جامعة الإمارات العربية المتحدة
United Arab Emirates University

Course Catalog 2017-2018

College of Business and Economics

Accounting

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.

ACCT625 Corporate Governance, Business Ethics and Control (3 CH)

This course aims to equip professional accountants with the knowledge and key skills necessary to deal with issues related to corporate governance, ethics, and controls. The course develops a sound understanding of corporate governance systems, mechanisms, fundamental theories, and practice. It explains the practice of corporate governance in a national and international context. The course also focuses on ethical reasoning, moral decision making, and controls. This course explores the effect of professional codes of conduct and controls on corporate governance.

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 profit and loss information. 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 the impact of harmonisation on accounting standards, accounting earnings quality in an international context, the impact of corporate governance, and earnings management.

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 Internal Auditing and Risk-Based 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.

Business Administration

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

ENTR410 Managing Entrepreneurial Ventures (3 CH)

Entrepreneurial ventures whether they are Home-based businesses (HBB), Family controlled businesses (FCB), SME's or within large corporations (intra-preneurship) all go through the same challenges of growth. After sustaining a certain level of expansion in the initial stage, they realize that management by personality does not work any more. The transition from a personal to a professional management style becomes a necessity and requires drastic changes in the manner of how the entity was being managed and run in the start-up phase. The students will be exposed to the working and intricacies of each type of venture and will be able to identify their relative strengths and weaknesses. At the end of the course they will be in a good position to measure the merits and demerits of each approach and apply their learning in their chosen careers. The course will draw heavily from real life examples and each type will be debated, dissected and analyzed in detail to enhance their understanding.

Prerequisites

ENTR310 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

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.

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 D
STAT130 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.

MGMT625 Business Project Management (3 CH)

This course covers the role of project management in business or governmental organizations. The course is designed to equip students with skills, knowledge, abilities, and behaviors required for effective management of projects over the various phases in the project life cycle from the initial concept to project completion. The course covers key aspects of managing projects starting from understanding of the socio-economic environment in which the project is created and then focusing on technical aspects of project planning, implementation and control. Students in this course will learn how to achieve project goals and objectives within set constraints, such as time and budget.

MGMT630 Business Ethics & Corporate Governance (3 CH)

This course addresses the "big picture" questions surrounding the relationships between business ethics and business and society as a whole: Why does an organization exist? Whom does the organization serve? What responsibilities does an organization have to its stakeholders? Is there a moral high ground in business? Does running an ethical business pay off in the long run? Students will learn to address these questions throughout this course.

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.

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.

Prerequisites

ENGU1404

MIST205 Introduction to Programming & Web B D (3 CH)

This course provides an exposure to the fundamental concepts and models of web-based application development. Students learn the basic programming, program design, data structures, computer concepts, problem solving, and event driven programming. It includes the use of logical and physical structures for both programs and data. It introduces MIS students to business programming applications by providing them with the skills necessary to design and implement programs and web-based user interfaces. This course covers fundamentals of object-oriented program development using top-down design, structured programming and debugging, testing and implementation, and elementary data structures. Java programming language is used as the software tool for students to learn about the fundamentals of programming for business applications.

Prerequisites

MIST200 with a minimum grade D

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

MIST220 MIS Analysis & Logical Design (3 CH)

This course discusses the processes, methods, techniques and tools that organizations use to determine how they should conduct their business, with a particular focus on how computer-based technologies can most effectively contribute to the way business is organized and business processes are managed. The course covers a systematic methodology for analyzing a business problem or opportunity, determining what role, if any, computer-based technologies can play in addressing the business need, articulating business requirements for the technology solution, specifying alternative approaches to acquiring the technology capabilities needed to address the business requirements, and specifying the requirements for the business information systems solution in particular, in-house development, development from third-party providers, or purchased commercial-off-the-shelf (COTS) packages.

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

MIST320 Data & Information Management (3 CH)

This course provides the students with an introduction to the core concepts in data and information management. It is centered around the core skills of identifying organizational information requirements, modeling them using conceptual data modeling techniques, converting the conceptual data models into relational data models and verifying its structural characteristics with normalization techniques, and implementing and utilizing a relational database using an industrial-strength database management system. The course covers basic database administration tasks. This course also provides MIS students with fundamental principles and topics of data quality and IT security. In addition to developing database applications, the course helps the students understand how large-scale packaged systems are highly dependent on the use of DBMSs. Building on the transactional database understanding, the course introduces data and information management technologies that support business intelligence.

Prerequisites
MIST220 with a minimum grade D
MIST205 with a minimum grade D

MIST360 MIS Project Management & Practice (3 CH)

This course discusses the processes, methods, techniques and tools that organizations use to manage their business information systems projects. The course covers a systematic methodology for initiating, planning, executing, controlling, and closing projects. This course assumes that project management in the modern organization is a complex team-based activity, where various types of technologies (including project management software as well as software to support group collaboration) are an inherent part of the project management process. This course also acknowledges that project management involves both the use of resources from within the firm, as well as contracted from outside the organization.

Prerequisites

MIST220 with a minimum grade D

MIST420 Business Intelligence & PM (3 CH)

This course aims to develop understanding about the essentials of Business Intelligence (BI), Data Warehousing, Business Analytics, Data Visualization, Business Data Mining and Business Performance Management (BPM) Systems. Through lectures, case studies and class discussions this course develops participants' ability to identify key decision variables, critical success factors, key performance indicators (KPIs) that are affecting business performance and subsequently monitor the same using business intelligence systems using online analytical process (OLAP) and other performance management (BPM) techniques. This course helps participants to develop a connection between BI and BPM by using the output of business intelligence systems as input for BPM. The idea of using BI and BPM hand-in-hand revolves around the concept that any kind of knowledge created locally (within an organization) is a corporate resource and hence should be managed effectively using appropriate tools, processes, and methodology.

Prerequisites

MIST320 with a minimum grade D

MIST460 Enterprise Systems & MIS Strategy (3 CH)

This course is designed to provide students with an understanding of the theoretic and practical issues related to the application of Enterprise Systems within organizations as a strategic initiative. The main focus of this course is to demonstrate how Enterprise Systems integrate information and organizational processes across functional areas with a unified system comprised of a single database and shared reporting tools. It takes a senior management perspective in exploring the acquisition, development and implementation of plans and policies to achieve efficient and effective enterprise systems. The students will gain an appreciation of the scope of enterprise information systems and the motivation for implementing them. This course covers information systems security and risk management at the organizational level. This course conceptualizes, comprehends, and communicates the complex nature of strategic information systems management (SISM). The course will include hands-on experience with local clients so students get a clear idea on how MIS strategy is formulated and implemented.

Prerequisites

MIST360 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).

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

Economics and Finance

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 money, the banking and financial systems and the role of monetary policy in the economy, topics that are vital to the efficient working of any economy. The course emphasizes concepts that are central to understanding financial instruments, institutions and markets, and the tools and techniques employed throughout the financial system. Course objectives include an understanding of: 1) the origins and

nature of money; 2) the determination of interest rates; 3) how to apply basic knowledge of financial markets and instruments; 4) how money and capital markets function; and 5) the role of central banks and formulation of monetary policy.

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. In addition, the students will learn how to use the regression models for causality analysis and forecasting. All estimations will be performed via econometric software.

Prerequisites
ECON125 with a minimum grade D
MATH115 with a minimum grade
STAT130 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
COMS230

ECON334 Islamic Economics (3 CH)

This course studies the development and evolution of the principles of Islamic economic thoughts in general and Islamic finance and investment in particular. It focuses on the principle of profit-and-loss-sharing and Islamic modes of finance and investment and their implications on economic policies, development and stability. The course also examines Islamic ethical business, management and labor economics when they all interact together.

Prerequisites
ECON105 with a minimum grade D

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
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.

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.

ECON621 Microeconomic Principles and Analysis (3 CH)

This course is designed to develop students understanding of microeconomic principles and how they can be applied to deal with real world situations. It focuses on the study of economic agents' behavior and how they respond to changes in opportunities and constraints. It also analyzes agents' interaction in the marketplace. The course also covers issues related to the welfare effects of market structures and how do governments deal with market failures. The course methodology relies on mathematical tools and their microeconomic applications.(Not sure whether such course exists)

ECON631 Introduction to Econometrics (3 CH)

This course introduces econometric approach to problem solving. Major emphasis is placed on applications of methods to economic problems in agriculture and related industries. The course includes discussion of univariate, bivariate, and multivariate statistical analysis and applications. It provides students with the skills necessary to be able to construct models and estimate them within a regression framework. Diagnostic testing in order to verify whether or not the underlying assumptions for a good model are fulfilled is an integral part of the course. In case any assumption is not fulfilled potential remedies will be provided.

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.

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.

General Business Administration

DBA900 The Philosophy of Social Research (1 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 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 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
DBA901 with a minimum grade D

DBA903 Literature Review and Critique (1 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 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 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 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 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

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)

GBUS610 Field Project I (3 CH)

This course is the first in a series of four courses in which students will be removed from a structured learning environment in a classroom setting and will be challenged to deal with unstructured practical and industry-based problems. Students will be provided with the opportunity to work with the management of a client organization from the community. In groups and under the supervision of a faculty member, students will be required to utilize their skills to complete the first stage of analyzing a business problem or opportunity. At the end of this course, students are expected to demonstrate their understanding of the business problem and present their findings with the analysis framework.

GBUS620 Field Project II (3 CH)

At this second stage of the field project, students are expected to use the knowledge gained and tools learned from the courses in the first semester of the MBA program to develop and defend action plans within the framework developed in Field Project I. Students will collect data, conduct interviews with subject matter experts, and top executives in order to enhance and finalize their action plans. Findings are presented and submitted in a report at the end of this course.

GBUS630 Field Project III (3 CH)

In this course, students will learn skills and tools to implement the action plans developed in Field Project II. Some tools and techniques will require subject matter experts, field professionals, and/or faculty members from the client organization or other institutions to explanation and facilitation. Students will implement the skills and use the tools in enhancing the action plans. At the end of this course, students are expected to present their proposed solution and/or recommendations in both oral and written formats.

GBUS640 Field Project IV (3 CH)

This is the final course in the four-course field project series. In this course, under the supervision of a faculty member (project consultant) and executives from the associated client organization, students will implement, and receive feedback on, the action plans developed in Field Project III. If the project addresses a business issue that has been resolved by the organization under consideration then a congruency analysis between the two approaches will be developed. Otherwise, the proposed implementation or solution will

be discussed with the stakeholders. At the end of this course, students are expected to submit a report documenting the findings of their field project.

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.

Statistics

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.

STAT105 Statistics for Business I (3 CH)

This course helps students handle statistical exploratory, descriptive and estimation tools in business applications. It includes data collection, tabular and graphical presentation, descriptive statistics, probability distributions, sampling distributions and statistical estimation.

STAT125 Statistics for Business II (3 CH)

This course helps students use statistical methods for making decisions in Business and Economics. This course includes hypothesis testing for one and two means and for one and two proportions, nonparametric tests, single factor analysis of variance, chi-square test for goodness-of-fit, chi-square test for independence, contingency tables, simple and multiple regression and time series analysis.

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.

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

STAT215 Social Statistics (1) (3 CH)

This course provides students with statistical methods for modeling and analyzing social data. It includes data collection, tabulation and graphical presentation, statistical measures, cross-tabulation analysis, and principles of survey data analysis using statistical packages. It emphasizes the use of the computer package (SPSS) to analyze real social data.

STAT2152 Social Statistics (1) (3 CH)

This course provides students with statistical methods for modeling and analyzing social data. It includes data collection, tabulation and graphical presentation, statistical measures, hypothesis testing, principles of survey data analysis using statistical packages.

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 function, bivariate and marginal distribution functions, conditional distributions and expectations. Although 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 the social and physical sciences.

Prerequisites
MATH115 with a minimum grade D or
MATH105 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
MATH115

STAT242 Non-Parametric Statistics (3 CH)

This course develops students' understanding of the methodology and the theory underlying a number of statistical techniques applicable in solving real-life inference problems under minimal assumptions about the underlying distribution of the data. It covers the following topics: order statistics, distribution free tests, single and multi-sample rank statistics, Pittman's efficiency and rank correlations.

Prerequisites
STAT130

STAT245 Probability and Statistics for Education (3 CH)

The course introduces students to the basic concepts and methods of probability and statistics with applications in the education field. It includes sample spaces and events; counting techniques; probability; conditional probability; random variables; cumulative distribution function and probability density function; moments of random variables; sampling and sampling distributions, inference about means and proportions, correlation and simple regression.

Prerequisites
MATH110

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

STAT320 Applied Random Processes (3 CH)

This course introduces students to Stochastic processes as models of time-dependent random phenomena. It covers Markov chains; Autocorrelation and Stationary; Fourier Transforms; Queuing Theory.

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

STAT338 Regression Analysis (3 CH)

This course introduces students to the methods of regression analysis and trains them to fit regression models to data. This course includes simple and multiple linear regression, dummy variable regression, model selection, diagnostics for residuals, multi-collinearity detection, transformations, lack-of-fit tests, partial and sequential F-tests.

Prerequisites
(STAT130 with a minimum grade D or STAT210 with a minimum grade D or STAT235 with a minimum grade D) AND
STAT230 with a minimum grade D

STAT340 Mathematical Statistics (3 CH)

This course introduces the basic concepts of estimation and hypothesis testing. It includes point estimation, properties of estimators, method of moments, method of maximum likelihood, method of least squares, interval estimation, most powerful tests and likelihood ratio tests. It also covers some common confidence intervals and tests for means, variances and proportions.

Prerequisites
STAT230 with a minimum grade D AND
(STAT130 with a minimum grade D or STAT210 with a minimum grade D or STAT235 with a minimum grade D)

STAT369 Demographic Analysis (3 CH)

This course introduces techniques of demographic analysis and their applications using computer packages. It covers vital statistics, rates and proportions, population distribution by age and gender, mortality, fertility and migration, life tables, population projections, and estimation.

Prerequisites
STAT130 or
STAT215

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

STAT433 Time Series Analysis (3 CH)

This course trains students to select the appropriate time series model, estimate the parameters and make forecasts. It includes time series regression, classical decomposition, exponential smoothing, autocorrelation and partial autocorrelation functions, stationary and homogeneous time series, autoregressive, moving average, ARMA and ARIMA models and seasonal models, Box-Jenkins methodology and business applications.

Prerequisites
STAT338

STAT461 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 computer implementation and applications to the various sciences rather than the theoretical aspects of the topics.

Prerequisites
STAT338

STAT462 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 the analysis of categorical data using the statistical package SPSS. 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
STAT130
STAT230

STAT469 Statistical Quality Control (3 CH)

This course introduces the basic process control and acceptance sampling techniques. It covers the objectives of statistical quality control, control charts for variables, control charts for attributes, acceptance sampling, single, double and multiple sampling, and the OC curve.

Prerequisites
STAT230
(STAT130 or STAT210 or STAT235)

STAT472 Statistical Computing (3 CH)

The course introduces students to common computational techniques needed in statistics. It covers, in particular, data manipulation and cleaning techniques, sampling, simulation, resampling, maximum likelihood estimation and elementary Bayesian analysis. These techniques will be demonstrated using prominent statistical packages.

Prerequisites
STAT130
STAT230

STAT480 Seminar in Applied Statistics (E) (3 CH)

This course uses the case teaching technique. During the course students will work in groups to solve various cases / capstone experiences / projects. Students are also expected to write reports and give oral presentations for each project. Each group will be assigned a project that requires the use of international, national and /or official statistical databases.

Prerequisites
STAT331
STAT338
STAT422

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.

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.

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.

STAT659 Applied Statistics (2 CH)

This is a graduate course that covers the principles of risk and uncertainty applied to hydraulic, environmental and other water-related problems. It includes such topics as statistical measures and graphs, parametric and non-parametric statistical inference, analysis of variance, multiple regression and correlation.

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.

STAT701 Applied Petroleum Statistics (2 CH)

This course provides students with an understanding of computer-based statistical methods in petroleum sciences and engineering. Focuses on estimation of parameters, comparisons of treatments, multivariate techniques such as multivariate regression, discrimination analysis and Statistical analysis of field and petroleum engineering data.

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.

CURR104 Introduction to Art Education (3 CH)

The objective of this course is to introduce students to concepts, areas of inquiry, and experiences in contemporary art education. This is a required course that serves as the first of a sequence of courses in the Art Education major and will provide a starting point for the rest of the courses in the major.

CURR105 Educational Technology in Preparatory & Secondary Schools (3 CH)

The course aims to introduce preparatory and secondary prospective school teachers to the uses of educational technology in their classes. It provides candidates with opportunities to combine knowledge of subject matter and technology into teaching and learning to facilitate experiences that advance student learning, creativity, and innovation. The course emphasizes the design, development, and evaluation of authentic learning experiences and assessment. It focused on helping prospective teachers to understand the global, societal, legal, and ethical issues in an evolving digital culture.

