft. The first topic will describe the components of a space vehicle followed by an account of the spacecraft materials used to build the structure. After that, some examples of the spacecraft's main payload (spectrographs and spectrometers, imaging systems, space-based telescopes, radars and antennae) will be discussed. The functionality of the spacecraft attitude & orbit determination be highlighted next. After that, a brief account of the communication and navigation systems will be given. Then, the spacecraft power system will be described followed by an account of the spacecraft propulsion system. The fundamentals of spacecraft positioning control will be discussed in the end.

Prerequisites

- PHYS235 with a minimum grade D
- PHYS250 with a minimum grade D

PHYS330 Computational Physics (3 CH)

This course aims at introducing the basic concepts and principles of numerical methods. It includes: principles of numerical analysis, some important numerical algorithms, mathematical modeling of physical systems, application of numerical techniques to mathematical models, computer simulation of physical systems, the Monte-Carlo method with some applications.
Prerequisites

- MATH140 with a minimum grade D
- PHYS110 with a minimum grade D

PHYS335 Electromagnetic Theory (3 CH)

The course aims at establishing the basic knowledge of the static electric and magnetic fields. It includes: electrostatics: Gauss law, electric fields in materials, polarization, boundary-value problems, Laplace and Poisson

equations; magnetostatics: Biot-Savart’s law, Ampere’s law, scalar and vector potentials, magnetization of materials, Faraday’s law, and Maxwell's equations.

Prerequisites

- PHYS255 with a minimum grade D

PHYS345 Laser Physics (3 CH)

The course is intended to develop a clear understanding of the physical foundations of laser operation, laser systems and laser applications. Moreover, the course aims at developing the student's problem solving, skills and creative thought needed to meet modern high technology challenges. The course covers: The basic concepts of laser operation, properties of laser beams, spontaneous and stimulated emission, production of population inversion, optical resonator, pumping process, rate equations with transient & steady state solutions, laser types and applications in science and technology.

Prerequisites

- PHYS250

PHYS355 Quantum Mechanics (3 CH)

This course aims at developing a clear understanding of the fundamentals (concepts, postu-lates, and mathematical structure) of quantum mechanics. It aims also at developing the basic quantitative skills necessary in solving quantum mechanical problems.

Prerequisites

- PHYS250 with a minimum grade D
- MATH275 with a minimum grade D or PHYS255 with a minimum grade D

PHYS385 Radiation Physics (3 CH)

This course aims at covering topics in radiation and its uses. It includes: types and sources of radiation, radioactive decay processes and energy release

involved in decay schemes, interaction of radiation with matter, radiation tracks and stopping power.

Prerequisites

- PHYS250 with a minimum grade D

PHYS390 Introduction to Astrophysics (3 CH)

The wonders of the Universe and mysteries of the outer space fascinates every human being living on planet Earth. We all find ourselves inherently curious about the objects, events and the related phenomenon, and we strive to know more about it. Astrophysics, as a subject, provides us with the framework to apply laws and theories of Physics to behaviour of various objects and events in the Universe in order build an understanding of their nature, properties and origin. This course is all about how can we best utilize our knowledge of Physics to know more about our Universe in a systematic and scientific way.

Prerequisites

- MATH110 with a minimum grade D
- PHYS105 with a minimum grade D

PHYS410 Space Applications I (3 CH)

The Space Applications I course will serve the purpose of introducing the main areas of space science research. An account of remote sensing, earth observation & Geographic Information System will be given followed by the topics of study in space physics. Astronomy & Astrophysics will be outlined as the study of the processes and objects in the Universe. The course will be concluded with the concepts supporting data & image processing and some tools (introduction to Python, IDL and Matlab) and working knowledge of techniques (data analysis & interpretation) will also be developed as an essential skill set to carry out scientific research in the relevant areas of space science introduced in the course.

Prerequisites

- PHYS335 with a minimum grade D or (PHYS270 with a minimum grade D and ELEC372 with a minimum grade D)

PHYS420 Space Applications II (3 CH)

This course will discuss presenting some more areas of research in space sciences. Firstly, the fundamentals of positioning guidance & navigation using space-based systems will be introduced. Followed by that, an outline of the themes related to atmospheric & ionospheric physics will be given. After that, modern communication achieved with space-based systems will be discussed. The last space applications theme to be outlined will be weather monitoring and prediction using spacecraft. The development of working knowledge of various tools and techniques will continue in this course as well, particularly relevant to the areas covered in this course.

Prerequisites

- PHYS335 with a minimum grade D or (PHYS270 with a minimum grade D and ELEC372 with a minimum grade D)

PHYS430 Electromagnetic Theory II (3 CH)

The course aims at using Maxwell's equations in treating specific problems of wave propagation and their interactions with media and charged particles. It includes wave equation propagation of electromagnetic waves in non-conducting media, polarization. Waves in bounded regions: reflection and refraction at dielectric interface, guided waves. Radiation from a group of moving charges, radiation damping. Electrodynamics and special relativity.

Prerequisites

- PHYS335

PHYS450 Quantum Mechanics II (3 CH)

The course aims at developing the student’s fundamental knowledge in Quantum Mechanics. The course introduces several modern concepts in quantum mechanics that include propagators and path integral, symmetries, angular momentum and irreducible tensor operators, approximation methods, and scattering theory.

Prerequisites

- PHYS355

PHYS470 Solid State Physics (3 CH)

Students in this course will learn about: crystalline structure and symmetry, Bravais lattice and reciprocal lattice, lattice vibrations and phonons, specific heat, energy band theory of metals, semiconductors and insulators, electric transport in metals and semiconductors, optical, dielectric, and magnetic properties, superconductivity.

Prerequisites

- PHYS250 with a minimum grade D
- PHYS312 with a minimum grade D

PHYS475 Semiconductor Physics (3 CH)

This course will provide students with a solid understanding of the physical principles of basic semiconductor devices. This course will give the students an overview of the development of semiconductor devices. Several important semiconductor physics and prototypical devices will be studied. The course material covers semiconductor properties under thermal equilibrium and under non-equilibrium conditions. Three fundamental device structures will be covered in detail, the p-n junction, the MOSFET and related devices, and the bipolar transistor. The course will focus on aspects of semiconductors such as silicon and gallium arsenide, both of which have commercial relevance. Therefore, fundamental properties of semiconductors will be explored, as well as their device applications.

Prerequisites

- PHYS231

PHYS483 Introductory Nuclear Physics (3 CH)

This course covers basic concepts of nuclear physics with emphasis on Rutherford's nuclear atom model, nuclear properties (nuclear size, mass and abundance of nuclides, nuclear binding energy), nuclear structures and nuclear models (Liquid-drop model and the semi-empirical mass formula, and the shell model). Other topics include nuclear decay and radioactivity, nuclear reactions (fundamental Laws, scattering and reaction cross section, mechanisms of nuclear reactions), nuclear fission (characteristics of fission, energy in fission, fission nuclear reactors), nuclear fusion (basic fusion processes, characteristics of fusion, controlled fusion reactors).

Prerequisites

- PHYS355 with a minimum grade D

PHYS494 Research Project (3 CH)

This course aims at developing the students' theoretical and/or experimental research skills necessary for conducting a scientific research project under the guidance of a faculty member. A real-life or active research problem is identified by the instructor and students. Students use their knowledge and get trained on methods to solve the problem. Students will be trained on, literature survey, team work, interpreting their results, implementing the ethics of scientific research, and communicating the whole investigation by means of a written report and an oral presentation.

Corequisites

- PHYS500

PHYS495 Selected Topics (3 CH)

This course is aimed at studying a special topic which will serve the needs of the student. The topic varies according to needs and demands, and is set by the department.

PHYS500 Internship (6 CH)

Students usually choose internship organizations that offer them an opportunity to apply in a supervised manner what they learned in their studies in a practical manner and to apply their rigorous coursework in a professional and

industrial setting. In addition to its direct benefits to the student it consolidates the department bonds with the outside world and offers a real opportunity to get feedback about the teaching programs and educational services it offers.

Prerequisites

- Pre/Co PHYS494 with a minimum grade D

PHYS505 Space Physics (3 CH)

This course will serve to give an overview of the Physics of near-Earth space. It is intended to build the understanding of physical processes occurring immediately above planet Earth. It will start off with an outline of the characteristics and properties of space plasma including a discussion of various species of particles and their behavior. Followed by that, it will cover the topics related to Earth's magnetosphere. Then, the aspects of Solar activity along with the elements of Solar-Terrestrial interaction will be highlighted. After that, an account of the characteristics of space weather and its effects on Earth will be given. The students will then be introduced to cosmic radiation, its origins and its interaction with Earth's atmosphere. Moreover, the dynamics of near-Earth objects such as Asteroids, Meteors and Comets will be discussed including the tracking and mitigation of space debris. In addition, the environment and characteristics of unmagnetized objects (Mars, Venus) and magnetized objects (Mercury, Jupiter, Saturn, Uranus, Neptune) will also be highlighted). Then, a brief history of human space exploration will be given, leading to an outline of the space age we live in today. The course will be concluded with an overview of the methods of space physics research.

Prerequisites

- PHYS105 with a minimum grade D
- PHYS110 with a minimum grade D
- MATH105 with a minimum grade D
- MATH110 with a minimum grade D

PHYS506 Astronomy & Astrophysics (3 CH)

This course will develop a good understanding of various astrophysical processes involved in the formation and evolution of astronomical objects such as stars, planets, galaxies. After a brief overwiew about the history of astronomy, we will discuss the fundamentals of celestial and Newtonian mechanics. We will also introduce various types of telescopes, their usability in astronomical observations and how to measure the distances within the solar

system and between stars. Students will learn about about fundamental of photometry and spectroscopy. This will enable to them to interpret the stellar spectra and how to mearue brightness and fluxes. Formation of spectral lines in stellar atmospheres and Hertzsprun-Russell Diagram will be discussed in detail. This course will provide a detailed undesrtanding of star formation, stellar evolution and stellar interiors. This course will conclude by giving an overview of galaxy formation and their classification based on the Hubble sequence.

Prerequisites

- PHYS105 with a minimum grade D
- PHYS110 with a minimum grade D
- MATH105 with a minimum grade D
- MATH110 with a minimum grade D

PHYS515 Methods of Mathematical Physics (3 CH)

Complex analysis, special functions with applications in Physics, calculus of variations, integral transforms, partial differential equations, boundary-value problems, Green's functions, operator algebra and tensors.

Prerequisites

- PHYS255

PHYS525 Quantum Physics I (3 CH)

The course presents the basic concepts and mathematical formalism of quantum mechanics and introduces applications in atomic, molecular, and solid-state Physics. Topics include the mathematics of quantum mechanics, one-dimensional problems, central field problems, the interaction of electromagnetic radiation with atomic systems, the harmonic oscillator, angular momentum, and perturbation theory.