CURR200 Planning & Implement ISAR CURR (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 elementary school students' development and learning of Islamic/Arabic curriculum in UAE. Student teachers will have the opportunity to learn the connection between theories of curriculum planning development and their applications in actual classroom practices in the elementary schools.

CURR201 Language Ed in Elem School (3 CH)

This course aims at providing students with the necessary background about the basic elements of language education in elementary schools. It also intends to assist student teachers acquire skills necessary to improve elementary school children's language proficiency. It provides students with basic skills related to the various approaches and techniques of language Education. It covers analysis of children's discourse: speaking, listening, reading and writing and ways of improving these skills. Emphasis is placed on applications of language skills on texts drawn from various subject matters.

CURR202 Plan & Implement of SOCV CURR (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 elementary school student's development and learning of social studies/civics curriculum. Student teachers will have the opportunity to learn the connection between theories of curriculum planning development and their applications in actual classroom practices in the elementary schools.

CURR203 Curriculum Development in Arabic Language (3 CH)

This course aims to introduce students with the principles of curriculum planning and development in Arabic language, and implementation of Arabic language standards, key concepts, as well as theories will be discussed in this course.

CURR204 Plan & Implement of SCMA CURR (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 elementary school student's development and learning of mathematics/science curriculum. Student teachers will have the opportunity to learn the connection between theories of curriculum planning development and their applications in actual classroom practices in the elementary school science and mathematics.

CURR205 Curriculum Development in General Social Studies (3 CH)

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

CURR206 Plan & Implement of ENGL CURR (3 CH)

This course is designed to be an exploration of new trends and approaches to English as a second language curriculum (ESL). It provides an overview of contemporary issues relating to ESL curriculum planning and implementation. It offers theoretical framework and curriculum models for teaching ESL in elementary schools. Attention is given to major language issues as they affect ESL curricular activity. Systematic analysis of current ESL curriculum practices, with particular emphasis on instructional, learning and linguistic forces affecting elementary-school curriculum. It provides trainees with experiential activities into how to plan, organize and implement ESL curriculum in elementary schools.

CURR207 Curriculum Development in in Mathematics (3 CH)

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

CURR208 Curriculum Development in English Language (3 CH)

This course familiarizes students with the main features of traditional and recent forms of English language curricula and standards for primary students. This course is intended to

introduce students to key components and features of traditional and current forms of English language curricula and principles in preparatory and secondary schools. It will focus on linguistic and educational theories and principles for ESL/EFL curriculum design. The role of language curriculum standards will be examined in relation to instruction and assessment. Special attention will be paid to influential course design approaches such as task-based and content-based syllabi. Students will be provided with opportunities to analyze and reflect on preparatory and/or secondary schools' curriculum, implementation and evaluation.

CURR209 Curriculum Development in Islamic Studies (3 CH)

This course aims to introduce students to the key components of curriculum development in Islamic studies. Principles of curriculum planning, development and implementation of Islamic studies standards, and key curricular concepts as well as theories will be discussed in this course.

CURR211 Planning & Implementation of ECE Curriculum (3 CH)

This course aims at providing students with a wide range of exploratory educational experiences including basic educational concepts combined with field experiences to enable them make a decision as to whether to join the teaching profession. It covers topics such as teaching as a profession, professional ethics, the future of teaching, teacher duties and responsibilities and school and its roles in the UAE society. Emphasis is placed on enabling students to develop portfolios. Students are expected to engage in field experiences.

Prerequisites
CURR414

CURR212 Language Development and Emergent Literacy (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.

CURR213 Children's Artistic Development (3 CH)

This course introduces the historical and contemporary perspectives of children's artistic development. It also emphasizes the relationships between general intellectual growth and the ability to create and respond to works of art.

CURR214 Methods of Teaching Arabic Language in Preparatory & Secondary Schools (1) (3 CH)

This course is designed to introduce students to the current approaches and theories of teaching and learning Arabic in grades (6-12). The course introduces principles of teaching and learning and provides students with opportunity to be familiar with current approaches to planning and implementing effective lessons in Arabic. Current teaching strategies particularly student centered strategies will also be emphasized, in addition to the integration of information and communication technology into teaching and learning Arabic.

CURR215 Methods of Teaching General Social Studies in Preparatory & Secondary Schools (1) (3 CH)

This course is designed to introduce general social studies teacher students to the current approaches and theories of teaching and learning general social studies in grades (6-7). The course introduces principles of teaching and learning and provides students with opportunity to be familiar with current approaches to planning and implementing effective lessons in general social studies. Current teaching strategies particularly student centered strategies will also be emphasized, in addition to the integration of information and communication technology into teaching and learning general social studies.

CURR216 Curriculum Development in Chemistry (3 CH)

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

CURR217 Methods of Teaching Mathematics in Preparatory & Secondary Schools (1) (3 CH)

This course is designed to introduce mathematics teacher students to the current approaches and theories of teaching and learning mathematics in grades (6 -12). The course introduces principles of teaching and learning and provides students with opportunity to be familiar with current approaches to planning and implementing effective lessons in mathematics. Current teaching strategies particularly student centered strategies will also be emphasized, in addition to the integration of information and communication technology into teaching and learning mathematics.

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.

CURR219 Methods of Teaching Islamic Studies in Preparatory & Secondary Schools (1) (3 CH)

This course is designed to introduce prep. & secondary schools Islamic studies students to the current approaches and theories of teaching and learning in grades (6-12). The course introduces principles of teaching and learning and provides students with opportunity to be familiar with current approaches of planning and implementing effective lessons in Islamic studies. Current teaching strategies particularly student centered strategies will also be emphasized, in addition to the integration of information and communication technology into teaching and learning Islamic Studies.

CURR223 Assessment in Art Education (3 CH)

This course will look into a variety of approaches of evaluation and assessment development and implementation. Attention will be given to the problems associated with the assessing of process and product, as well as criticism of historical and aesthetic concepts in the discipline of art education.

CURR224 Interpreting Art Experience: Social and Behavioral Perspectives (3 CH)

This course will examine the shared human experience of making and responding to visual images and artifacts from the broadest possible range of perspectives, encouraging students to develop an understanding of the role of art experience in their own lives and in the lives of others. How art is learned within specific cultures and subcultures, how understanding and appreciation of particular images and objects evolves, and how experience and learning interacts with fundamental processes of perception, cognition, and interpretation are central themes.

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.

CURR226 Methods of Teaching Chemistry in Secondary Schools (1) (3 CH)

This course is designed to introduce chemistry teacher students to the current approaches and theories of teaching and learning chemistry in grades (10-12). The course introduces principles of teaching and learning and provides students with opportunity to be familiar with current approaches to planning and implementing effective lessons in chemistry. Current teaching strategies particularly student centered strategies will also be emphasized, in addition to the integration of information and communication technology into teaching and learning chemistry.

CURR227 Methods of Teaching Physics in Secondary Schools (1) (3 CH)

This course is designed to introduce physics teacher students to the current approaches and theories of teaching and learning physics in grades (10-12). The course introduces principles of teaching and learning and provides students with opportunity to be familiar with current approaches to planning and implementing effective lessons in physics. Current teaching strategies particularly student centered strategies will also be emphasized, in addition to the integration of information and communication technology into teaching and learning physics.

CURR300 Assessement in Preparatory & Secondary Schools (3 CH)

The course aims to introduce prospective preparatory and secondary school teachers to the essentials of assessment at the level of (6-12) grades. It also aims to help candidates explore "assessment for learning" by keeping an eye on the major methods and techniques of assessment (formal and informal assessment, teacher-made tests and standardized tests, authentic assessment, performance-based assessment, and summative and formative feedback methods). Specific emphasis will be placed on how these methods should be built and used to assess and report growth, development, and academic achievement of learners. Candidates will be given opportunities to look into how assessment can be integrated into the process of planning and teaching, and apply that knowledge by developing an assessment plan and a variety of assessment activities and tools.

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.

CURR303 Principle of Educational Research (3 CH)

This course is designed to introduce teacher education candidates to educational research skills needed to become effective professional practitioners. An overview of major approaches to educational research is provided, followed by an examination of the components of qualitative and quantitative research to provide foundation for classroom-based research/inquiry. The course focusses on issues related to planning a study, selecting a research method, gathering, analyzing and interpreting evidences and data, and the writing of a research report. Finally, an overview of action research will provide candidates with skills to undertake action research in their future roles as professional practitioners.

CURR304 Methods of Teaching Arabic Language in Preparatory & Secondary Schools (2) (3 CH)

This course is designed to introduce students to the current approaches of teaching and learning Arabic language in grades (6-12). It intends to develop an integrated professional knowledge system that will allow the students to teach Arabic language effectively. Students will have opportunity to advance their understanding of current teaching methods, how student learn, and the factors conducive to knowledge construction and conceptual changes. In addition, it focuses on the integration of information and communication technology into teaching and learning Arabic language.

Prerequisites

CURR214 with a minimum grade D

CURR305 Methods of Teaching General Social Studies in Preparatory & Secondary Schools (2) (3 CH)

This course is designed to introduce prospective general social studies teachers to the current approaches of teaching and learning in grades (6-7). It intends to develop an integrated professional knowledge system that will allow the students to teach general social studies effectively. Students will have opportunity to advance their understanding of

current teaching methods of general social studies, how student learn, and factors conducive to knowledge construction and conceptual changes in general social studies.

Prerequisites
CURR215 with a minimum grade D

CURR306 Methods of Teaching Islamic Studies in Preparatory & Secondary Schools (2) (3 CH)

This course is designed to introduce students to the current approaches of teaching and learning of Islamic studies in grades (6-12). It intends to develop an integrated professional knowledge system that allows students to teach Islamic studies effectively. Students will have the opportunity to advance their understanding of current teaching methods, how students learn, and the factors conducive to knowledge construction and conceptual changes. In addition, the course will focus on the integration of information and communication technology into teaching and learning Islamic studies.

CURR307 Methods of Teaching Mathematics in Preparatory Secondary Schools (2) (3 CH)

This course is designed to introduce prospective mathematics teachers to the current approaches of teaching and learning in grades (6-12). It intends to develop an integrated professional knowledge system that will allow the students to teach mathematics effectively. Students will have opportunity to advance their understanding of current teaching methods of mathematics, how student learn, and factors conducive to knowledge construction and conceptual changes in mathematics.

Prerequisites
CURR217 with a minimum grade D

CURR308 Methods of Teaching English Language in Preparatory & Secondary Schools (2) (3 CH)

This course will provide students with different perspectives in second and foreign language teaching and learning in order to prepare them to select and apply effective instructional methods and techniques for teaching reading and writing in preparatory and secondary schools. It is intended to build on the knowledge and understanding gained from previous courses to develop an integrated professional knowledge system that will allow the students to teach English effectively. Students will be offered various opportunities to advance their understanding of current second/foreign language teaching methods and evaluate and modify them for academic literacy purposes in the context of the UAE. Planning for instruction and implementing lessons will be a key practical aspect of the course. Microteaching will be used to help students become confident in using second language instructional methods. The role of materials, technology, and assessment in literacy development will be considered.

Prerequisites
CURR218 with a minimum grade D

CURR309 Classroom Environment & Adolescent Culture (3 CH)

This course focuses on designing learning environment that full fell the needs, readiness, learning styles, and interests of adolescents. The learning environment will include the cognitive, social, psychological, and physical learning environments. Active learning, and real and virtual designs and episodes will be implemented.

CURR310 Classroom Assessment in Elementary Education (3 CH)

This course aims at introducing candidates to a variety of classroom techniques and tools of assessment to help them make better educational decisions and modify their own planning and teaching. The course covers topics such as formal and informal; alternative and authentic; performance and portfolio assessments in addition to test construction properties. Candidates will have the experience of using appropriate software to analyze test results.

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 & ECE (3 CH)

This course aims at providing candidates with the skills necessary to effectively draw source of learning from the children's family, community, and cultural contexts to advance their learning. It reviews the family systems theory and covers the processes and skills involved in the teacher's collaborative relationships with colleagues, families, and community service agencies. The course emphasizes the teacher's need to foster responsible relationships that support children's well being.

CURR315 Methods of Teaching Chemistry in Secondary Schools (2) (3 CH)

This course is designed to introduce prospective chemistry teachers to the current approaches of teaching and learning in grades (10-12). It intends to develop an integrated professional knowledge system that will allow the students to teach chemistry effectively. Students will have opportunity to advance their understanding of current teaching methods of chemistry, how student learn, and factors conducive to knowledge construction and conceptual changes in chemistry.

CURR316 Teaching Methods of English for Young Learners (3 CH)

This course aims at introducing candidates to English language teaching approaches and techniques suitable for young learners. It covers topics such as characteristics of the young language learner, language development, approaches to teaching children and the development of language skills at the lower elementary level. Emphasis is placed on an activity-based approach to the teaching of English to children. Classroom observation and micro-teaching experiences are an integral part of this course.

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 Child (3 CH)

This course aims at providing students with the knowledge and skills needed to plan and implement an integrated science program for young children (birth through age 6). Students will be involved in an in-depth study of how young children develop science concepts and skills through interacting with their environment.

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.

CURR322 Methods of Teaching Physics in Secondary Schools (2) (3 CH)

This course is designed to introduce prospective physics teachers to the current approaches of teaching and learning in grades (10-12). It intends to develop an integrated

professional knowledge system that will allow the students to teach physics effectively. Students will have opportunity to advance their understanding of current teaching methods of physics, how student learn, and factors conducive to knowledge construction and conceptual changes in physics.

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

CURR325 Current Trends & Issues in Teaching Chemistry (3 CH)

This course aims to provide students with opportunities to learn about and reflect on the most recent contemporary issues and trends in the teaching and learning chemistry. Students will have opportunities to read, discuss, and reflect on current trends and practices related to chemistry to build sound and coherent understanding of these current trends and issues.

CURR330 Current Trends & Issues in Teaching Arabic Language (3 CH)

This course aims to provide students with opportunities to learn about and reflect on the most recent contemporary issues and trends in the teaching and learning Arabic language. Students will have opportunities to read, discuss, and reflect on current trends and practices related to their specialty area to build sound and coherent understanding of these current trends and issues.

CURR331 Current Trends & Issues in Teaching General Social Studies (3 CH)

This course aims to provide students with opportunities to learn about and reflect on the most recent contemporary issues and trends in the teaching and learning general social studies. Students will have opportunities to read, discuss, and reflect on current trends and practices related to general social studies to build sound and coherent understanding of these current trends and issues.

CURR332 Current Trends & Issues in Teaching Mathematics (3 CH)

This course aims to provide students with opportunities to learn about and reflect on the most recent contemporary issues and trends in the teaching and learning of mathematics. Students will have opportunities to read, discuss, and reflect on current trends and practices related to mathematics education to build sound and coherent understanding of these current trends and issues.

CURR333 Current Trends & Issues in Teaching English Language (3 CH)

This course aims at providing students with opportunities to learn about the most recent contemporary research issues and trends in teaching and learning English as a second and/or foreign language. Current issues such as the role of technology, independent learning, personalized assessment, language learning strategies and learning from media will be highlighted. Aspects of second language acquisition and learning will also be reviewed. A classroom-based action research project will be an integral part of the course so students can gain experience in collecting and analyzing data relevant to language learning and teaching.

CURR334 Current Trends & Issues in Teaching Islamic Studies (3 CH)

This course aims at providing students with opportunities to learn about the most recent contemporary research issues and trends in teaching and learning English as a second and/or foreign language. Current issues such as the role of technology, independent learning, personalized assessment, language learning strategies and learning from media will be highlighted. Aspects of second language acquisition and learning will also be reviewed. A classroom-based action research project will be an integral part of the course so students can gain experience in collecting and analyzing data relevant to language learning and teaching.

CURR335 Current Trends & Issues in Teaching Physics (3 CH)

This course aims to provide students with opportunities to learn about and reflect on the most recent contemporary issues and trends in the teaching and learning physics. Students will have opportunities to read, discuss, and reflect on current trends and practices related to physics to build sound and coherent understanding of these current trends and issues.

CURR336 Thinking and Learning in Teaching Chemistry (3 CH)

This course aims to help students study the types of reasoning students engage in during learning chemistry. Students will be given opportunities to learn how to get at student understanding in specific content and how to use it in planning and implementing instruction in chemistry. Thinking and reasoning activities will represent the focal point in planning and implementation of this course.

CURR337 Thinking and Learning in Teaching Physics (3 CH)

This course aims to help students study the types of reasoning students engage in during learning physics. Students will be given opportunities to learn how to get at student understanding in specific content and how to use it in planning and implementing instruction in physics. Thinking and reasoning activities will represent the focal point in planning and implementation of this course.

CURR340 Thinking and Learning in Teaching Arabic Language (3 CH)

This course aims to help students study the types of practices and/or activities that promote thinking and critical thinking skills in teaching and learning Arabic language in preparatory and secondary school context. Students will be given opportunities to learn how to get at student understanding in Arabic language and how to use it in planning and implementing instruction in teaching Arabic. Thinking and reasoning activities will represent the focal point in planning and implementation of this course.

CURR342 Thinking and Learning in Teaching General Social Studies (3 CH)

This course aims to help students study the types of reasoning students engage in during learning general social studies. Students will be given opportunities to learn how to get at student understanding in specific content and how to use it in planning and implementing instruction in general social studies. Thinking and reasoning activities will represent the focal point in planning and implementation of this course.

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.

CURR344 Thinking and Learning in Teaching English Language (3 CH)

This course aims to help students study the types of practices and/or activities that promote thinking and critical thinking skills in teaching and learning English as a second and/or foreign language in preparatory and secondary school contexts. The effect of audience and purpose on choice of discourse features will be considered when using English in various communicative contexts such as business, academic research and literary prose. Students will learn to embed thinking skills training in a wide variety of instructional activities to promote logical reasoning, argumentation, critical analysis and inferencing. Prospective teachers will be exposed to different pieces of literature and ways of teaching them to enhance learners' language proficiency. Reflection and self-evaluation will be integrated into selected components of the course.

CURR345 Thinking and Learning in Teaching Islamic Studies (3 CH)

This course aims to help students study the types of practices and/or activities that promote thinking and critical thinking skills in teaching and learning English as a second and/or foreign language in preparatory and secondary school contexts. The effect of audience and purpose on choice of discourse features will be considered when using English in various communicative contexts such as business, academic research and literary prose. Students will learn to embed thinking skills training in a wide variety of instructional activities to promote logical reasoning, argumentation, critical analysis and inferencing. Prospective teachers will be exposed to different pieces of literature and ways of teaching them to enhance learners' language proficiency. Reflection and self-evaluation will be integrated into selected components of the course.

CURR351 Content and Pedagogy Development of ISLM-EL (3 CH)

This course is designed to help candidates acquire the content and pedagogical content knowledge needed to effectively teach elementary school Islamic studies. It aims at fostering candidates' deep understanding of elementary school Islamic studies curriculum at grade 1 - 5, its organization, planning, and implementation in classrooms through frequent analysis and activities designed to familiarize candidates with different background and abilities with how particular concepts and skills related to Islamic studies are represented and adapted to learners various interests and abilities.

CURR352 Content and Pedagogy Development of ARAB-EL (3 CH)

This course is designed to help candidates acquire the content and pedagogical content knowledge needed to effectively teach elementary school Arabic language. It aims at fostering candidates' understanding of elementary school Arabic language curriculum, its organization, its planning, and its implementation in classrooms through frequent analysis and activities designed to familiarize candidates with how particular linguistic concepts are represented and adapted to learners various interests and abilities.

CURR353 Content and Pedagogy Development of SOCI-EL (3 CH)

The course is designed to help candidates acquire the content and the pedagogical content knowledge needed to effectively teach elementary school in Social Studies. The course also aims at fostering candidates' understanding of elementary school curriculum through frequent content analysis and activities that are designed to familiarize candidates with how curriculum topics and major concepts are represented and adapted to learners various interests and abilities.

CURR354 Content and Pedagogy Development of CIVIC-EL (3 CH)

The course is designed to help candidates acquire the content and the pedagogical content knowledge needed to effectively teach elementary school in Civic Education. The course also aims at fostering candidates' understanding of elementary school curriculum through

frequent content analysis and activities that are designed to familiarize candidates with how curriculum topics and major concepts are represented and adapted to learners various interests and abilities.

CURR356 Content and Pedagogy Development of MATH-ED (3 CH)

This course is designed to help candidates acquire the content and pedagogical content knowledge needed to effectively teach elementary school mathematics. It is guided by the National Document of school Mathematics curriculum. It aims at fostering candidates' understanding of elementary school mathematics curriculum through frequent analysis and activities designed to familiarize candidates with how particular mathematical concepts are represented and adapted to learners various interests and abilities.

CURR357 Content and Pedagogy Development of SCIE_EL (3 CH)

This course is designed to help candidates acquire the content and pedagogical content knowledge needed to effectively teach elementary school science. It is guided by the National Document of school Science curriculum. It aims at fostering candidates' understanding of elementary school science curriculum through frequent analysis and activities designed to familiarize candidates with how particular science concepts are represented and adapted to learners various interests and abilities.

CURR358 Content and Pedagogy Development of ENGL-EL (3 CH)

The course is designed to help candidates acquire the content and the pedagogical content knowledge needed to effectively teach elementary school English. The course also aims at fostering candidates' understanding of elementary school English language curriculum through frequent content analysis and activities that are designed to familiarize candidates with how curriculum topics and major concepts are represented and adapted to learners various interests and abilities.

CURR359 Early Field Experience in Cycle I (1 CH)

In the Early Field class student will spend one day (Thursday) with a co-operating teacher in cycle I. All students must sign up for the Early Field Experience course in the semester prior to taking the class. This course will be taken simultaneously with Curr xxx, Teaching Art in Cycle I Schools.

Corequisites
CURR369

CURR360 Early Field Experience in Cycle II (1 CH)

In the Early Field class student will spend one day (Thursday) with a co-operating teacher in cycle II. All students must sign up for Early Field Experience course in the semester prior

to taking the class. This course will be taken simultaneously with Curr xxx, Teaching Art in Cycle II Schools.

Prerequisites
CURR223
CURR359

Corequisites
CURR370

CURR361 Teach Islamic Education in Elementary (3 CH)

This course aims at introducing candidates to effective strategies used in the teaching of Islamic Education in the Elementary School. It covers the basic concepts of teaching Islamic Education and its nature. In addition, it covers planning skills, instruction and evaluation in an integrated way. Emphasis is placed on the application of Islamic Education activities and practices inside and outside school. The course includes field experiences.

CURR362 Teaching Arabic in Elem School (3 CH)

This course aims at introducing candidates to contemporary approaches and methods in the teaching of Arabic in the Elementary School. It covers recent approaches of teaching the mother tongue such as the integration approach, the communicative and ways of developing the four language skills. Emphasis is placed on the integration approach to develop the skills. The course includes field experiences.

CURR363 Teaching Methods of SS in ELEM (3 CH)

This course aims at enabling candidates acquire knowledge and skills of contemporary methods and strategies of Social Studies in the Elementary School. It covers topics such as nature of the discipline, strategies discovery and inquiry methods and cooperative learning. Emphasis is placed on applications of knowledge and skills in practical situations. Field experiences are part of the course.

CURR364 Teaching Methods of CIVICS in ELEM (3 CH)

This course aims at introducing candidates to the recent approaches and methods in teaching Civics in the Elementary School. It covers nature of the discipline as well as effective methods and strategies such as inquiry methods and cooperative learning, etc. Emphasis is placed on case studies and practical situations. Field experiences are part of the course.

CURR366 Teachings Methods of Math in ELEM (3 CH)

This course aims at introducing candidates to contemporary methods of teaching mathematics at the elementary school level. In this course, candidates will learn about the core of mathematical concepts, students' ways of reasoning about those concepts and effective teaching of these concepts at elementary school level. Candidates will also have the opportunities to develop pedagogical skills such as planning and implementing instruction as aligned with curricular standards at national and international level, using a variety of instructional tools in teaching, and assessing students' understanding and performance. Major emphasis will be placed on learning through goal-directed activities and teaching mathematics in ways that help students to construct their own knowledge.

CURR367 Teaching Methods of SC in ELEM (3 CH)

This course aims at introducing candidates to the current methods of teaching science in the Elementary School. The course includes planning, organizing and using materials and resources, integrating technology into science teaching and applying science activities. Emphasis is placed on scientific literacy and candidates' ability to observe and think critically about children's thinking. Field Experience is part of the course requirements.

CURR368 Teachings Methods of ENGL in ELEM (3 CH)

This course aims at introducing candidates to the major English as a Foreign Language (EFL) approaches and methods. It covers topics such as language acquisition and learning, the contemporary teaching approaches and the development of language skills. Emphasis is placed on the communicative approach and on techniques, which suit the UAE educational setting. Classroom observation and microteaching are an integral part of this course.

CURR369 Teaching Art in Cycle I Schools (3 CH)

This course is designed to develop students’ skills in teaching art to young people (preschool through elementary). Needs, interests, and capabilities of the young audience will be examined through readings, field experience, and in-class discussion. Emphasis will be placed on methods and content development (lessons/curriculum) for increasing children’s abilities in art production, art criticism, art history and culture, and aesthetics; and promoting authentic environments where students construct meaning. This course is to be taken concurrently with early field experience. Students must register for both).

Corequisites
CURR359

CURR370 Teaching Art in Cycle II Schools (3 CH)

The goal of this course is to develop an understanding for teaching art in cycle 2 school settings. A holistic approach is taken in this course toward cycle 2 art education. Discussions of definitions of cycle 2 art education are explored through curriculum development, teaching strategies, and classroom management. This course is to be taken concurrently with early field experience. Students must register for both).

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 ECE (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.

Prerequisites
- CURR312
- CURR320

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.

CURR421 Cap Exp in Elem/Islm&Arab (3 CH)

This course is 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, synthesize, evaluate and reflect on learned knowledge in a project having professional focus, while demonstrating capacity for being a teacher leader and fostering school change

CURR422 Cap Exp in ELEM/SS & CIVICS (3 CH)

This course is 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, synthesize, evaluate and reflect on learned knowledge in a project having professional focus, while demonstrating capacity for being a teacher leader and fostering school change

CURR423 Cap Exp in ELEM/MATH & SC (3 CH)

This course is 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, synthesize, evaluate and reflect on learned knowledge in a project having professional focus, while demonstrating capacity for being a teacher leader and fostering school change

CURR424 Cap Exp in ELEM/English (3 CH)

This course is 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, synthesize, evaluate and reflect on learned knowledge in a project having professional focus, while demonstrating capacity for being a teacher leader and fostering school change

CURR425 Capstone Experience in ECE (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

CURR426 Capstone Experiences in Art Education (3 CH)

This course aims at integrating knowledge, concepts, and skills associated with the courses in the Art Education 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
CURR466

CURR427 Capstone Experiences of Teaching Arabic Language in Preparatory & Secondary Schools (3 CH)

This course is the last course taken by students in the program. It aims to help student gain practical skills needed for teaching Arabic language. The course structure aligned with the field experience course. Students are expected to reflect on their teaching and discuss with their classmates and teachers to improve their teaching continuously. In addition to that, the course is helping candidate teachers to gain action research skills by conducting an action research in schools and discuss the results in the class. Finally, this course will help students to acquire the culture of sustainable professional development by creating their philosophy of teaching and learning.

Corequisites
CURR467 with a minimum grade D

CURR428 Capstone Experiences of Teaching General Social Studies in Preparatory & Seconedary Schools (3 CH)

This course is the last course taken by general social studies teachers in the program. It aims to help candidate teachers to gain practical skills needed for teaching general social studies. The course structure aligned with the field experience course. Students are expected to reflect on their teaching and discuss with their classmates and teachers to improve their teaching continuously. In addition to that, the course is helping candidate teachers to gain action research skills by conducting an action research in schools and discuss the results in the class. Finally, this course will help students to acquire the culture of sustainable professional development by creating their philosophy of teaching and learning general social studies.

Corequisites
CURR468

CURR429 Capstone Experiences of Teaching Mathematics in Preparatory & Secondary Schools (3 CH)

This course is the last course taken by prospective preparatory and secondary mathematics teachers in the program. It aims to help candidate teachers to gain practical skills needed for teaching. The course structure aligned with the field experience course. Students are expected to reflect teaching mathematics. The course structure aligned with the field experience course. Students are expected to reflect on their mathematics teaching and discuss with their classmates and teachers to improve their teaching continuously. In addition to that, the course is helping candidate teachers to gain action research skills by conducting an action research in schools and discuss the results in the class. Finally, this course will help students to acquire the culture of sustainable professional development by creating their philosophy of teaching and learning of mathematics.

Corequisites
CURR469 with a minimum grade D

CURR430 Capstone Experiences of Teaching English Language in Preparatory & Secondary Schools (3 CH)

This course is the last course taken by prospective preparatory and secondary English teachers in the program. It aims to help candidate teachers gain practical skills needed for teaching English language. The course structure aligned with the field experience course. Students are expected to reflect on their teaching and discuss with their classmates and teachers to improve their teaching continuously. In addition to that, the course is helping candidate teachers to gain action research skills by conducting an action research in schools and discuss the results in the class. Finally, this course will help students to acquire the culture of sustainable professional development by creating their philosophy of teaching and learning English in preparatory and secondary schools.

Corequisites
CURR470 with a minimum grade D

CURR431 Capstone Experiences of Teaching Islamic Studies in Preparatory & Secondary Schools (3 CH)

This course is the last course taken by students in the program. It aims to help them to gain practical skills needed for teaching Islamic studies. The course structure aligned with the field experience course. Students are expected to reflect on their teaching and discuss with their classmates and teachers to improve their teaching continuously. In addition, the course is helping students to gain action research skills by conducting an action research in schools and discuss the results in the class. Finally, this course will help students to acquire the culture of sustainable professional development by creating their philosophy of teaching and learning.

CURR432 Capstone Experiences of Teaching Chemistry in Prearatory Schools (3 CH)

This course is the last course taken by chemistry teachers in the program. It aims to help candidate teachers to gain practical skills needed for teaching chemistry. The course structure aligned with the field experience course. Students are expected to reflect on their teaching and discuss with their classmates and teachers to improve their teaching continuously. In addition to that, the course is helping candidate teachers to gain action research skills by conducting an action research in schools and discuss the results in the class. Finally, this course will help students to acquire the culture of sustainable professional development by creating their philosophy of teaching and learning chemistry.

CURR433 Capstone Experiences of Teaching Physics in Prearatory Schools (3 CH)

This course is the last course taken by physics teachers in the program. It aims to help candidate teachers to gain practical skills needed for teaching physics. The course structure aligned with the field experience course. Students are expected to reflect on their teaching and discuss with their classmates and teachers to improve their teaching continuously. In addition to that, the course is helping candidate teachers to gain action research skills by conducting an action research in schools and discuss the results in the class. Finally, this course will help students to acquire the culture of sustainable professional development by creating their philosophy of teaching and learning physics.