Prerequisites

- PHYS355 with a minimum grade D

PHYS530 Electrodynamics I (3 CH)

Electrostatics and magnetostatics, Electric and magnetic fields in matter, Boundary value problems in electrostatics and magnetostatics, Polarization and magnetization, Multipole expansion and dielectrics, Maxwell's equations, Conservation laws, Wave guides and resonators.
Prerequisites

- PHYS335

PHYS541 Atomic Physics (3 CH)

Electronic structure of one-electron atoms; fine and hyperfine structures, Interaction of one-electron atoms with static external electric and magnetic fields and with electromagnetic radiation. Study of the electronic structure of many-electron atoms using Pauli Exclusion principle, perturbation and variational methods, angular momentum coupling schemes, central field approximation, Thomas-Fermi model, Hartee-Fock method, interactions of many-electron atoms with static and magnetic fields and electromagnetic radiation, Auger effect. Study the structure of molecules and their rotational, vibrational, and electronic structure

Prerequisites

- PHYS250

PHYS542 Introduction to Astrophysics (3 CH)

The course is intended as an introduction to the concepts of modern astrophysics for the advanced undergraduate students and graduate students. It covers topics such as celestial coordinate systems, celestial orbits, radiation, stars, stellar structure, stellar evolution, clusters of stars, galactic components, galactic structure, galaxy types, active galaxies and cosmology.

Prerequisites

- PHYS250

PHYS543 Laser Physics (3 CH)

The course is intended to introduce the fundamental concepts of laser theory and the interaction of electromagnetic waves with matter. The course covers:

the concepts of laser operation, absorption, spontaneous and stimulated emission, optical resonator, pumping sources, laser oscillation (gain and threshold), the modulation of optical radiation, Q- switching and mode locking. Moreover, the course aims at developing the student's problem solving, skills and creative thought needed to meet modern high technology challenges.

Prerequisites

- PHYS355

PHYS545 Analytical Mechanics (3 CH)

Elementary principles, variational principles and Lagrange's equations, central force problem, kinematics of rigid body motion, oscillations, Hamilton's principle and Hamilton's equations, Canonical transformations, Hamilton-Jacobi theory, classical chaos, canonical perturbation theory, introduction to Lagrangian and Hamiltonian formulations for continuous systems and fields.
Prerequisites

- PHYS262 with a minimum grade D

PHYS552 Nuclear Physics (3 CH)

Nuclear Properties (Nuclear Radius, Mass and Abundance of Nuclides, Nuclear Binding Energy), Forces between Nucleons (Properties of the Nuclear Force, The Exchange Force Model), Nuclear Structures and Nuclear Models (Liquid-drop Model and the Semi-empirical Mass Formula, Shell Model, More Realistic Nuclear Models), Nuclear Decay and Radioactivity, Nuclear Reactions (Fundamental Laws, Scattering and Reaction Cross Section, The Optical Model, Mechanisms of Nuclear Reactions), Neutron Physics (Neutron Sources, Absorption and Moderation, Neutron Reaction Cross Sections, Neutron Capture, Interference and Diffraction with Neutrons), Nuclear Fission (Characteristics of Fission, Energy in Fission, Fission Reactors, Radioactive Fission Products, Fission Explosives), Nuclear Fusion (Basic Fusion Processes, Characteristics of Fusion, Controlled Fusion Reactors, Thermonuclear Weapons).
Prerequisites

- PHYS355

PHYS555 Introduction to Plasma Physics (3 CH)

This course covers elementary plasma physics for physics and engineering students. It includes an introduction to the plasma state and occurrence, motion of single charged particles in static and time varying electric and magnetic fields, plasmas described as (charged) fluids or magnetohydrodynamics; waves in plasmas, kinetic theory description of plasmas, Vlasov equation and collisionless plasmas, collisions and transport properties, in addition to a discussion of nuclear fusion.

Prerequisites

- PHYS335 with a minimum grade D

PHYS560 Elementary Particle Physics (3 CH)

Description of elementary particles with emphasis on phenomenology and historical and experimental buildup of current knowledge: weak decays and weak currents, parity violation, detectors and accelerators, elementary processes, deep inelastic scattering and proton model, quark model spectroscopy, color symmetry, elements of the Standard Model, successes and shortcomings.

Prerequisites

- PHYS525

PHYS571 Radiation Physics (3 CH)

Review of fundamentals of sources of radiation, nuclear Physics and radioactivity, and X-ray production. Interaction of heavy charged particles with matter, interaction of electrons with matter, linear energy transfer, interaction of photons with matter, interaction of neutrons with matter, neutron fission and criticality, radiation detection, statistics, introduction to radiation dosimetry, radiation protection criteria and exposure limits.

Prerequisites

- PHYS250

PHYS574 Physics of Radiotherapy (3 CH)

Review of X-ray production and fundamentals of nuclear physics and radioactivity. Detailed analysis of radiation absorption and interactions in biological materials as specifically related to radiation therapy and radiation therapy dosimetry. Explore the use of computers and electronics in the diagnosis, tumor and normal tissue localization, treatment planning, treatment delivery, and treatment verification as applied to cancer patients; principles of radiation therapy treatment planning and isodose calculations. This is in addition to surveys of use of teletherapy isotopes and X-ray generators in radiation therapy plus the clinical use of interstitial and intracavitary isotopes (fundamentals of brachytherapy, and brachytherapy dosimetry systems). Problem sets taken from actual clinical examples are assigned.

Prerequisites

- PHYS571

PHYS575 Physics of Semiconductors (3 CH)

This course gives students a solid background in semiconductor Physics and devices. It explains crystal structure, band structure and carrier statistics, carrier transport, phonons, scattering processes, electro- and optical-absorption in semiconductors.

Prerequisites

- PHYS470 with a minimum grade D

PHYS576 Physics of Nuclear Medicine (3 CH)

Physical bases of nuclear medicine are reviewed, and imaging instrumentation and computer diagnosis is discussed. Other topics include radionucleide generator systems and quality control, radiopharmaceutical preparations and quality control, chemistry and radiopharmacology of radionucleides, and radiopharmaceuticals for diagnostics and therapeutics. Unsealed source dosimetry, nuclear measurement instrumentation, spectrometry. This course also includes design and function of gamma cameras, single photon emission tomography, and positron emission tomography.

Prerequisites

- PHYS571

PHYS578 Diagnostics Radiology (3 CH)

Course includes practical applications of diagnostic radiology for various measurements and equipment assessments. Topics include X-ray generator calibration, focal spot measurements, radiation output measurements, half-value layer measurements, and others. The description and design of computed tomographic systems as well as the associated reconstruction algorithms from single to multislice helical systems are studied.

Prerequisites

- PHYS571

PHYS580 Biophysics (3 CH)

This course will explore topics in bio-electricity based on the classical theory of electricity and magnetism. Topics include: transport in an infinite medium, transport through neural membranes, impulses in nerve and muscle cells, exterior potential and electrocardiogram, biomagnetism, electricity and magnetism at the cellular level.

Prerequisites

- PHYS110

PHYS606 Space Science Instrumentation (3 CH)

This course aims at presenting an account of various instruments and facilities used in space science. It will start off with a description and classification of the types of space science instruments such as spectrometers, spectrographs, telescopes, cameras, sensors, imagers and detectors. Followed by that, the scientific principles behind these instruments and the physics of detector

operation will be discussed. Then, an understanding of the inputs and outputs of these instruments will be developed. The interpretation of the variations in the observable signatures of physical phenomena will also be discussed. After that, the students will be given an overview of the platforms and facilities on which the space science instruments operate. This topic will include case studies of space missions. A brief outline of some of the specifications and technical characteristics will also be covered.

PHYS614 Modern Statistical Physics (3 CH)

Review of the statistical theory of thermodynamics, Ensemble theory, identical particles. Quantum statistical Physics, Distribution functions, Applications to Quantum gases (superfluidity, superconductivity, and Bose-Einstein condensation), Critical phenomena, Brownian motion, Langevin, and Fokker-Planck and Boltzmann equations.

Prerequisites

- PHYS312

PHYS616 Experimental Condensed Matter Physics (3 CH)

This course deals with experimental techniques (X-ray, Raman Spectroscopy, Electron Microscope, Auger Spectrometer, X-Ray Fluorescent, Electrical measurements, Magnetic measurements, Optical measurements, Positron Annihilation, etc) used for material characterizations and study of physical properties as well as defects of different materials. Particularly the course deals with phase transitions of amorphous and crystal compounds, Synthesis of composites, thin films, superlattices and nanomaterials.

Prerequisites

- PHYS250

PHYS622 Solid-State Physics I (3 CH)

Students in this course will learn about: crystalline structure and symmetry, Bravais lattice and reciprocal lattice, lattice vibrations and phonons, specific heat, energy band theory of metals, semiconductors and insulators, electric

transport in metals and semiconductors, optical, dielectric, and magnetic properties, superconductivity.

Prerequisites

- PHYS355 with a minimum grade D

PHYS624 Computational Physics-I (3 CH)

Classical and quantum Monte Carlo simulation methods with applications, molecular dynamics simulations, random systems, selected topics in modern computational physics problems.

Prerequisites

- PHYS330 with a minimum grade D

PHYS625 Group & Representation Theory (3 CH)

Group and representation theory designed for the particle physicist: groups and their representations: general theory and results; Lie Groups and their representations; Lie algebras and their representations; use and applications in Modern Physics.

Prerequisites

- PHYS705

PHYS633 Physics Seminar (1 CH)

This course is based on a research project where the student is expected to present a seminar at the end of the semester. The topic is selected by the faculty member. Ethics issues related to physics research will be also discussed.

PHYS635 General Relativity (3 CH)

Introduction to Einstein's theory of General Relativity: a review of Special Relativity; the equivalence principle; tensor calculus and elements of differential geometry; Einstein's gravitational field equations; classic tests of General Relativity and standard applications in Astrophysics and Cosmology.

Prerequisites

- PHYS545
- PHYS530

PHYS650 Space Science Internship (0 CH)

The primary objective of this internship course is to afford the MSc Space Science students a supervised opportunity to acquire practical and hands-on working experience at one of the reputed space research and development organizations in the UAE. Within the scope of this internship, the students will be attached to teams of researchers, engineers and scientists at the internship provider site (e.g. UAE Space Agency, Muhammad Bin Rashid Space Centre) to work on practical tasks which will be components of actual and ongoing space projects. Availing this opportunity, students will be able to apply the knowledge they attained as part of their MSc coursework, get first-hand experience in a professional space research setting, learn practical aspects of problem solving, solution development, teamwork, project execution and delivery, and it will also benefit them in terms of skill development and capacity building.

PHYS660 Methods in Experimental Particle Physics (3 CH)

This course is required for students preparing a doctoral thesis in experimental particle physics. Topics designed and taught by the various LHC collaborations (CMS, ATLAS, ALICE, etc.).