CURR461 Student Teaching in ELEM / ISLM ED & 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 of practice teaching in one of the elementary schools. (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Prerequisites
CURR361 with a minimum grade D
CURR362 with a minimum grade D

Corequisites
CURR421 with a minimum grade D

CURR462 Student Teaching in ELEM / SS & CIVICS (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 of practice teaching in one of the elementary schools. (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Prerequisites
CURR363 with a minimum grade D
CURR364 with a minimum grade D

Corequisites
CURR422 with a minimum grade D

CURR463 Student Teaching in ELEM / MATH & SC (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 of practice teaching in one of the elementary schools. (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Prerequisites
CURR366 with a minimum grade D
CURR367 with a minimum grade D

Corequisites
CURR423 with a minimum grade D

CURR464 Student Teaching in ELEM / ENGL (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 of practice teaching in one of the elementary schools. (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Prerequisites
CURR316 with a minimum grade D
CURR368 with a minimum grade D

Corequisites
CURR424 with a minimum grade D

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

CURR466 Student Teaching in Art Education (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. (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Corequisites
CURR426

CURR467 Student Teaching of Arabic Language in Preparatory & Secondary Schools (9 CH)

The aim of this course is to provide students with an opportunity to spend a full semester student teaching of Arabic language in one of the preparatory and/or secondary schools. The course will provide students with opportunities to demonstrate mastery of all standards that have been adopted by the College of Education Teacher Education Programs such as planning and preparation of instruction, classroom environment, and professional responsibilities. Students are expected as part of their professional development to contribute to schools extra activities in a form of voluntary works and activities in order to help them develop professionally. (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Corequisites
CURR427 with a minimum grade D

CURR468 Student Teaching of General Social Studies in Preparatory & Secondary Schools (9 CH)

The aim of this course is to provide students with an opportunity to spend a full semester student teaching in one of the preparatory schools. The course will provide students with opportunities to demonstrate mastery of all standards for beginning teachers that have been adopted by the College of Education Teacher Education Programs such as planning and preparation of general social studies instruction, classroom environment, and professional responsibilities. Students are expected as part of their professional development to contribute to schools extra activities in a form of voluntary works and activities in order to help them develop professionally. (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Corequisites
CURR428 with a minimum grade D

CURR469 Student Teaching of Mathematics in Preparatory & Secondary Schools (9 CH)

The aim of this course is to provide students majoring in mathematics education with opportunities to spend a full semester of mathematics teaching in one of the preparatory and/or secondary schools. The course will provide students with opportunities to demonstrate mastery of all standards for beginning mathematics teachers that have been adopted by the College of Education Teacher Education Programs such as planning and preparation of instruction, classroom environment, and professional responsibilities. Students are expected as part of their professional development to contribute to schools extra activities in a form of voluntary works and activities in order to help them develop professionally. (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Corequisites
CURR429 with a minimum grade D

CURR470 Student Teaching of English Language in Preparatory & Secondary Schools (9 CH)

The aim of this course is to provide English language students with an opportunity to spend a full semester teaching English language in one of the preparatory and/or secondary schools. The course will provide students with opportunities to demonstrate mastery of all standards for beginning teachers that have been adopted by the College of Education Teacher Education Programs such as planning and preparation of instruction, classroom environment, and professional responsibilities. Students are expected as part of their professional development to contribute to schools extra activities in a form of voluntary works and activities in order to help them develop professionally. (This course is

conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Corequisites
CURR430 with a minimum grade D

CURR471 Student Teaching of Islamic Studies in Preparatory & Secondary Schools (9 CH)

The aim of this course is to provide students with an opportunity to spend a full semester student teaching Islamic studies in one of the preparatory and/or secondary schools. The course will provide students with opportunities to demonstrate mastery of all standards for beginning teachers that have been adopted by the College of Education Teacher Education Programs such as planning and preparation of instruction, classroom environment, and professional responsibilities. Students are expected as part of their professional development to contribute to schools extra activities in a form of voluntary works and activities in order to help them develop professionally. (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Corequisites
CURR431 with a minimum grade D

CURR472 Student Teaching of Chemistry in Preparatory Schools (9 CH)

The aim of this course is to provide students with an opportunity to spend a full semester student teaching in one of the secondary schools. The course will provide students with opportunities to demonstrate mastery of all standards for beginning teachers that have been adopted by the College of Education Teacher Education Programs such as planning and preparation of chemistry instruction, classroom environment, and professional responsibilities. Students are expected as part of their professional development to contribute to schools extra activities in a form of voluntary works and activities in order to help them develop professionally. (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Corequisites
CURR432 with a minimum grade D

CURR474 Student Teaching of Physics in Preparatory Schools (9 CH)

The aim of this course is to provide students with an opportunity to spend a full semester student teaching in one of the secondary schools. The course will provide students with opportunities to demonstrate mastery of all standards for beginning teachers that have been adopted by the College of Education Teacher Education Programs such as planning and preparation of physics instruction, classroom environment, and professional responsibilities. Students are expected as part of their professional development to contribute to schools extra activities in a form of voluntary works and activities in order to help them develop professionally. (This course is conducted in the last semester. Capstone Course (3 Cr. Hrs.) should be taken during the internship semester).

Corequisites

CURR433 with a minimum grade D

CURR570 Teaching Methods / Islamic St Diploma (3 CH)

This course aims at introducing candidates to effective strategies, methods and techniques used in the teaching of Islamic Education in the preparatory and secondary schools. It covers basic concepts in teaching Islamic Education, its nature, planning, skills, instruction and evaluation. Emphasis is placed on connecting Islamic Education with students' real life. Field experience is an integral part of this course.

CURR571 Teaching Methods /Arabic Lang Diploma (3 CH)

This course introduces candidates to the main Arabic Language teaching methods and approaches in the Preparatory and Secondary Schools. It covers knowledge and skills needed to design teaching and learning situations related to Arabic language with its social and communicative implications. Emphasis is placed on a communicative approach, which deals with integrated language skills. Field experience is part of the course.

CURR572 Teaching Methods / SS Diploma (3 CH)

This course enables candidates to understand strategies and approaches of teaching social studies in preparatory and secondary schools. It covers studying the nature, structure, concepts, interdisciplinary relationships, inquiry and discovery methods, cooperative learning, and problem solving. The course focuses on application of knowledge and skills in practical situations. Field experience is part of this course.

CURR575 Teaching Methods /English Diploma (3 CH)

This course aims at introducing candidates to various contemporary English as a foreign language (EFL) approaches and methods. It covers the major eight approaches and techniques, which have been used by ELT professionals at different times such as the direct method, the situational and the audio lingual. Emphasis is placed on the communicative approach and on techniques suitable for the UAE school setting. Classroom observation and microteaching experiences are an integral part of this course.

CURR576 Teaching Methods / CIVICS Diploma (3 CH)

This course aims at developing candidates' abilities to use strategies and approaches of teaching civics in the Preparatory and Secondary Schools. It covers the nature, structure and concepts as well as planning, instruction and evaluation of civics. Emphasis is placed on application of knowledge and skills in practical situations. Field experience is part of the course.

CURR577 Teaching Methods / MATH Diploma (3 CH)

This course aims at introducing candidates to the recent and contemporary strategies and methods in the teaching of mathematics at the Preparatory and Secondary levels. Among the topics covered are: trends in mathematics education reform, history of mathematics, instructional planning, assessment techniques relevant to mathematics, effective classroom discourse, and the role of technology as a teacher resource and classroom tool. Emphasis is placed on knowledge and applications of different perspectives on teaching mathematics at the preparatory and secondary levels. The course, also, involves field experience in local schools.

CURR578 Teaching Methods /SCIENCE Diploma (3 CH)

This course aims at introducing candidates to contemporary methods and approaches for teaching science effectively for all students in preparatory and secondary schools. Among topics included is science teaching standards, nature of science, instructional strategies, instructional planning, and instructional technology integration, safety in the classroom, science classroom management and assessment. Emphasis is placed on inquiry-oriented instruction and on reconstructing, reflecting upon and applying personal and professional knowledge, skills, beliefs and attitudes regarding effective science teaching. Field experience is part of this course.

CURR6013 Advanced Teaching Applications in ED (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.

CURR6014 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.

CURR611 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.

CURR6121 Advanced Study in Curriculum & 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.

CURR612E Advanced Teaching Methods / Eng I (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.

CURR612H Advanced Teaching Methods / SS I (3 CH)

This course explores instructional theories and strategies for teaching preparatory and secondary Social Studies. 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 Social Studies as well as opportunities to read, analyze, and critique related literature about 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.

CURR612M Advanced Teaching Methods / Math I (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.

CURR612S Advanced Teaching Methods / Science I (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.

CURR617 Current Issues in T & L (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.

CURR622 Class Assessment & 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

CURR622E Advanced Teaching Methods / Eng II (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.

CURR622M Advanced Teaching Methods / Math II (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.

CURR622S Advanced Teaching Methods / Sc II (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.

CURR6400 Thesis (0 CH)

This course is the culminating experience where each student will conduct a project or construct a portfolio for the M.Ed. program.

Prerequisites

CURR6401 with a minimum grade P
CURR6402 with a minimum grade P
CURR6403 with a minimum grade P

CURR6401 Thesis Proposal Development Seminar I (1 CH)

The seminar courses introduce master students to the process of academic writing and guide them through the process of developing their thesis. The three seminar courses cover a wide range of topics including: a) writing different sections of chapter 1 in Seminar 1, b) reviewing the relevant literature of the second chapter in Seminar 2, and c) writing different sections of chapter 3, the methodology chapter, in Seminar 3. Seminar 1 is very important for master students as it assists them in developing and drafting the first chapter of their thesis and it helps them develop critical thinking and scholarly writing skills.

Prerequisites
CURR6012

CURR6402 Thesis Proposal Development Seminar II (1 CH)

The three seminar courses introduce the master program students to the process of academic writing and guide them through the process of developing their thesis. Seminar 2 is designed to help students in the master program write a literature review that is appropriate for a thesis proposal. Drafting the second chapter will assist students in developing scholarly writing skills, finalizing research questions and writing a theoretical framework. Students will also be exposed to previously written literature reviews and asked to analyze and critique as a way of helping them understand what differentiates between a well-written and poorly-written literature review. The activities in this course are geared toward the gradual production of chapter 2.

Prerequisites
CURR6401 with a minimum grade P

CURR6403 Thesis Proposal Development Seminar III (1 CH)

Throughout the three seminar courses, master students are assisted and guided to develop and draft their thesis proposal. Seminar 3 is designed to provide master candidates with opportunities and guidance to develop and draft the methodology chapter of their thesis and their thesis proposal. It will assist students in exploring different research approaches and/or methodologies and decide on an appropriate research method for their intended research topic including research design, setting and/or context, population and sampling, instruments and their reliability and validity, ethical issues, data collection procedures, and data analysis. In addition to that, during the period of Seminar 3, students are expected to establish and describe all the key elements of the research proposal. At the end of Seminar 3 students are expected to do preliminary proposal defense.

Prerequisites
CURR6402 with a minimum grade P

CURR644 Professional Portfolio Development 1 (3 CH)

This course focuses on professional portfolio and final project development. The professional portfolio and final project should be a continuous work which involves synthesizing the preparatory work done in the framework of the previous courses and projects. This course will assist students in preparing their professional portfolio and final project which may include background study, plan schedule, and project development phases. Most lecture hours will be allocated for group discussion and group or individual questions. In this course students are also expected to critique each other's work and assignments. Throughout the semester students should also work with their project advisor. Prerequisite: Core Courses.

CURR645 Professional Portfolio Development 2 (3 CH)

In this course students are expected to finalize their professional portfolio and graduation project. The professional portfolio must demonstrate competence in the graduate requirements, program outcomes, competence in the student's emphasis area, and further demonstrating the student's ability to assume a leadership role in the field of education. In addition to that, during this course students are expected to execute and evaluate a major project in their area of specialization.

Prerequisites
CURR6411

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 (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 I (3 CH)

Quantitative Research Method (I) 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.

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.

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.

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.

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.

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.

FOED103 Foundation of Education (3 CH)

The Foundations of Education course will draw on four distinct scholarly traditions in education—philosophy of education, history of education, sociology of education, and ethics of education. The purpose is to help prospective secondary school teachers conceptualize frameworks for their practice in the UAE schools depending on the four foundations. In addition, the course aims to enable students to think critically about these foundations in relation to contemporary education issues in the UAE.

FOED201 School and Family (3 CH)

The course aims at introducing students to the basic concepts related to family, school, and their roles in the education process. It covers different aspects related to interactions between school and family and their relations to the social context of learning. The course places emphasis on the integration of family and school roles for the purpose of achieving effective learning.

FOED321 School Management & Supervision (3 CH)

This course aims at enabling students to acquire knowledge and skills related to school management and supervision. A wide array of topics is covered such as: emergence of school management, concept of management and managerial processes (planning, organization, leadership, supervision and evaluation), traditional and recent trends in school management and supervision. Emphasis is placed on school-based management, school effectiveness, and school improvement.

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.

FOED6015 Intern Perspective on ED LSH (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.

FOED6019 Leadership of Change in Education Organizations (3 CH)

This course is designed to enable candidates to effectively manage change in their workplaces. The course is based on the premise that planning for change begins with a deep understanding of the culture of an organization so that strategic decisions can be made about implementing change. Change requires the transformation of contexts in order to improve both educational systems and learning opportunities for students; it is viewed as a process rather than an event. This course supports the development of leaders by recognizing that the process of change has many components that require planned attention and careful implementation if an educational organization is to improve its effectiveness. Aspects that candidates will prepare for include the development of community support for proposed changes, and the management of expectations, resistance, and conflict that often arise. Candidates will prepare also to build organizational capacity, focus on shared leadership, develop cultures for learning and evaluation, work with external and internal constraints, and create coherence in order to successfully implement and maintain changes that improve organizational effectiveness.

FOED616 Leading Schools & 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.

FOED6400 Thesis (0 CH)

After completing successfully the three research seminars, each student is expected to register for this course and produce an academic thesis of an appropriate length culminating experience in the M.Ed. Program. 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 candidate 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 thesis must be defended in a special session and evaluated and approved by the same three-members of the advisory and examination committee. The discussion session is made public for the academic community.

Prerequisites

FOED6401 with a minimum grade P
FOED6402 with a minimum grade P
FOED6403 with a minimum grade P

FOED6401 Thesis Proposal Dev Seminar I (1 CH)

The seminar courses introduce master students to the process of academic writing and guide them through the process of developing their thesis. Seminar 1 assists master students in developing and drafting the first chapter of their thesis.

FOED6402 Thesis Proposal Dev Seminar II (1 CH)

"The three seminar courses introduce the master program students to the process of academic writing and guide them through the process of developing their thesis. Seminar 2 is designed to help students in the master program write a literature review that is appropriate for a thesis proposal. Students will also be exposed to previously written literature reviews and asked to analyze and critique as a way of helping them understand what differentiates between a well-written and poorly-written literature review. The activities in this course are geared toward the gradual production of chapter 2."

Prerequisites

FOED6401 with a minimum grade P

FOED6403 Thesis Proposal Dev Seminar III (1 CH)

Throughout the three seminar courses, master students are assisted and guided to develop and draft their thesis proposal. Seminar 3 is designed to provide master candidates with opportunities and guidance to develop and draft the methodology chapter of their thesis and their thesis proposal. It will assist students in exploring different research approaches and/or methodologies and decide on an appropriate research method for their intended research topic including research design, setting and/or context, population and sampling, instruments and their reliability and validity, ethical issues, data collection procedures, and data analysis. In addition to that, during the period of Seminar 3, students are expected to establish and describe all the key elements of the research proposal. At the end of Seminar 3 students are expected to do preliminary proposal defense.

Prerequisites

FOED6402 with a minimum grade P

FOED6421 Personnel Administration & 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.

FOED6422 School Finance & 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.

FOED6423 Professional & 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.

FOED6424 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.

FOED6425 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.

FOED701 Policy studies in Education (3 CH)

This course is designed to enable candidates to examine the broader political and social context of education. Emphasis will be given to the role of key public policies that have shaped current education systems. The diverse purposes of these key public policies will be explored, along with the social, economic and political processes by which the educational purposes and procedures were authorized, and the organizational and cultural factors that affected the implementation of the policies. Candidates will then place recent educational reform efforts and the policies that shape them into a larger social and political framework.

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 introduces candidates into the classic and contemporary literature on schools and socialization. The relevance of sociological theory to education policy debates is also highlighted. Students will increase their understandings of the forces shaping education that are embedded in the larger social context.

FOED722 Leading School Change (3 CH)

This course focuses on the roles of leaders in collaborative approaches to changing school cultures and structures. It focuses on building a shared vision that will enable a school community to contribute to the process of desired change.

FOED723 Leadership & Policy in Adult Education (3 CH)

This course will examine individual and professional leadership development for administrators of adult education and training programs. Ethical and policy implications relating to leadership and management of programs will also be explored. This course is intended to help students to plan for personal leadership improvement, define ethics and policy and their relation to adult education, and use some tools to determine policy development in educational organizations.

FOED724 Ethics of Educational Leadership (3 CH)

This course will review theories relating to ethics and values and their application to educational leadership. Candidates will be provided with opportunities to evaluate the ethical dimensions of educational leadership. The role and function of integrity, equality, justice, and fairness in leadership will be examined within school settings.

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 in Special Education (3 CH)

In this course, candidates will seek individualized study in some area of educational leadership and policy that is not covered in the scheduled courses. Students assume responsibility for readings and research under the supervision of a designated College member (the academic advisor). Regular meetings with the advisor and completion of all assignments are required.

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.

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.

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.

PHED313 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

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

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 theories, methods, and techniques of classroom environment. Topics include special classroom management, social acceptance, behavior modification, management techniques, and transitional planning. This course focuses on environmental modification, and instructional design.

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)

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. Students taking this course will be introduced to different ways of assessing individuals with speech-language disorders , in addition to different therapeutic modes including assistive technology (augmentative & alternative communication).

Prerequisites
SPED101

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 Differentiating Instruction (3 CH)

This course is based on the premise that one way of instruction does not fit all. Students taking this course will be introduced to the necessary skills and knowledge for differentiating instruction with the different types of exceptional learners. Emphasis is on skills necessary to implement specialized alternative instructional strategies. Educational service and instructional delivery systems for exceptional children are identified and analyzed. The course focuses on the classroom teacher's role in development and modification of environment, curriculum, and instruction to enable students with disabilities to be educated within typical educational environment. The course will provide various strategies for differentiating curriculum, instruction, assessment and classroom learning environments.

Prerequisites
SPED101

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. ي

Prerequisites
SPED101

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

This course provides students with the strategies and techniques 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 emphasis is upon ways of knowing (epistemology) unique to gifted students, and an appropriate pedagogy to specifically enhance each student's giftedness.

Prerequisites
SPED331

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

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

This course aims at understanding techniques of teaching children with mild/moderate disabilities. Topics include thinking and academic skills, curriculum planning and implementation, alternative instructional strategies, class organization, maintenance and generalization of skills, and integration of services into instructional settings. This course emphasizes the process by which content is taught within various educational settings

SPED400 Practical Experiences in Special Education (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

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

This course focuses on providing students with formal and informal assessment measures to use to determine students' literacy and math levels in school. This course also presents the students with knowledge and use of effective scientifically based intervention strategies. Emphasis is also placed in this course on the use of strategic approaches to the teaching of reading and math through employing variety of teaching methods, materials and strategies to help children learn to read and solve math. Students will also learn in this course how to monitor and document student's progress, strengths, and needs.

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

SPED441 Capstone Experience in SPED/Mild/Mod Disabilities (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

SPED444 Capstone Experience in SPED/Gifted & Talented (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
SPED400
SPED464

SPED461 Student Teaching in SPED/Mild and Moderate Disabilities (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
SPED441 with a minimum grade D

SPED464 Student Teaching in SPED/Gifted & Talented (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
SPED400 with a minimum grade D
SPED416 with a minimum grade D

Corequisites
SPED444 with a minimum grade D

SPED6018 Human Development & 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.

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.

SPED6321 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

SPED6322 Characteristics & Teaching Techniques for Individuals (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.

SPED6323 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.

SPED6325 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.

SPED6400 Thesis (0 CH)

After completing successfully the three research seminars, each student is expected to register for this course and produce an academic thesis of an appropriate length culminating experience in the M.Ed. Program. 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. Upon completion, the thesis must be defended in a special session and evaluated and approved by the same three-members of the advisory and examination committee. The discussion session is made public for the academic community.

Prerequisites

SPED6401 with a minimum grade P
SPED6402 with a minimum grade P
SPED6403 with a minimum grade P

SPED6401 Thesis Proposal Dev Seminar I (1 CH)

The seminar courses introduce master students to the process of academic writing and guide them through the process of developing their thesis. The three seminar courses cover a wide range of topics including: a) writing different sections of chapter 1 in Seminar 1, b) reviewing the relevant literature of the second chapter in Seminar 2, and c) writing different sections of chapter 3, the methodology chapter, in Seminar 3. Seminar 1 is very important for master students as it assists them in developing and drafting the first chapter of their thesis and it helps them develop critical thinking and scholarly writing skills.

Prerequisites
CURR6012

SPED6402 Thesis Proposal Dev Seminar II (1 CH)

The three seminar courses introduce the master program students to the process of academic writing and guide them through the process of developing their thesis. Seminar 2 is designed to help students in the master program write a literature review that is appropriate for a thesis proposal. Drafting the second chapter will assist students in developing scholarly writing skills, finalizing research questions and writing a theoretical framework. Students will also be exposed to previously written literature reviews and asked to analyze and critique as a way of helping them understand what differentiates between a well-written and poorly-written literature review. The activities in this course are geared toward the gradual production of chapter 2.

Prerequisites
SPED6401 with a minimum grade P

SPED6403 Thesis Proposal Dev Seminar III (1 CH)

The three seminar courses introduce the master program students to the process of academic writing and guide them through the process of developing their thesis. Seminar 3 is designed to help students in the master program drafting and developing the third chapter of their thesis. In Seminar 3, graduate students should not deviate from the original proposal unless they are told so by the advisor.

Prerequisites
SPED6402 with a minimum grade P

SPED6411 Professional Portfolio Development 1 (3 CH)

This course focuses on professional portfolio and final project development. The professional portfolio and final project should be a continuous work which involves synthesizing the preparatory work done in the framework of the previous courses and projects. This course will assist students in preparing their professional portfolio and final project which may include background study, plan schedule, and project development phases. Most lecture hours will be allocated for group discussion and group or individual questions. In this course students are also expected to critique each other’s work and

assignments. Throughout the semester students should also work with their project advisor.

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 Children from Culturally and Linguistically Divers Background (3 CH)

In this course, 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. It 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.

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 examines theories regarding oral language and literacy disorders across the life span. In addition, this course includes methods of assessment and research-based intervention strategies for all types of reading and language disorders (developmental & acquired). Participants in this course will also explore the intersection of literacy, language and technology.

SPED722 Advanced Topics in Special Education (3 CH)

This course is designed to address contemporary topics and issues in special education. Topics will be chosen based on timelines, interest, and relevance to current educational practices. The course will allow students the opportunity to examine current issues in greater detail than would be possible in other course offerings. This course will cover advanced topics in special education, including legislation, interdisciplinary functions, and the role of special education in general education and placement practices. Nationally recognized issues and practices for these individuals will also be reviewed.

SPED723 Independent Study in Special Education (3 CH)

In this course students will work on personalized system of independent study. The course is offered by appointment with a selected staff in the specific area of interest/specialization. The course will address various issues in the field of special education. More specifically, the course will allow students to examine issues related to their area of interest in a specific area/problem in the field of special education.

SPED724 Developmental Disabilities (3 CH)

This course provides broad knowledge and skills in the field of development disabilities in which conditions, services, policies, diagnosis, individual progress planning approaches, and public funding will be reviewed from a life span perspective. Instruction will focus on family support and school-based principles of inclusion for youth. Transition considerations

to adulthood will be addressed. An understanding of individuals with developmental disabilities will include the expression of rights, dignity, citizenship and opportunity in a historical context of a climate of devaluing and segregation based on disability.

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)

The aim 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 assessment and instructional techniques for 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 assess and design effective and relevant instruction. This course explores accommodations related to assessment and teaching techniques for students with mild/moderate disabilities in the regular education setting.

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.

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 ARCH315 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
ARCH315
ARCH320 with a minimum grade D

Pre/Co
CIVL310 with a minimum grade D
ARCH325 with a minimum grade D

ARCH340 History and Theory of 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 assesses the historic built environment of Africa, Ancient Egypt, and the Greco-Roman/classical realm and examines Byzantine, Romanesque, Gothic and broadly Renaissance arts and architecture. The timeframe covered is from 3000 BC to the 1600 AD, with some later examples to demonstrate historical influence.

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 equipments 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
ARCH341 with a minimum grade D
Corequisites
PHYS110 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

ARCH346 Contemporary World Architecture (3 CH)

This course examines contemporary world architecture 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 the impact of regional forms and traditions on early modern architecture, and surveys later modernist proposals for a universal or international architecture. The course reviews regional and local reactions to these formulations through the analysis of examples of 20th and 21st century architecture, theory, and criticism that question this global agenda and attempt to negotiate the tensions between global ideals and local conditions.

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
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
Pre/Co ARCH345 with a minimum grade D
CIVL310 with a minimum grade D
ARCH325 with a minimum grade D
ARCH335 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

ARCH315 with a minimum grade D
GENG220

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 ARCH410 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

ARCH410 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
ARCH410

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
ARCH410

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 Graduation Project I (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, 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
ARCH495 with a minimum grade P

ARCH590 Graduation Project II (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 and performance verification is conducted. Submissions include a final technical report and supporting visual materials.

Prerequisites
ARCH585 with a minimum grade D
ARCH430 with a minimum grade D

ARCH600 Building Research & Methods (3 CH)

Research methods and design appropriate to concentrations areas. Qualitative and quantitative methods of research, survey research,sampling, and data collection. Selecting and defining a problem; planning the research program; developing and testing hypothesis; collecting, classifying, evaluating, and analyzing evidence; drawing conclusions; and presenting results

ARCH601 Graduate Research Seminar (1 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

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.

ARCH605 Independent Research (2 CH)

A non-class course where each student proposes and conduct a meaningful building research relevant to his/her thesis/graduate project topic under the supervision of the assigned course faculty. Student must submit a major research report on his/her topic and its outcomes by the end of the semester

Prerequisites

ARCH600 with a minimum grade C

ARCH606 Project Management (3 CH)

This course aims at introducing students to the advanced techniques of project management and control. This includes topics such as the life cycle of a project, functions of project management, project analysis and evaluation, comparison of alternatives, project screening and selection, project organization and structures, work breakdown structure, and management of human resources in projects. Students will also acquire knowledge in design management, risk management, conflict management and resolution, introduction to supply chain management, project monitoring and control, advanced scheduling techniques, introduction to simulation of engineering operations, cost analysis and management, and introduction to value engineering.

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 (6 CH)

Students are responsible for developing independently a satisfactory thesis proposal which provides an in-depth examination of a research study of a topic in the student's area of concentration leading to the thesis development

Prerequisites

ARCH600 with a minimum grade C
ARCH601 with a minimum grade C
ARCH602 with a minimum grade C
ARCH603 with a minimum grade C
ARCH608 with a minimum grade C

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 candidate defend research plans in front of supervisory committee.

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
BIOC100 with a minimum grade D
CHEM111 with a minimum grade D

CHME310 Computer Applications in Chemical Engineering (1 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.

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

CHME3252 Chemical Engineering Principles (3 CH)

This course aims at introducing different balance calculations for chemical processes. Topics covered include mass, momentum, and energy balance calculations with and without chemical reactions, different forms of energy, and transient balances. Applications include case studies using computer-aided balances.

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

PHYS1110 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
PHYS1110 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.

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

CHME418 Chemical Eng Laboratory I (2 CH)

In this laboratory course, students conduct selected experiments to illustrate and use material covered in transport phenomena courses: fluid, heat and mass transfer. Students are evaluated on submitted reports covering experimental design, theory tested, and analyses of experimental data.

Prerequisites

CHME413 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.

CHME427 Process Modeling & Simulation (3 CH)

This course aims to introduce the principles of modeling and Aamahkah packages using modern computer programs. Include the topics covered balance, movement and operations fluid flow, interactions and separation processes. Applications using MATLAB is Asameeolink, Izzy Solf and Alpolamatt

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.

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.

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.

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.

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.

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

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
CHEM2703 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

CHEM2703 with a minimum grade D
CHME300 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.

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.

CHME519 Chemical Engineering Lab II (2 CH)

In this course the students conduct selected experiments to apply material presented in kinetics and reactor design, and separation processes. Students are evaluated based on their participation and submitted reports.

Prerequisites

CHME411 with a minimum grade D
CHME421 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.

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.

CHME585 Graduation Project I (3 CH)

Each student will be required to complete a design project before graduation. The project is to emphasize fundamentals of chemical engineering and allow an element of original work by each student. A critical review of literature is required in order to present current state of knowledge of the problem under investigation and a detailed report will be submitted.

Prerequisites

CHME495 with a minimum grade P

CHME590 Graduation Project II (3 CH)

Each student will be required to complete a design project before graduation. The project is to emphasize fundamentals of chemical engineering and allow an element of original work by each student. A critical review of literature is required in order to present current state of knowledge of the problem under investigation and a detailed report will be submitted.

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.

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.

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

CHME755 Graduate PhD Seminar (1 CH)

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

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 candidate defend research plans in front of supervisory committee.

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.

CPSE621 Advanced Reservoir Characterization (3 CH)

Interpretation of data that delineate reservoir dynamics and conceptualize reservoir architecture. Data collected from drilling-logs, detailed petrographic core studies, and open-hole logs. Additional data such as tracer study, characterization of water chemistry, and data from MWD and their use to understand lateral and vertical variation in reservoir properties, identify cross zone communication, vertical permeability profile, and permeability anisotropy. Integrated use of data to characterize a reservoir, produce a simulation model, and predict its potential performance.

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 (6 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.

Prerequisites

CHEM2703 with a minimum grade D

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.

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
STAT220 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 ll (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.

Prerequisites
PETE495

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
GEOL115 with a minimum grade D
GEOL105 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
MATH2220 with a minimum grade D
PETE320 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.

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.

Prerequisites
PETE495

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
PETE495
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
PETE495

Corequisites
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.

Prerequisites
PETE320

PETE585 Graduation Project I (3 CH)

A significant design effort in one area of petroleum operations. Design is based on fundamental understanding of petroleum and reservoir engineering concepts and a critical review of literature of current state of knowledge for the subject under consideration. Projects may involve analysis and computer program development and/or usage combined with experimental work. Topics for projects may be developed with industry cooperation.

Prerequisites
PETE495

PETE590 Graduation Project II (3 CH)

A significant design effort in one area of petroleum operations. Design is based on fundamental understanding of petroleum and reservoir engineering concepts and a critical review of literature of current state of knowledge for the subject under consideration. Projects may involve analysis and computer program development and/or usage combined with experimental work. Topics for projects may be developed with industry cooperation.

Prerequisites
PETE585

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.

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.

PETE622 Advanced Well Test Analysis (3 CH)

Review of conventional methods. Analysis of variable rate tests, fractured well tests, layered and commingled well tests; pulse testing; interference testing; well testing for vertical permeability; multiple well tests; computer-aided well test analysis, confidence intervals.

PETE623 Reservoir Simulation for IOR (3 CH)

Design and implementation of one and two-dimensional multiphase flow reservoir simulator, including interphase mass transfer for variable bubble point oils; development of multiphase flow equations in reservoirs; solution methods of flow equations, phase appearance, treatment of injection and production terms and vertical equilibrium.

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.

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 candidate defend research plans in front of supervisory committee.

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

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).

Prerequisites
Pre/Co MECH305

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)

The course gives fundamentals of plane surveying and an introduction to mapping science for architects. Topics covered include leveling, together with its field procedure and applications, and computation of areas and earth volumes. Computation and determination of point coordinates are also covered through studying methods for horizontal distance measurement, traversing, including its theory, applications, and adjustment. An introduction to photogrammetry is also included. In addition, the course sheds some light on computer aided surveying techniques.

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 (4 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; stairs; and walls. Physical laboratory for testing beams, slabs and columns under different loads in addition to computational laboratory to practice the use of software in design of reinforced concrete elements.

Prerequisites
CIVL365

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
Pre/Co CIVL365

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.

Prerequisites
Pre/Co CIVL335 with a minimum grade D

CIVL442 Foundation Engineering (2 CH)

This course aims at studying the design of different types of foundations for various structures. It includes subsurface exploration; bearing capacity; shallow foundation design; spread footing design; lateral earth pressure; sheet piles; and deep foundations.

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.

Prerequisites
Pre/Co 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. (This course is conducted over a full semester (before the last study year). No courses are allowed to be registered during the internship).

Prerequisites
BIOL250 with a minimum grade D
PHYS1120 with a minimum grade D
MATH2210 with a minimum grade D
MATH2220 with a minimum grade D
GENG215 with a minimum grade D
GENG315 with a minimum grade
CHEM2706 with a minimum grade D
GENG220 with a minimum grade D
ELEC330 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.

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 Graduation Project I (3 CH)

Application of knowledge gained in other courses to an engineering design project, emphasizing creativity and originality. A final report is required.

Prerequisites
CIVL495

CIVL590 Graduation Project II (3 CH)

Application of knowledge gained in other courses to an engineering design project, emphasizing creativity and originality. A final report is required.

Prerequisites
CIVL585

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 (6 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.

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

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 candidate defend research plans in front of supervisory committee.

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.

Prerequisites

WATR605 with a minimum grade C

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).

Prerequisites

WATR606

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 (6 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

WATR740 Independent Research in Water Resources I (3 CH)

To be designed to the specific interest of the exiting PhD students, in which they conduct exploratory research with emphasis on new frontiers in Water Resources.

WATR741 Independent Research in Water Resources II (3 CH)

To be designed to the specific interest of the exiting PhD students, in which they conduct exploratory research with emphasis on new frontiers in Water Resources.

WATR745 Water Resources Seminar (0 CH)

PhD students must sign for the 0 credit hour seminar course every semester.

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 candidate defend research plans in front of supervisory committee.

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 Random Signals (3 CH)

Introduction to probability with applications to electrical engineering, Sets and events, probability functions, independence, random variables, probability distribution and density functions, expectations, and characteristic functions. Dependence and correlation; multi-variant Gaussian distribution. Random processes, stationarity, ergodicity, correlation functions, spectral densities, random inputs to linear systems; Gaussian processes.

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

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

ECOM531 Microwave Engineering (3 CH)

Design and analysis of passive microwave circuits. Topics include transmission lines, electromagnetic field theory, waveguides, microwave network analysis and signal flow graphs, impedance matching and tuning, resonators, power dividers and directional couplers, and microwave filters and components.

Prerequisites

ECOM412 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

ECOM551 Introduction to Secure Communications Systems (3 CH)

Review of Modulation and Coding; Direct-Sequence Spread-Spectrum Systems; Frequency Hopping; Jamming and anti-jamming; Interception; Adaptive Antenna Systems; Cryptographic Communications: Rotor Machine and Polyalphabetic Ciphers; Block Ciphers; DES ; AES ; Public Key Systems; Key Management; Digital Signatures and Authentication; Stream Ciphers; Watermarking and Steganography; Selected case studies.