Prerequisites

- PHYS560

PHYS672 Medical Imaging & Instrumentation (3 CH)

This course covers the physical aspects of medical image formation. Image receptor design/optimization, reconstruction techniques, device hardware and performance characteristics are considered. This course includes a system theory approach to the production, analysis, processing and reconstruction of medical images. An extensive use of Fourier techniques is used to describe the processes involved with conventional radiographic detectors, digital and computed radiography.

Prerequisites

- PHYS255

PHYS675 Imaging Science (3 CH)

This is a general imaging course intended to: 1) cover the basic physical principles of image formation and contrast of the main imaging modalities; and 2) introduce their applications in disciplines such as medicine, biology, and chemistry. It is designed to be given for non-physics students and to explain elements of hardware, basic energy interaction leading to image formation, basic image properties including signal-to-noise ratio, resolution, and contrast, and finally sample and technical factors controlling image contrast. The main modalities include: x-ray imaging, computed x-ray tomography, magnetic resonance imaging (MRI) and spectroscopy (MRS), Nuclear Medicine (SPECT, PET Imaging). Functional and multi-dimensional imaging is also introduced. Students may be asked to cover elementary topics according to their background.

Prerequisites

- PHYS250

PHYS678 Magnetic Resonance Imaging & Spectro (3 CH)

Basic physics of NMR, relaxation phenomena, relaxation time measurement, rotating reference frame and resonance, RF field, Bloch equations, magnetic field gradient, projection, basic pulse sequences, image contrast, one-dimensional Fourier imaging, k-space, slice excitation, multi-dimensional imaging; advanced MRI methods including fast imaging, chemical shift imaging, diffusion imaging, functional MRI, flow imaging, MR angiography, and

cardiac gated imaging; hardware for MRI; radiofrequency coils, surface coils; in vivo NMR spectroscopy.

Prerequisites

- PHYS250

PHYS694 Seminar II (1 CH)

This course is based on a research project where the student is expected to present a seminar at the end of the semester. The topic is selected by the faculty member.

PHYS698 Selected Topics I (3 CH)

This course will develop a good understanding of various astrophysical processes involved in the star formation. After a brief overview about the interstellar medium and molecular cloud , we will discuss the atomic and molecular gas observations using radio observations and students will be given worked-out examples. We will also introduce detailed observational properties of molecular clouds, physics of molecular cloud, structure and kinematics and various scaling relation, and initial mass function to understand the star processes. High-mass star feedback processes will be introduced with the HII region physical processes. The cloud properties such as column densities, virial-mass, and LTE mass will be discussed. This course will also introduce various astronomical tools and codes for studying the molecular cloud and HII region properties using radio and optical observational data.

PHYS705 Quantum Physics II (3 CH)

Variational theorem and WKB method, time-dependent perturbation theory, scattering theory, Born approximation, Identical particles and second quantization, symmetry principles, Dirac and Klein-Gordon equations for free particles, quantum theory of radiation, path integral formalism.

Prerequisites

- PHYS525

PHYS715 Synthesis, Characteristics & Applications of Nanomaterials (3 CH)

Synthesis of nanomaterials; nanoparticles, nanotubes, nanowires, assembly of nanostructures, property-structure-dependence in nanomaterials, main characterization techniques; transmission electron microscopy (TEM), scanning electron microscopy (SEM), scanning tunneling microscopy (STM), atomic force microscopy (AFM), applications of nanomaterials; transistors, bio-sensors, NEMS, and solar cells.

Prerequisites

- PHYS470 with a minimum grade D

PHYS720 Quantum Field Theory (3 CH)

Building the theory of relativistic quantum fields: classical field theory; Noethers's theorem; Klein Gordon field; representations of the Lorentz Group; Dirac equation; quantized Dirac field; discrete symmetries of the Dirac theory; interacting fields; S-matrix and reduction formula; Green’s functions in path integral formalism; perturbation theory and Feynman diagrams; elementary processes in QED and QCD.

Prerequisites

- PHYS530 with a minimum grade D
- PHYS525 with a minimum grade D

PHYS722 Solid State Physics II (3 CH)

Many body theory, Hartree-Fock theory and electron-electron interactions, density functional theory, introduction to main numerical methods for band structure calculations, excitons, polarons, phonons, Bloch Wannier and Slater functions, band structures of solids, density matrix approximation Huekle model, Moller-Plesset perturbation theory, second order quantization, Wannier and Frankel excitons and biexcitons in molecular crystals, types of superconductors, electron-phonon interactions, the BCS theory of superconductivity; Ginzberg-Landau theory, Landau Fermi liquid theory, theory of solitons and soliton dynamics.

Prerequisites

- PHYS622

PHYS724 Computational Physics-II (3 CH)

The course aims at developing essential numerical analysis techniques such as classical and quantum Monte Carlo simulation methods with applications, molecular dynamics simulations, random systems, selected topics in modern computational physics problems.

PHYS730 Electrodynamics II (3 CH)

Review of Maxwell's equations and the conservation laws, electromagnetic potentials, multipole radiation, radiation from moving charges, plane waves in material media, polarization, attenuation, dispersion, diffraction, scattering, special relativity, Relativistic electrodynamics.

Prerequisites

- PHYS530

PHYS733 Seminar III (1 CH)

This course is based on a research project where the student is expected to present a seminar at the end of the semester. The topic is selected by the faculty member.

PHYS735 Quantum Theory of Polymers (3 CH)

Introduction to polymers, Hartree-Fock crystal orbital theory of periodic ploymers, Ab initio calculations on quasi-one-dimensional polymers, semiempirical theories of band structures, treatment of aperiodicity in polymers, electronic correlation in polymers, interaction between polymers, the effect of environment on the band structure of polymers, theoretical investigation of different physical properties of polymers.