Prerequisites

ECOM422 with a minimum grade D

ECOM552 Telecommunication Network Management (3 CH)

Introduction to methods, techniques and tools for the management of telecommunication systems and networks with specific examples from Simple Network Management Protocol (SNMP, SNMPv2, SNMPv3), the Open System Interconnection Common Management Information protocol (OSI CMIP) and Remote Monitoring (RMON, RMON2). Issues to be addressed include: configuration and name management, fault and performance management, security, and accounting management. Other topics such as OSI/ISO based CMIS/CMIP, Web-based Network Management.

Prerequisites
ECOM432 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
ECOM432 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

ELEC230 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.

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)

Review of vectors and coordinate systems. Electrostatics: electric field intensity and potential due to different charge distributions; Electric flux, Gauss's law, divergence theorem and capacitance; Electric boundary conditions. Magnetostatics: steady magnetic field; Biot-Savart law; Ampere's circuital law; Stokes' theorem and magnetic flux. Magnetic force and Inductance. Magnetic boundary conditions.

Prerequisites
MATH1120 with a minimum grade D
PHYS1120 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

PHYS1120 with a minimum grade D
ELEC330 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
ELEC325 with a minimum grade D
ELEC330 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
(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

ELEC552 Computer Networks (3 CH)

Review of network models, wired & wireless Local Area Networks, Wide Area Networks, Routing protocols, Congestion and Traffic management, Network security.

Prerequisites
ECOM432 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
ELEC330 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 Graduation Project I (3 CH)

This course is the capstone design experience. Students work in teams on a project design idea using all gained knowledge including literature search, data acquisition and analysis, system modeling and simulation, IT tools,, as well as the design hardware or software prototyping for demonstration and/or experimentation.

Prerequisites
ELEC495 with a minimum grade P

ELEC590 Graduation Project II (3 CH)

This course is the capstone design experience. Students work in teams on a project design idea using all gained knowledge including literature search, data acquisition and analysis, system modeling and simulation, IT tools,, as well as the design hardware or software prototyping for demonstration and/or experimentation.

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.

ELEC601 Applied Discrete Mathematics (3 CH)

Methods of Mathematical proof, binomial coefficients and counting methods, automata and complexity analysis of algorithms, combinatorics and graph theory, optimization problems.

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

ELEC605 Algorithmic Applications in Electrical Engineering (3 CH)

Logic and proofs, the Language of mathematics, relations, algorithms, introduction to number theory, counting methods and the pigeonhole principle, recurrence relations, graph theory, trees, network models, applications.

ELEC611 Detection and Estimation Theory (3 CH)

Detection decision theory, Bayes and Neyman-Pearson Criteria, optimal receivers, classical estimation theory, signal-noise representations, signal detection in additive noise; Optimal linear estimation.

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.

Prerequisite
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

ELEC614 Electromagnetic Interference & Compatibility (3 CH)

Introduction to electromagnetic fields, circuits and signals, sources of electromagnetic interference and the E.M. environment, penetration through shields and apertures, shielding theory, principles of propagation and cross-talk, coupling from external fields, E.M. fields generated by transmission lines, prediction of EMI/RFI conditions in radio communications, simulation of E.M. coupling between systems, effects of electromagnetic interference on devices and systems, transients suppression, shielding and grounding, cable screening, filtering, general EMC design principles, EMC standards, EMC measurements and testing.

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

ELEC616 Digital Image Processing (3 CH)

The nature of images, visual effects, acquisition of images, sampling, quantization, and two-dimensional linear processing; image enhancement and restoration; image coding; texture analysis; tomography.

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

ELEC618 Microwave Engineering (3 CH)

Microwave: Properties of microstrip transmission lines. Theory and design of microwave integrated circuit components and systems. Microwave circuit devices (terminations, attenuators, couplers, circulators, the magic tee, and overall system considerations). Waveguides: circuit representation of waveguide systems using impedance and scattering formulation, impedance transformation and matching.

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

ELEC621 Power Systems Models & Control (3 CH)

Modern power system operational and control problems. Single-area and Multi-area power systems. Load-frequency control. Automatic voltage regulator. Automatic generation control. Modern Control Centers.

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

ELEC623 Power Systems Planning (3 CH)

Economic dispatch, unit commitment, dynamic programming, power system planning and operation, control, generation modeling, AGC, and power protection.

ELEC624 Power Electronic Applications in Utilities (3 CH)

HVDC transmission, renewable sources, utility interactive systems, static VAR compensators, utility interface systems, flexible AC transmission systems.

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

ELEC626 Power System Transients & Stability (3 CH)

Introduction to power transients. Power system equipment modeling, synchronous machine modeling, power system loads, transient modeling and analysis, control of active power and reactive power, system stability, basics of steady state stability, transient stability, voltage stability, voltage collapse and preventing voltage collapse. Flexible AC Transmission Systems (FACTS).

ELEC627 Advanced Motor Drives (3 CH)

Introduction to 3-phase machines, Comparison of AC and DC motors, dq modelling of induction machines, dq modelling of Synchronous machines, einding inductors in dq frame, system equations in abc frame, complex vector representation of three phase machines, transformation to a rotating frame, complex vectors.

ELEC628 Embedded System Design Using Microcontrollers (3 CH)

Introduction to embedded systems, applications of embedded systems in power engineering. DSP and/or Micontrollers will be used to control motors. This course includes real lab simulators and lab experiments.

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

ELEC630 Power Electronics Analysis and Applications (3 CH)

The course is an introduction to switched-mode power converters. It provides a basic knowledge of circuitry for the control and conversion of electrical power with high efficiency. The course covers operation in continuous conduction mode (CCM) and discontinuous conduction mode (DCM). These dc-dc converters can change and regulate the voltage, current, or power. Applications include electronic power supplies, aerospace and vehicular power systems, and renewable energy systems.

ELEC631 Quantum Semiconductor Structures (3 CH)

Epitaxial growth of semiconductors, electrons in quantum semiconductor structures, localization and transport, electronic states and optical properties of quantum wells, nonlinear optics in low-dimensional semiconductors, semiconductor lasers, mesoscopic devices, high speed heterostructure devices.

ELEC632 Analog and Mixed Signal Design (3 CH)

Analog Integrated Circuits, analysis and modeling of active components. Current analog and mixed functions: operational amplifiers, D/A and A/D converters. Switched capacitor technique. Current-mode and voltage-mode design techniques. CMOS, Bipolar, and BiCMOS technologies. Design tools for analog and mixed-signal designs. Applications: Voltage regulators, advanced pre-amplifiers and amplifiers, current sources, filters.

ELEC633 VLSI System Design (3 CH)

Static and dynamics MOS circuits; advantages and limitations of NMOS, CMOS, Bipolar and BiCMOS technologies; process and device simulators; system design, fault testing and symbolic layout.

ELEC634 Analog Integrated Circuits Design (3 CH)

Design of linear integrated circuits. Op-amp design and modeling. AC and DC op-amp parameters and their effects on designs. Electronics noise sources and their control. Design and simulation (using CCI-CAP and spice programs) of differential amplifiers, active filters, oscillators, other linear and nonlinear circuits using linear integrated circuits, and PLLs.

ELEC635 Integrated Circuits Test & Measurements (3 CH)

Introduction to analog, digital, and mixed signal circuits and testing techniques, test specification process, DC & parametric measurement, tester hardware, analog & sampled channel testing, DAC & ADC testing, device interface board design, design for test, measurement accuracy & calibration, data analysis, and test economics.

ELEC636 MOS Devices and Circuits (3 CH)

Physics of MOS devices including the MOS capacitor and applications; long-channel MOSFET theory; MOSFET scaling and short-channel effects; hot carriers and reliability; SOI MOSFETs and CMOS; MOS memory; novel devices.

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

ELEC638 Mechatronics (3 CH)

Introduction to Mechatronics, physical system modeling, sensors & actuators, systems & control, computers & logic systems, and software & data acquisition.

ELEC639 Advance Topics in Electrical Engineering (3 CH)

Topics to be chosen every year according to specific interests.

ELEC640 Directed Studies in Electrical 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.

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

ELEC642 Artificial Intelligence (3 CH)

An introduction to artificial intelligence and expert systems. Topics include: state-space representations and search methods, problem-reduction representation and search methods, theorem proving using predicate calculus; games, computer vision and robotics, natural languages, expert system design using Lisp or Prolog.

ELEC643 Digital Circuit Test & Design Fault Testing (3 CH)

An introduction to the practices and techniques in the field of digital circuit testing. Topics include: fault modeling, test generation for combinational logic circuits, test generation for sequential circuits, design of testable combinational circuits, design of testable sequential circuits, built-in self test, and testable memory design.

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

ELEC645 Computer Architecture (3 CH)

Concepts of computer design, information representation, instruction sets and addressing modes, arithmetic and logic unit design for fixed and floating point operations, hardwired and microprogrammed control design, concepts of pipelining, CISC and RISC architectures, memory system design including virtual memory, caches and interleaved memories, I/O design methods, interrupt mechanisms, DMA and system integration.

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

ELEC647 Computer Networks (3 CH)

Study of local area networks (LAN) and wide area networks (WAN), survey of the state-of-the-art computer network. Topics include networking theory, design approaches, standards, topologies, OSI and TCP/IP, protocols, simulation tools such as Opnet will be used to evaluate different network designs, architectures, topologies, distributed processing, and applications.

ELEC648 Software Engineering Design & Testing (3 CH)

Background touch to traditional methods in software engineering, including the various development models, requirements, specification, design, implementation, and testing, issues of stepwise refinement and top-down designs are explored in depth. Students will complete a software project with the aide of STP, Logiscope, and ATTOL CASE tools.

ELEC649 Advanced Topics in Computer Engineering (3 CH)

Topics to be chosen every year according to specific interests.

ELEC651 Robust Control (3 CH)

Review of Linear Algebra, performance specifications and limitations, uncertainty and robustness, loop shaping, H2 and H_infinity control design, industrial applications.

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

ELEC653 Control & Instrumentation (3 CH)

Laboratory study of advanced feedback control techniques as applied to nonlinear and multi-output systems under computer or microprocessor control.

ELEC654 Stochastic Estimation & Control (3 CH)

Introduction to stochastic control and its applications. Markov decision processes, optimal policy with full state information for finite-horizon case, infinite-horizon discounted, and average stage cost problems. Bellman value function, value iteration, and policy iteration. Linear quadratic stochastic control.

ELEC655 Adaptive Control (3 CH)

Adaptive control for linear time-invariant systems. Includes indirect and model reference adaptive controllers plus a discussion of robustness issues in adaptive control.

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.

ELEC657 Advanced Feedback Control (3 CH)

Review of matrix methods, state space realization, multivariable control systems, state and output feedback control, model reduction, introduction to large scale systems and decentralized control. Industrial applications.

ELEC658 Sliding Mode Control (3 CH)

Sliding mode control for decoupling of the design procedure and low sensitivity with respect to uncertainties.

ELEC659 Advanced Topics in Control Systems (3 CH)

Topics are to be chosen every year according to specific interests

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.

ELEC692 Graduate Seminar II (0 CH)

Thesis option students should defend their MSc research in front of an examination panel appointed by the EE Graduate Studies committee. These seminars will be attended by faculty members, members of the student's advisory committee, and MSc students.

ELEC693 Master's Research Thesis (0 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.

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

ELEC741 Independent Research in Electrical Engineering II (3 CH)

To be designed to the specific interest of the exiting PhD students, in which they conduct exploratory research with emphasis on new frontiers in Electrical Engineering.

ELEC745 Electrical Engineering Seminar (0 CH)

PhD students must sign for the 0 credit hour seminar course every semester.

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 candidate defend research plans in front of supervisory committee.

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

ENGU1404 with a minimum grade P
PHYS105 with a minimum grade 60
PHYS135 with a minimum grade 60

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

Mechanical Engineering

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

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.

Prerequisites
MECH390

MECH310 Dynamics (3 CH)

This course aims to provide students with knowledge of dynamics of particles and rigid bodies. Topics include: plane kinematics and kinetics of particles, rectilinear and curvilinear motion, work and energy, impulse and momentum, plane kinematics and kinetics of rigid bodies, including nonrotating and rotating axes. The course also includes applications using modern engineering tools, such as MATLAB for simulation and analysis of dynamical systems.

Prerequisites
CIVL240 with a minimum grade D
Or
ELEC325 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: Freehand sketching, 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 throughout to apply the concepts learnt during this course.

Prerequisites

Pre/Co 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

Pre/Co MECH340 with a minimum grade D

MECH350 Introduction to Mechatronics (3 CH)

This course provides students with an introduction to mechatronics. Topics include: characteristics of measurement systems, measuring fundamental properties; transducers for motion measurements, fluid flow, temperature, pressure and strain, signal conditioning, operational amplifiers, diode circuits and applications, bipolar junction transistors and field-effect transistors theory and applications, analog to digital/digital to analog conversions, and microprocessor applications. The course also aims to familiarize students with entrepreneurial opportunities related to mechatronics, as well as to increase their commitment to ethical practices and to social and environmental issues.

Prerequisites

MATH2210 with a minimum grade D
Pre/Co ELEC372 with a minimum grade D

MECH384 Mathematics for Mech. Eng. (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

MECH407 Machine Design I (3 CH)

This course aims to provide students with fundamental skills and concepts of machine design with applications to simple elements. Topics 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 as well as 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 includes project work where students formed in teams perform design and analysis and do laboratory implementation of control systems for applications of their choice. The course also includes applications using modern engineering tools, such as MATLAB for control system design, simulation, and analyzes.

Prerequisites
MECH350

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
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 modeling, 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. The course also provides students with the awareness of entrepreneurial activities in manufacturing.

Prerequisites
MECH306

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 System Dynamics Lab (1 CH)

The lab provides students with hands-on skills of dynamic systems analysis and control implementation. The lab consists of three main experiments based on representative thermal, fluid, and mechanical systems. For each experiment the students will select a process, model it, simulate it, design a controller for it, and implement the final control system on a microcontroller. The course also aims to familiarize students with entrepreneurial opportunities related to mechatronics, dynamics and control, as well as to increase their commitment to ethical practices and to social and environmental issues relevant to mechatronics, dynamics and control.

Corequisites
- MECH409
- 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

MECH523 Biomaterials (3 CH)

Material properties of natural and artificial biomaterials. Tissue and blood biocompatibility. Uses of materials to replace body parts. Analysis of replacements. Tissue engineering.

Prerequisites
MECH310
MECH390

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.

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 Graduation Project I (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.

MECH590 Graduation Project II (3 CH)

Continuation of the project stared in MECH 585. Students are required to manufacture and implement the design carried out in Graduation Project I for demonstration and/or experimentation. Public oral presentation and submission of final written report of the design project are essential requirements for the completion of the course.

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.

MECH613 Advanced Robotics & Vibrations (3 CH)

Equations of motion of manipulators by Newton-Euler and Lagrange formulations; independent joint control, multivariable control, feedback linearization, computer interfacing, trajectory control, compliant motion control.

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.

MECH622 Theory of Elasticity & Plastic (3 CH)

Linear elasticity: including concepts of stress and strain as second order tensors, equilibrium equations, compatibility of strains, and strain energy; formulation of the governing equations and the appropriate boundary conditions in linear elasticity, and uniqueness of the solutions; elementary three-dimensional examples and two-dimensional theory; stress functions; solutions in Cartesian and polar coordinates. Stress and strain deviators, invariants and distortional energy, principal and octahedral stresses and strains, Tresca and von Mises yield criteria, yield surface and Haigh-Westergaard stress space, Lode's stress parameters, subsequent yield surface, Prandtl-Reuss relations, work hardening and strain hardening, stress-strain relations from Tresca criteria, incremental and deformation theories, the slip-line field, slip-line equations for stress, velocity equations and geometry of slip-line field, limit analysis, simple truss, bending of beams, lower and upper bound theorems.

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)

Covers the theory and practice of advanced finite element procedures. Topics include implicit and explicit time integration, stability of integration algorithms, unsteady heat conduction, treatment of plates and shells, small-strain plasticity, and treatment geometric nonlinearity. Practical engineering problems in solid mechanics and heat transfer are solved using MATLAB and commercial finite element software. Special emphasis is placed on proper time step and convergence tolerance selection, mesh design, and results interpretation.

MECH635 Advanced Manufacturing Engineering (3 CH)

Analytical, experimental and computer simulation techniques for the study of manufacturing processes (forming, machining, casting, joining and assembly). Effects of variables on the quality of manufactured products. Advances in processing of engineered materials.

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.