Prerequisites

- PHYS705
- PHYS724

PHYS755 Physics of NonIdeal Plasmas (3 CH)

The course covers the basic concepts, natural existence as well as the laboratory techniques used for the generation and diagnostics of nonideal plasma. In addition, the course studies ionization equilibrium, equation-of-state, thermodynamic properties, transport coefficients and optical characteristics of partially ionized nonideal plasma.

PHYS771 Physics & Engineering of Radiation Detection (3 CH)

Gas filled detectors, liquid filled detectors, solid state detectors, scintillation detectors and photodetectors, position sensitive detection, signal processing

PHYS778 Advanced Magnetic Resonance (3 CH)

Signal acquisition and k-space sampling, image reconstruction techniques, filtering and resolution, image artifacts, slice excitation, radio frequency pulses (rectangular, sinc, SLR, variable rate), spectral RF pulses, spatial RF pulses, advanced pulse sequence techniques.

Prerequisites

- PHYS678

PHYS780 Quantum Field Theory II (3 CH)

This course covers: Radiative processes; renormalization; renormalization group; gauge theories; renormalization of gauge theories; asymptotic freedom.

Prerequisites

- PHYS625
- PHYS720

PHYS782 Standard Model of Particle Physics (3 CH)

This course covers: Theoretical building of the Standard Model of Particle Physics: phenomenology of weak interactions; Higgs mechanics and mass generation; spontaneously broken gauge theory; renormalization; the Standard Model; successes and shortcomings.

Prerequisites

- PHYS525 with a minimum grade D

PHYS790 Particle Physics Phenomenology (3 CH)

The course gives a description of the current and future experiments in the area of High Energy Physics, their most significant results, future prospects and measurement techniques for Physics beyond the Standard Model. Topics include: Higgs boson searches at LEP, the Tevatron and LHC, the main signatures for Higgs decay in different mass ranges and the experimental problems of detecting them; motivation for supersymmetry (SUSY); the spectrum and signatures of superpartners in some constrained MSSM scenarios such as mSUGRA and GMSB.

Prerequisites

- PHYS660
- PHYS720

PHYS792 Supersymmetry (3 CH)

Motivations for supersymmetry; Clifford algebra and spinor representations in D-dimensions; supersymmetry algebra; superspace and superfields; supersymmetric gauge theories; breaking of supersymmetry; the minimal supersymmetric extension of the Standard Model (MSSM); elementary

supergravity; gravity and gauge mediated supersymmetry breaking; phenomenology of the MSSM and some of its extensions; supersymmetry at colliders and in cosmology.

Prerequisites

- PHYS635

PHYS795 Advanced Topics in Particle Theory (3 CH)

Selected and changing topics beyond and besides the Standard Model like: neutrinos and masses; solitons, instantons and topological objects; nonperturbative methods: lattice field theory; quantum field theory at finite temperature and/or density; LHC particle physics; string theory.

Prerequisites

- PHYS782

PHYS798 Selected Topics II (3 CH)

This course is proposed by faculty members according to needs when needed and is based on new trends of physics.

University College

General Education Program

ESPU1014 Introduction to Academic English for Humanities and SS (3 CH)

The aim of this mobile-learning enhanced course is to introduce students to conventions of academic English with respect to reading, writing and oral communication skills. Academic reading and writing skills are developed through the reading of disciplinary academic texts, the study of academic essay models and the writing of short academic texts based on research. Academic oral communication skills are developed with particular reference to the effective preparation and delivery of an academic presentation. The correct use of paraphrasing and APA citation are also taught and used throughout.

ESPU102 Introduction to Academic English For Science (3 CH)

The aim of this mobile-learning enhanced course is to introduce students to conventions of academic English with respect to reading, writing and oral communication skills. Academic reading and writing skills are developed through the reading of disciplinary academic texts, the study of academic essay models and the writing of short academic texts based on research. Academic oral communication skills are developed with particular reference to the effective preparation and delivery of an academic presentation. The correct use of paraphrasing and APA citation are also taught and used throughout.

ESPU103 Introduction to Academic English For Education (3 CH)

The aim of this mobile-learning enhanced course is to introduce students to conventions of academic English with respect to reading, writing and oral communication skills. Academic reading and writing skills are developed through the reading of disciplinary academic texts, the study of academic essay models and the writing of short academic texts based on research. Academic oral communication skills are developed with particular reference to the effective preparation and delivery of an academic presentation. The correct use of paraphrasing and APA citation are also taught and used throughout.

Prerequisites

- ENGU130

ESPU104 Introduction to Academic English For Business (3 CH)

The aim of this mobile-learning enhanced course is to introduce students to conventions of academic English with respect to reading, writing and oral communication skills. Academic reading and writing skills are developed through the reading of disciplinary academic texts, the study of academic essay models and the writing of short academic texts based on research. Academic oral communication skills are developed with particular reference to the effective preparation and delivery of an academic presentation. The correct use of paraphrasing and APA citation are also taught and used throughout.

ESPU1052 English for Law I (3 CH)

This mobile-learning enhanced course aims to help students understand and use English legal terminology with particular reference to contracts, international agreements and basic business law. Students build up their legal vocabulary and their academic reading and writing skills in order to read and write legal and law-related documents, ranging from professional emails to case studies to basic business contracts to research reports. Oral communication skills are developed with particular reference to the effective preparation and delivery of a presentation on a legal topic. The correct use of citation is also taught.

ESPU106 Introduction to Academic English For Food & Agriculture (3 CH)

The aim of this mobile-learning enhanced course is to introduce students to conventions of academic English with respect to reading, writing and oral communication skills. Academic reading and writing skills are developed through the reading of disciplinary academic texts, the study of academic essay models and the writing of short academic texts based on research. Academic oral communication skills are developed with particular reference to the effective preparation and delivery of an academic presentation. The correct use of paraphrasing and APA citation are also taught and used throughout.

ESPU107 Introduction to Academic English For Engineering (3 CH)

The aim of this mobile-learning enhanced course is to introduce students to conventions of academic English with respect to reading, writing and oral communication skills. Academic reading and writing skills are developed through the reading of disciplinary academic texts, the study of academic essay models and the writing of short academic texts based on research. Academic oral communication skills are developed with particular reference to the effective preparation and delivery of an academic presentation. The correct use of paraphrasing and APA citation are also taught and used throughout.

ESPU1081 Introduction to Academic English for Information Technology I (3 CH)

The aim of this mobile-learning enhanced course is to introduce students to conventions of academic English with respect to reading, writing and oral communication skills. Academic reading and writing skills are developed

through the reading of disciplinary academic texts, the study of academic essay models and the writing of short academic texts based on research. Academic oral communication skills are developed with particular reference to the effective preparation and delivery of an academic presentation. The correct use of paraphrasing and APA citation are also taught and used throughout.

ESPU1082 Introduction to Academic English for Information Technology II (3 CH)

TThis mobile-learning enhanced course aims to improve student proficiency in writing well-organized, accurate academic essays, and presenting information to an audience. The course is organized around IT themes that lead to contrastive essay writing. Emphasis is placed on organizing and developing ideas, reading for information, paraphrasing, referencing, synthesis, structural complexity, as well as grammatical and mechanical accuracy. The course's capstone project focuses on improving speaking and associated non-verbal skills with particular reference to the design, preparation and delivery of IT presentations for an audience of IT professionals.

Prerequisites

- ESPU102 with a minimum grade D or ESPU103 with a minimum grade D or ESPU104 with a minimum grade D or ESPU106 with a minimum grade D or ESPU107 with a minimum grade D or ESPU1014 with a minimum grade D or ESPU1081

ESPU1462 Communication Skills for Hum & SS (3 CH)

This mobile-learning enhanced course is designed to develop and improve skills and competencies in English communication. It focuses on improving speaking and associated non-verbal skills with particular reference to the design, preparation and delivery of college-appropriate presentations for a specific audience. These skills include producing the authentic sounds and rhythms of spoken English and using visual aids correctly. The course also aims to promote collaborative learning, critical thinking and a realistic and ethical approach to research. Students also complete reflective writing tasks to develop thinking and self-evaluation skills and to improve their written communications in English.

Prerequisites

- ESPU102 with a minimum grade D or ESPU103 with a minimum grade D or ESPU104 with a minimum grade D or ESPU106 with a minimum grade D or ESPU107 with a minimum grade D or ESPU1014 with a minimum grade D

ESPU240 Business Writing in English (3 CH)

The aims of this mobile-learning enhanced course are to develop workplace skills including professional writing, presentation skills, performance readiness, as well as academic abilities. Workplace writing, specifically the improvement of business etiquette, audience-appropriate language and content are targeted, while professional presentation skills that focus on content appropriateness, organization, media choice and effective delivery are covered as well as the multicultural and behavioral skills needed for career success. Additionally, academic writing with a focus on in-depth research, referencing and citations to prepare students for further education is taught.

Prerequisites

- ESPU1014 with a minimum grade D or ESPU102 with a minimum grade D or ESPU103 with a minimum grade D or ESPU104 with a minimum grade D or ESPU106 with a minimum grade D or ESPU107 with a minimum grade D or ESPU1081 with a minimum grade D

GEHP111 Happiness and Wellbeing (3 CH)

In this course, you will learn a number of scientifically validated strategies to boost your happiness and wellbeing across several contexts, such as your future workplace, home, academic, and community/social life, like gratitude, savoring, developing goals, identifying three good things, developing purpose, and deepening their relationships among others. You will learn why strategies work according to various wellbeing models, such as the Broaden and Build (Fredrickson), Flourishing (Keyes) and PERMA (Seligman) models, as well as under which conditions they are effective (i.e. adaptation, fit, variety, timing, etc.). Wellbeing from a religious and cultural perspective is also explored so that you can appreciate how and why understandings of happiness differ. We

will also review strategies you can use to improve your health. Finally, you will engage in a positivity initiative right in your own community.

GEIE222 Fundamentals of Innovation and Entrepreneurship (3 CH)

Developed as a Stanford-informed approach to learning innovation and entrepreneurship, this course offers skills that can be applied to any high-growth enterprise or other organization in the UAE. The class is composed of two modules encompassing 1) Design Thinking, 2) Entrepreneurship and Leadership. Throughout the course, students will develop creativity and entrepreneurship mindsets, teamwork, taking and managing responsibility, ethical decision-making and critical thinking skills. Optimised for a class size of 25 to 30 students, the course is taught in two 75-minute sessions over 16 weeks, and is appropriate for undergraduate students at a second year level (30+ credit hours). *** GEIE222 is supported with a once weekly English language lab of 50 minutes ***

GEIL101 Information Literacy (3 CH)

In this course, students will be equipped with information literacy skills, communications skills, critical thinking and lifelong learning skills. Information literacy skills cover how to locate, access, evaluate and use information ethically. Communication skills cover how to communicate and present information and findings effectively. The course delivery method enables students to develop and apply the 21st century skills and Information Literacy skills. Throughout the course, students will be engaged in active, self-directed and oriented tasks.