MECH655 Dynamics of Viscous Fluids (3 CH)

Navier-Stokes equations and some simple exact solutions. Oseen-Stokes flows. Boundary-layer equations and their physical interpretations. Flows along walls and in channels. Jets and wakes. Separation and transition to turbulence. Boundary layers in unsteady flows. Thermal and compressible boundary layers. Mathematical techniques of similarity transformation, regular and singular perturbation, and finite differences.

MECH660 Mechanical Engineering Seminar (0 CH)

Special topics in Mechanical Engineering presented by post-graduate students, invited speakers from industry and academia.

MECH690 Thesis (6 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.

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

MECH745 Mechanical Engineering Seminar (0 CH)

PhD students must sign for the 0 credit hour seminar course every semester.

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 candidate defend research plans in front of supervisory committee.

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

MTSE601 Fundamentals Of Materials (3 CH)

Electronic structure, dielectric properties and quantum states of metals, non metals, polymers and semiconductors. Crystal structure and phase diagrams of materials. Relationships between material structure and electrical, magnetic, mechanical, thermal, and chemical properties. Introduction to elementary solid-state concepts in materials and band theories. Principles of conduction in metals, insulators, polymer Sand semiconductors.

MTSE604 Thermodynamics Of Materials (3 CH)

An introduction to, classical thermodynamics and statistical thermodynamics. The three laws of thermodynamics applied to materials processing. Thermodynamics of gases and critical phenomena. Thermodynamic activity in solid and liquid systems: Gibbs energy of solutions; binary phase diagrams; equilibrium constant; chemical reactions and phase equilibria and applications in materials technology.

MTSE608 Material For Electronic Development (3 CH)

Fundamental properties of materials used in micro devices. Fabrication methods and packaging. Magnetic and optoelectronic properties. Micro electro device technologies in microelectronics, optoelectronics, magnetic storage, microsystems, and biotechnology.

MTSE609 Seminar in Material Science and Engineering (0 CH)

Speakers from academia and industry review current research on broad areas of interest in materials science and engineering.

MTSE611 Materials Characterization (3 CH)

Principles and applications of analytical techniques, imaging, diffraction and spectroscopy for materials characterization, microscopic analysis (Optical, TEM, SEM, and electron microprobe analysis). Spectroscopic characterization of materials utilizing UV, IR, NMR, Atomic Absorption). Liquid Chromatography, including GC, GCMS, HPLC, GPC. Thermal characterization (DTA, DSC, TGA, and TMA). X-ray techniques, elemental and structural analysis.

MTSE612 Modeling & Computational Methods (3 CH)

Methods for numerical solution of engineering problems related to materials. Solutions of linear and non-linear equations. Finite Element Methods, Finite Difference Methods, Monte Carlo Methods, Density Function Theory. Modeling techniques. Application to study of material system and processes.

Prerequisites
MTSE601
MTSE604

MTSE614 Failure Analysis & Prevention (3 CH)

Failure analysis, methodology and procedure. Failure mechanisms: mechanical and corrosion, high temperature. Detection and evaluation of materials defects. X-ray radiography, ultrasonic, dye penetrate, magnetic particles and eddy current techniques.

MTSE620 Special Topics in Materials Science and Engineering (3 CH)

To be designed to the specific interest of the existing graduate students with emphasis on new frontiers in Materials Science and Engineering.

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.

MTSE635 Properties and Processes of Composites (3 CH)

Types of fibers, continuous and discontinuous fibers. Hybrid composites, mechanics and thermodynamics of interfaces; mechanical properties and fabrication of engineering composites. Intrinsic properties of matrix materials and fibers. Fiber reinforced composites, rule of mixture. Theory of lamination, sandwich and honeycomb structures.

MTSE640 Materials for Biomedical Application (3 CH)

Surface chemistry and physical properties of metals, alloys polymers and ceramics for biomedical application. An introduction to the interactions between proteins, cells and surfaces of biomaterials. Organ replacement therapies and acute and chronic response to implanted biomaterials, biosensors, drug delivery and tissue engineering, the dynamic aspects of living tissues, body response to implants, biocompatibility and soft tissues replacement.

MTSE645 Thin Film and Surface Analysis (3 CH)

Thin films, thin film technology: MOS, MNS, etc. Modification of surface and near-surface regions of materials using lasers, ion beams, oxidation, adsorption. Interaction of ions, electrons, photons, and neutrons with matter. Composition, and defects in semiconductors, ceramics, polymers, composites and metals. Ion beam techniques, Rutherford backscattering and forward recoil spectrometry, and secondary ion mass spectrometry. Electron probe techniques, electron energy loss spectrometry and low-energy electron diffraction. Neutron techniques. Application to electronic materials, polymers and ceramics.

MTSE650 Nanomaterials (3 CH)

Introduction to synthesis routes for nanomaterials, specific properties of materials at the nano-scale including carbon nanotubes, nanoparticles and quantum dots. Interaction of electrons and photons with matter. Imaging methods with electron microscopy, scanning probe techniques, x-ray photoelectron spectroscopy and X-ray absorption analysis with high spatial resolution. Survey various processes that are used to produce materials structured at the micron and nanometer scales for electronic, optical and chemical applications. The newest approaches to nanofabrication: microcontact printing, self-assembly, and nanolithography.

MTSE657 Individual Research Project (3 CH)

A one semester long project with specific outline and specific expected outcomes that meet the approval of the committee.

MTSE660 Thesis (6 CH)

Individual research subject with a supervisor.

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 candidate defend research plans in front of supervisory committee.

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 Food and Agriculture

Agribusiness and Consumer Science

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.

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.

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.

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
AGRB210

AGRB352 Agribusiness Management & 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

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
MATH105

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

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

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.

AGRB401 Evaluation of Agribusiness 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.

AGRB410 Internship (3 CH)

This course covers agribusiness application of theory and practice to the solution of problems of agricultural production or related businesses in the field of agribusiness and consumer science. Analyze specific management problems and perform general management assignments detailed in a contract between the student, the firm or organization, and the faculty advisor before the internship commences. (This course is conducted after completion of 90 Credit Hours following one of the following 3 options: Option1: 2 days/week for a complete semester (16 weeks). Courses can be registered in the other days of the week Option 2: 3 days/week for 3/4 of a semester (12 weeks). Courses can be registered in the other days of the week Option 3: 4 days/week for half a semester (8 weeks). Option3: Condensed courses can be taken in the remaining 8 weeks of the semester and student should complete 90 credit hours before taking this course).

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 International Agribusiness 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
ECON125
AGRB200

AGRB432 Agribusiness Marketing Plans (3 CH)

Course includes a client-centered course where self-managed teams obtain an agribusiness client in the country with a consumer-marketing problem. They develop an agribusiness-marketing plan through the use of primary and secondary consumer data. Emphasis on developing presentation skills, integration of marketing mix, particularly, promotional elements in developing agribusiness marketing strategy for consumers.

Prerequisites
AGRB300

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

AGRB602 Operations Management in Agribusiness (3 CH)

Operations management in agribusiness applies business principles and operations research techniques to a wide variety of management problems. Overview of the management problems involved in planning, operating, and controlling the farm and agribusiness systems. The course includes discussions of the decision making process and the application of various mathematical programming as optimization tool to agribusiness operational management problems.

Prerequisites
ECON631

AGRB604 Management Strategies for Agribusiness Firms (3 CH)

This course is designed to help students synthesize across their formal and informal learning of the general principles of marketing, finance, accounting, planning and human resource management in the food and agricultural sector. The course helps students understand advance professional tools that are problem-solving oriented in the areas of agribusiness management and strategies.

Prerequisites
AGRB602

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.

AGRB606 Agribusiness & Food Marketing Management (3 CH)

The course applies marketing, management, sales and business concepts to the food and fiber industry. This course will provide an opportunity to learn and apply the fundamentals of marketing management to multiple food and agribusiness scenarios. The course will help students develop the necessary set of skills to competently conduct market analyses and appraise and prioritize marketing activities within the broader context of farm/firm management.

Prerequisites
AGRB605

AGRB607 International Agribusiness Marketing (3 CH)

This course covers principles, trends, issues, barriers, policies, strategies, and decisions involved in international marketing, with emphasis on perishable and storable agricultural commodities and food products. The course combines firm-level agribusiness marketing concepts with strategic international agribusiness marketing and international trade applications. This includes development and presentation of an international agribusiness marketing plan.

Prerequisites
AGRB605

AGRB608 Agricultural Finance (3 CH)

This course covers advanced agricultural finance concepts. Particularly, the course covers finance theories applied to agricultural-production decision making including portfolio analysis, the farm capital-asset-pricing model, net present value decisions making analyses, and agribusiness risk analysis.

AGRB609 Agricultural Risk Management (3 CH)

A review of risk management concepts and techniques for managing risks faced by agribusiness firms. The risk management process, including risk control and risk financing techniques to business risk management problems will be analyzed. Focus on enterprise risk management and related tool/techniques will be determined.

Prerequisites
ECON621

AGRB610 Research Methods for Agribusiness Managers (3 CH)

The objective of the course is to provide students with a working knowledge of quantitative and qualitative techniques to be used for analyzing agribusiness-management contemporary issues and problems. The course emphases include the application and interpretation of quantitative and qualitative methods rather than on theoretical background in the agribusiness field.

Prerequisites
ECON631

AGRB611 Special Topics in Financial Agribusiness Management (3 CH)

An advanced course for students who wish to explore current and future topics in financial agribusiness management. The course covers financial data trends, financial statements and financial agribusiness management applications. The course's core topics include capital and investment theory related to food and agribusiness firms.

Prerequisites
AGRB608

AGRB612 Food and Agribusiness Policy (3 CH)

An analysis of economic and policy issues relevant to food and agribusiness managers in both developed and developing economies, with emphasis on the economic and policy environment that exists within UAE, GCC, and other Middle-East economies. In addition, public policies and programs affecting agriculture and agribusiness; development of policies and programs, identifying relevant issues, reviewing means to attain desired goals, and development of methods to evaluate the consequences of alternative farm policies on UAE agriculture, agribusiness, trade and resources will be covered.

Prerequisites
ECON621
ECON631

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

AGRB614 Problems and Issues in UAE Agribusiness Firms (3 CH)

This is proposal preparation course, which involves seminars by industry speakers. The course requires the students to prepare project's proposals. Students' proposals will be evaluated by the department's faculty members. Students will gain local, national, and global perspectives and improve their strategic skills through cases that explore topics such as the shifting role of government, food security around the world, consumer views of agribusiness, and investments in food and agricultural products markets.

Prerequisites
AGRB602
ECON621

AridLand Agriculture

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.

ARAG240 Contemporary Agricultural Science (3 CH)

The course is designed to introduce students to the basic knowledge and practices of food production systems under arid conditions. Topics include field crops, fruits, vegetables, livestock, and fisheries in addition to an overview of agribusiness management and the role of marketing and consumer demand. The course promotes sustainable agriculture for the enhancement of the environmental, economic, and social health of the society.

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.

ARAG306 Principles of Plant Protection (2 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.

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.

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.

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.

ARAG457 Issues in Animal Protein Production (2 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.

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.

HORT641 Modeling Horticultural System (3 CH)

Emphasis on physiological and ecological models, with examples from areas of interest to class participants. Economics of horticulture. Application of economic theory to the analysis aquaculture economics taking into account physical factors, biological factors and environment factors. Bioeconomic model of horticulture. Economic optimization technique in horticulture. Simulation in the economic analysis of horticulture.

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.

HORT648 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.

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 Integrated agricultural production systems (3 CH)

Farming systems cleverly integrating a range of different plant or animal production procedures in order to maximize resource utilization efficiency will be the main focus of this course. Methods by which productivity and environmental impact of integrated systems can be assessed and compared will be presented. Students will be encouraged to develop

and discuss novel ideas on how aquaculture, crop and farm animal production could be integrated at the farm- or community level. Students will also learn how to apply best management practices in Horticulture production to preserve and protect UAE water resources from non-point-source pollution occurring from agricultural fertilization and other cultural practices

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.

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)

In this course the students will learn the concepts of plant molecular biology and molecular techniques for plant improvement. Topics include: organization and regulation of plant genes, gene cloning and analysis, transformation systems for plants, marker aided selection and bioinformatics. Topics of research of particular relevance are the techniques in the field of plant breeding, stress physiology, pathology and nutrition. Students will discuss transgenic versus traditional breeding to accelerate plant improvement and product development, and visit respective laboratories to learn about their organizational structure, and the required facilities.

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 examine the planning, policy, and management strategies used in the stewardship of urban natural resources. The fundamentals for developing effective programs to maximize the economic, environmental, and social values and benefits of urban landscapes will be addressed. Case studies from the Gulf Region and other parts of the world will be presented, compared and discussed.

HORT900 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. Prerequisite: Min. of 18 Credits of Coursework

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

Food Science

COFA650 Graduate Seminar (1 CH)

Participation in the Graduate Seminar might be continued all through the student's study period, and involves regular attendance of relevant academic seminars or colloquia organized within UAEU. The main academic supervisor may choose seminars or colloquium sessions that are mandatory for a student to attend. The seminar also involves a weekly class where students present and critically review recent research advances related to their working field.

COFA660 Advanced 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.

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.

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
BIOC230 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
BIOC230

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)

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

FDSC615 Advanced Shelf Life of Stored Foods (3 CH)

This course deals with chemical and microbial spoilage of food mechanisms and kinetics. Important processes to be considered include microbial and enzymatic changes, lipid oxidation, Millard reactions. The course will focus on factors affecting chemical and sensory quality changes during transportation and storage.

Corequisites
FDSC640

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

FDSC632 Advanced Oil & Fat Technology (3 CH)

This course aims to give the students an advanced understanding of the technology of oils and fats and the chemical and physical properties related to raw materials and final products. The course considers different oil and fat sources and studies their extraction, clarification, refining, and modification. It focuses on the formulation and production of shortenings, margarines, special fat substitutes as well as analysis and quality aspects of processed oils.

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 (2 CH)

This course covers at an advance level the importance of water activity and its relations with water content and how they are related and affected by other food components and food processing. In this course, students will work on specific applications, participate in class discussions, and submit a report.

Prerequisites
FDSC610

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 2 (3 CH)

This course will further examine the physicochemical composition of foods and its relation to 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. The course will focus on reaction mechanisms, influencing factors, and mitigation strategies. Student evaluation will be based on students' participation in discussions and student reports.

Prerequisites
FDSC610

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, interpretation and analysis of literature, review, the methodologies and discussion as well to reading current books related to 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. The topics are to be assigned and approved by the Department PhD committee.

Prerequisites
FDSC633

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 deals with advanced knowledge related to the different methods used in food analytical laboratories. The course focuses on analytical method development and validation. Students will select an analyte and review different methods of its analysis comparing their advantages and limitations, and will then select an appropriate analytical method and present results from published studies on its calibration, validation, and verification. Student evaluation will be based on students' participation in discussions and student reports.

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.

Prerequisites
FDSC640

FDSC900 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. (Prerequisite: Min. of 18 Credits of Coursework)

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

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 Nutrition I (3 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 dietary assessment, anthropometric assessment, and medical terminology.

Prerequisites
CHEM283
FDSC250

NUTR330 Nutrition II (3 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 biochemical assessment, the nutrition care process, and medical terminology.

Prerequisites
NUTR320

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
NUTR352

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

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

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 (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.

Prerequisites
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.

Prerequisites
NUTR486

NUTR488 Medical Nutrition Therapy II (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
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
NUTR488

NUTR490 Internship (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 (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).

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 applies nutrition concepts; disease prevention and health promotion in public health setting. The course also analyzes related programs and legislation with nutrition components; utilizes a theoretical framework to guide and facilitate the strategic planning, implementation and evaluation of nutrition/health promotion programs through the lifecycle. Specific assessment and evaluation techniques will be used and issues related to global food insecurity and hunger will be addressed.

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 (2 CH)

The course discusses principles and issues related to nutrition and immunology and the impact of nutrients, foods and nutritional status on immune responses. It covers the role nutrition as a modulator of the pathophysiology of inflammatory and immune responses.

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 Exercise and Health (2 CH)

This course covers the application of the principles of the physiology of the exercise to improve performance, wellness and fitness through both training and exercise nutrition. The basis of training and exercise nutrition will be emphasized; the main strategies and nutritional tools, which may be used, will be considered. It will also focus on the use of physical activity and exercise in the prevention and treatment of major chronic diseases (obesity, diabetes, cardiovascular disease). In this aim, the factors influencing physical activity practice and maintenance, environmental models to design physical activity training programs and interventions will be considered

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)

The material covered in this course consists of three major emphasis areas: (1) review of carbohydrate, lipid, and protein structure, synthesis, absorption, and metabolism, (2) the impact of nutritional influences on macronutrient metabolism to health and disease, (3) the influence of macronutrient metabolism on the regulation of energy balance.