Prerequisites

- ENGU130 with a minimum grade D

GEIT112 Fourth Industrial Revolution (3 CH)

With the rapid technological development and transformation, the world now is amidst the Fourth Industrial Revolution. This revolution is very much driven by intelligence in powering decision-making and processes. This course is designed to offer students an introduction to Fourth Industrial Revolution and provides a coverage of key Fourth Industrial Revolution technologies and trends; the changes it will generate and the benefits of its application; the different provided opportunities and posed challenges; and how organizations can reap Fourth Industrial Revolution benefits.

GESU121 Sustainability (3 CH)

Today, the world we live in is facing challenges from numerous facets: food scarcity, energy demands, climate change and a population that is projected to increase. This course, therefore, focuses on sustainability as one of the dominant global concerns from an environmental, economic and social point of view. It is an urgent issue that is facing the world not only in our current century, but beyond. The course will introduce the major components of sustainability: definition, monitoring and assessment. Furthermore, the course will assist students in developing the core concepts of sustainable management from local to regional to global view points. Finally, case studies from the UAE, the region and the world will be used as real-world examples for students' reports and presentations.

HSR100 Rhetoric and Composition 2A (3 CH)

The courses cover a range of academic and communicative skills, although their outcomes are assessed separately. The courses cover themes relevant to students of the Humanities and Social Sciences such as Government and Leadership, Justice, Wealth and Poverty and Feminism. The instructor selects a minimum of four thematic areas from the range provided. These are based on the course book A World of Ideas [Ed Lee Jacobus) and a significant number of supplementary texts which bring a less Westernised bias to the material and link the themes to the learners' geographical and social context. The courses encourage the development of oral, aural, critical reading and academic writing skills.

Prerequisites

- ESPU1014 with a minimum grade D

HSR120 Introduction to Heritage & Culture (3 CH)

This is an interdisciplinary course which integrates various ideas or themes from a variety of disciplines such as literature (Arabic and English), philosophy, history, art history, archeology, geography and cultural anthropology. The majority of materials and assignments will focus upon critical reading, reviews and discussions, thematic or chronological progressions. The course content will reflect upon unique and varied perspectives from a variety of sources such as Mediterranean, Middle Eastern/Arabic and Gulf regions and the importance

and role that history and culture serves in fostering and understanding scholarly endeavors by previous generations and cultures. The focus will be primarily upon reading and writing skills, critical thinking, analytical criticism and group projects and research.

HSR130 Introduction to Language & Communication (3 CH)

This course covers the forms and functions of human communication and media in society. Students enrolled in the course learn the basic concepts of language, linguistics, translation, and media through an interdisciplinary perspective. It covers first and second language learning, the branches of linguistics, the relationships between languages, verbal and non-verbal communication, the nature of persuasion and the forms of translation. This course also makes students aware of the interrelationships within various disciplines in humanities and social sciences and informs them about their choice of majors.

HSR140 Introduction to Society & Behavior (3 CH)

This course covers the basic concepts and purposes of Psychology, Sociology, Social Work, and Human Services and Counseling. This course will provide definitions of these four areas, their fields of inquiry, and their roles in studying and addressing behavioral and societal issues. The primary goal of this course is to enable students to recognize the uniqueness of each of the four areas and to appreciate how they interrelate and complement each other in approaching and resolving behavioral and societal problems.

HSR150 Introduction to Government Policy & Urban Structures (3 CH)

This interdisciplinary course combines concepts, ideas, and theories from Geography, Political Science, and Urban Planning. The course interactively addresses a series of topics relevant to the above mentioned disciplines, and aims to help students comprehend the intricacies and essentials of some contemporary human phenomena. The selected topics include government, leadership, human environment interaction and urban planning.

HSR280 Critical & Creative Thinking (3 CH)

This course provides practical exercises and examples drawn from real life situation in both science and society to develop the skills which are needed to

conceptualize, analyze and evaluate arguments, information and evidence gathered from a variety of sources, such as observation, experience, reading and reflection.

HSR400 Integrated Capstone (3 CH)

This capstone course provides students with core knowledge, attitudes and skills to help them succeed in their lives and careers and to enhance their capacity for team work, leadership and innovation that will help them to successfully guide the economic, social and cultural development of the UAE.

HSS105 Emirates Studies (3 CH)

This course seeks to establish the national belonging and appreciation of the UAE national achievements through educating students on the key social aspects of the Emirates society, basic values and its inheritance, offering studies in various and significant studies that are relevant to UAE history and geography, aspects of internal and external policy, aspects of the social systems, social human development and citizen's developmental role & social responsibility, women empowerment and its role in the society services delivered by the State, and the country tendency to sustainable energy, economic development, developmental indicators and the country standing in the global competitiveness. The course also explores the visions of the federal government 2021 and Abu Dhabi 2030, in addition to the future issues of the developmental strategic plans and challenges facing them.

HSS110 Scientific Research Skills (3 CH)

The course is designed mainly to promote students? scientific research skills. This goal is achieved by providing students with information about the basic characteristics of science and its relationship to knowledge. Additionally, the course highlights research methodology, types, and scientific research steps. These steps include identifying the problem or the research topic, formulating assumptions or hypotheses, reviewing literature, collecting and analyzing data, and reporting findings