Prerequisites

CHEM641

NUTR810 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
NUTR800

NUTR820 Advanced Micronutrient Metabolism (4 CH)

This course will cover the properties, metabolism, biochemical and physiological functions and interactions of vitamins and minerals, and their relationships to chronic diseases, deficiency symptoms and toxicity.

Prerequisites
NUTR805

NUTR830 Human Nutrition Assessment (3 CH)

In this course students will study nutrition assessment parameters (anthropometric, biochemical, clinical, and dietary) used to develop a nutrition care plan or intervention designed to help the individual maintain or attain a healthier nutritional status. Students will also study the current counseling theories; interviewing and counseling techniques for use with various nutrition-related diagnoses. Methods, techniques, and data interpretation for assessing nutritional status and determination of body composition of individuals and groups will be covered.

Prerequisites
NUTR805

NUTR900 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. Prerequisite: Min. of 18 Credits of Coursework

NUTR910 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

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

Prerequisite
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.

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

ARAB602 Stylistic and Textual Analysis (3 CH)

The course critically approaches selected literary texts from a variety of stylistic and textual perspectives.

ARAB604 Literature and Language Sources (3 CH)

This course explores the major literary and linguistic sources enriching Arabic language and literature . The course studies major classical references and canonized books well-known in the field

ARAB606 Arabic Rhetoric Issues in the Text of the Holy Quran (3 CH)

This course investigates a spectrum of Arabic rhetoric issues using the holy text of the Quran as example

ARAB608 Issues in Feminist Literature (3 CH)

This course investigates the genesis and development of Feminist literature and its connections with contemporary critical theory. The course utilizes selected poetic and fictional texts to approach significant issues crucial to Feminist Literature.

ARAB614 Modern Trends in Arabic Poetry and Prose (3 CH)

This course explores classical and modern Arabic poetry concentrating on the lines of demarcations separating between these two traditions. The course illuminates variations between classical poetry and new trends epitomized by blank / free verse and the prose poem. It also studies the intersections between literature and other arts such as cinema.

ARAB616 Fundamenbtals of Syntactical Thought (3 CH)

This course deals with the fundamentals of theoretical studies in Arabic syntax with focus on classical theories and other related territories of research essential for Arabic grammar.

ARAB720 Analysis of Literary Discourse (3 CH)

This course critically examines texts within the contours of structural and linguistic theories . Classical and modern texts are analyzes from various perspectives in order to elucidate them.

ARAB725 Theory of Arabic Syntax (3 CH)

This course tackles the methodologies advocated by pioneering Arab scholars dealing with grammatical studies. The course also approaches Arabic syntax within the framework of modern linguistic theories.

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.

ARLN712 Trends in Modern Language Studies (3 CH)

This course studies modern trends in language studies such as structuralism, pragmatism and stylistics. It also investigates modern trends in syntactical studies including generative and transformational grammar in addition to related linguistic domains such as phonology and contemporary lexical studies.

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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English Literature

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.

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.

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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

ENG335 Practical Introduction to Theatre TA (3 CH)

Drawing first from the classic repertoire and then exploring the modern theatre, students will study a selection of works and investigate ways in which writers have envisioned their plays and the societal contexts from which these plays emerged. Having researched how these plays were directed and the responses garnered by either reviews or by critical analysis, students will stage scenes from the selected plays to gain practical experience of how a text is transformed from literature to performance.

ENG345 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.

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.

ENG455 Fundamentals of Stage Production 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.

ENGL616 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.

ENGL620 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.

ENGL621 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.

ENGL645 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.

ENGL655 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.

ENGL665 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.

ENGL670 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.

ENGL685 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.

ENGL693 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.

EWR385 Creative Writing Poetry (3 CH)

This course will encourage students to explore and to develop their talents as creative writers, in the composition of poetry. They will become acquainted with some of the tools and the techniques of poetic craftsmanship.

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.

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.

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

LIT325 Restoration & Enlightenment Literature (3 CH)

This course acquaints students with works by the major writers of the period from 1660 to 1800 and highlights major literary forms characteristic of the period such as the epic (Milton), the comedy of manners (Congreve), and satire (Swift, Pope).

Prerequisites
LIT150 with a minimum grade D
LIT220 with a minimum grade D

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

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

Geography and Urban Planning

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

GEO312 Geomorphology (3 CH)

This course provides an understanding of process mechanics operating within the Earth's surfical systems that shape, modify, and lead to the genesis of surface landfalls. From the perspective of landscape management, the course utilizes an applied emphasis for understanding the processes of weathering, slope development, fluvial systems, desert features, glacial landforms, coasts and shorelines

GEO332 Geography of the Arab World (3 CH)

The course covers the geography of the Arab World with a focus on the different geographical concepts. Diverse topics which include both human geography and physical geography of the Arab world are covered. These include geomorphology of the Arab World countries, climatology, hydrography, urban environment, economic activities (agriculture, industry, commerce), and their impacts on the composition and distribution of the population in each of the countries of the region referred to as the Arab World.

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.

GEO471 Political Geography (3 CH)

This course provides an overview of the major debates in urban politics. It 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. It selects different countries in the Middle East (including the UAE) and western countries to make a comparison in the nature of political authority as processes and institutions of politics, political participation, and domestic and foreign policy making.

Prerequisites

GEO201 with a minimum grade D

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).

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.

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

History and Archaeology

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.

HIS123 American History (3 CH)

This course examines the European discovery of the Americas, the establishment of the early settlements, the emergence and the development of the American states and their relations with the outside world, mainly with Europe over the period between the 15th and 20th centuries.

HIS124 Rise of Islam & Omayyed state (3 CH)

The course clarifies the transformation of Arab society as a result of the advent of Islam and the establishment of the first Arab Islamic State. It also deals with the role of the Rashidin Caliphs in cementing the foundations of the Islamic Arab State laid down by the Prophet, in addition to their military, administrative, and financial achievements.

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.

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.

HIS200 Methodology & Historiography (3 CH)

This course provides students with skills of methods of historical research; including, writing and analyzing history. It guides students to the methods and techniques of historical research; to reference works and sources; and to bibliography in general. Emphasis is also placed on varieties of secondary sources and the major trends in historical interpretation.

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.

HIS213 Medieval West: 600-1500 (3 CH)

This course surveys the history and civilization of Medieval Europe from 5th to 15th century including the forming of Medieval Europe, the Christian and Germanic legacy, and European institutions in the Middle Ages.

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)

HIS239 History of Africa:1800-present (3 CH)

This course covers African history during the Modern and Contemporary periods, in order to acquaint the student with the historical developments of Sub-Saharan African Countries from the 15th century to the middle of the 20th century.

HIS241 Modern History of Europe (3 CH)

This course covers the period from the Renaissance to the last quarter of the 19th century. It deals with the renaissance, its impact, European expansion, the reformation, major developments of the 17the and 18th centuries, the French revolution, Napoleon's Empire to the German unification and the scramble for colonies. It deals also with crises, alliances and Power rivalries since the dawn of 20th century, including the events leading to the two world wars and their impact worldwide, postwar evolution and west Europe, development of Europe in the post-Soviet era.

HIS243 History of East Asia (3 CH)

The course covers the history of Asia during the Modern and Contemporary periods, in order to acquaint the student with the historical developments of the region, with which Arabia has historical, cultural and economic ties.

HIS245 Relationship between East & West in Middle Ages (3 CH)

This course examines the Islamic East during the 11th-13th centuries of European offensive, and its effects on Islamic reaction towards the Crusaders, and the political and cultural effects of the Crusades on the Islamic East.

HIS251 History of the Islamic West (3 CH)

The course covers the history of Al-Andulus and Al-Maghrib from the Islamic conquest to the fall of Al-Muhaides state, including the following aspects; Political and cultural aspects during the Wali's period - the Independent States period and their internal and external relationships, and the political and cultural life under the Muravids and Al-Muhaids.

HIS301 Research Project (3 CH)

This course covers the practical application of scientific research in history and methodology techniques. It also gives each student the opportunity for choosing a topic of his/her own to practice methodology and techniques

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.

HIS311 Archaeology Field Methods (3 CH)

The course covers archeological field methods, emphasizing methods of recording field data including mapping, drawing and photography; practice in the use of field equipment; conservation of artifacts; participation in local site surveys and excavations when feasible.

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.

HIS332 Ancient History & Archaeology Arabian of the Peninsula (3 CH)

The course covers the geographical and historical background of the Arabian Peninsula, including its location, and descriptions of its commercial importance and its political situation during the period from the ancient times to the rise of Islam, plus some details about archaeological sites in the Peninsula. It also examines the ancient kingdoms, civilizations and societies of Arabia.

HIS352 History of the Abbasid State (3 CH)

The course examines the rise of the Abbasid State, the diversity of the new Islamic society, its cultural and social changes, the rise of the independent states and their relations to the caliphate. The course also deals with the cultural, social and economical circumstances led to the emergence of different sciences under the Abbasids and highlights the global dimensions of the human civilization through translation movements of sciences among nations.

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.

HIS374 Public History (3 CH)

This course focuses on writing history for public consumption and includes interpreting and writing public policy brochures, tourism pamphlets, interpret historical data for documentary production. Students will receive hands-on experience with a professional organization or agency in research and professional development and there will be close collaboration between faculty mentors.

HIS375 Hist. of Islam World from 1500 (3 CH)

The course studies the Islamic World History in modern and contemporary periods, and relations among Islamic and Arab peoples. It also deals with contemporary conditions and problems of the Islamic World.

HIS376 Special Topics I (3 CH)

This Course Provides an Intensive study of a central thematic topic or problem in history. May focus on a particular society, but should include recent historical interpretations that offer a comparative perspective. Topics selected by faculty members. (Possible examples: women and the family; oral and local history; migration and immigration; cities and urbanism; environmental history; war its impact on society; connections between world civilizations

HIS377 Special Topics II (3 CH)

This Course Provides an Intensive study of a central thematic topic or problem in history. May focus on a particular society, but should include recent historical interpretations that offer a comparative perspective. Topics selected by faculty members. (Possible examples: women and the family; oral and local history; migration and immigration; cities and urbanism; environmental history; war its impact on society; connections between world civilizations)

HIS378 History of Trade in the Indian ocean till 1500 (3 CH)

This course examines several themes of history of trade and navigation, its cultural, social and economic dimensions in the Indian Ocean (included the Arabian Gulf and the Chinese coasts) in the period from the 7th century to the end of the 15th century. The course studies and analyzes the interaction between sea and land through the commercial activities as well as the commercial competition between the Islamic world and European powers. The course will also focus on the development of navigation technologies and its effects on the commercial relations among the coastal nations as well as the role of the trade activities and navigation in establishing several coastal states in the region.

HIS379 Maritime Archaeology (3 CH)

The course is designed to provide students with a sound theoretical and methodological grounding in maritime archaeology and underwater cultural heritage management in the wider context. The course will discuss heritage and ethical issues related to work in maritime and underwater archaeology as well as the examination of the major shipwrecks and ship burials, historical accounts, literary traditions, harbours, and art, to reconstruct a range of seafaring activities.

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.

HIS400 Research Project (3 CH)

This course covers the practical application of scientific research in history and methodology. Students are provided with the opportunity to choose a topic of their own to practice methodology and techniques.

HIS401 Internship in Museum Studies (3 CH)

This course comprises a student internship in a museum setting, which should include a project in conservation of artifacts, exhibit display or development of educational materials.

HIS422 Mod. & Con. History of Africa (3 CH)

The course covers African history during the modern and contemporary periods and the historical developments of sub-Saharan African countries from the 15th to the middle of the 20th centuries.

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)

Interdisciplinary

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.

Prerequisite
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.

Prerequisites
ARBU1401

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

Linguistics

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.

LNG120 Linguistic Principles of English Grammar (3 CH)

This course provides an in-depth analysis of selected topics which are central to the linguistic study of English grammar, and involves both structural description and functional analysis. The aims of the course are to provide.

Prerequisites
LNG100

LNG220 Phonetics (3 CH)

This course introduces the study of speech sounds, including the theoretical foundations of phonetic theory, the mechanisms of human speech production, and the International Phonetic Alphabet. Students are trained to detect and transcribe individual sounds and supra-segmental properties such as stress, rhythm and intonation. Additionally, they study the basics of acoustic analysis of human speech sounds using specialized equipment. Practical application of these skills includes transcription and analysis of the students' own speech or any Arabic sample.

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.

LNG280 Linguistic Structure of English (3 CH)

This course examines 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

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.

LNG330 Introduction to Phonology & Morphology (3 CH)

This course is intended o cover two major linguistic levels of analysis: phonology and Morphology. The first part of the course is concerned with phonology, where students are expected to basic principles of phonemic and phonological analysis. Topics such as phonological alterations, rules and derivations are covered. The second part deals with word structure and word-formation, with emphases on Arabic and English. Students are introduced to basic principles of morphemic analysis, and ways to recognize and write morphological rules and derivations.

Prerequisites
- ENG310
- LNG310

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)

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. 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
LNG341
LNG342

LNG455 Practicum-TA- (3 CH)

Practicum is a supervised experience in which students learn professional skills of assessing people with Language aphasia and communicative disorders in real life situations. This practicum experience is intended to provide students with the necessary opportunities to apply and expand on the information learned in academic courses.

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

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

TSL100 Introduction to English Grammar (3 CH)

This course explores the relationship between literature and translation and examined some of the practical aspects of translation and the theoretical questions to which it gives rise. Quine's 'Theory of Indeterminacy of Translation' is discussed and the notion of 'lost in meaning' is analyzed. Translations of literary works and sample the diverse field of translation theory are also explored.

TSL110 Introduction to Applied Linguistics (3 CH)

This course acquaints students with the terminology and tools for analyzing English grammar. The course aims to improve students' accuracy in their written English and to help them to be better teachers of grammar. Teaching involves lectures plus in-class exercises and workshops where students are presented with (textbook) exercises to complete in pairs and small groups with instructor assistance. Written assignments will also be used to help learners improve their grammar in authentic writing environments.

TSL210 English Phonetics (3 CH)

Applied linguistics is the theoretical and empirical investigation of real world problems in which language is a central issue, and it draws upon research in education, linguistics, psychology, sociology, and anthropology. The course demonstrates how, for example, applied linguists employ research findings from linguistics, education and psychology to develop second language teaching methodologies and to implement successful literacy programs; how they employ sociolinguistic and pragmatic knowledge in the elucidation of misunderstandings in cross-cultural communication; how they draw on findings from

discourse analysis and pragmatics to clarify written and spoken communication in professional settings such as hospitals and law courts; how they use their knowledge of phonetics and phonology to solve problems in speech therapy; and how they draw on the many contributing fields to address major societal issues such as language planning. Through these and other examples, the course explains how applied linguists employ the theories and tools of formal linguistics, education, psychology, and sociolinguistics in a wide variety of socially useful ways.

Prerequisites
TSL100
TSL110

TSL220 Pedagogical Structure (3 CH)

This is a comprehensive course on English phonetics. Starting from the detailed description of the articulatory system of human beings, students will study the accurate description of different types of speech sounds. We will focus on the speech sounds as spoken by the native speakers of English (which primarily include British and American English, though other dialects of English may be taken into account when necessary). Students will also be taught to transcribe English words accurately using the International Phonetic Alphabet (IPA), and to translate their transcription into English words. By the end of this course, students should know both English-to-IPA and IPA-to-English translation.

Prerequisites
TSL100 with a minimum grade D
TSL110 with a minimum grade D

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.

TSL240 Teaching Adult Learners-TA (3 CH)

In addition to providing students with a basic theoretical knowledge of the processes involved in reading, the course addresses two problems which affect second language learners of English throughout Asia. The first is that second language literacy has not developed sufficiently in many countries because vocabulary is not taught systematically in schools. The second obstacle to the development of second language literacy is that very few students have the habit of reading for pleasure. The course describes these problems and their consequences, and it proposes solutions which young teachers could begin to implement in schools.

TSL321 Secondary Language Acquisition & Teaching (3 CH)

This course is a thematic application, and it focuses on the unique attributes of adult language education contexts. The course will train students to develop practical materials and methods to enhance their ability to conduct useful and relevant lessons with adult learners. By the end of the course students will have gained knowledge of the main issues surrounding adult language education and the ability to plan and conduct an effective language class with adult language learners.

Prerequisites

TSL100 with a minimum grade D
TSL110 with a minimum grade D

TSL331 Teaching Eng for (ESP) (3 CH)

This course introduces students to the basic issues and concepts involved in the study of second language acquisition (SLA), the study of the way in which people learn a language other than their first language (L1) and the multiple internal and external factors that affect it. It is designed to make the essentials of this rapidly expanding area accessible to students. The course is demanding, partly because it sometimes challenges students' experience and established practice, and partly because it introduces a large number of new terms, concepts, and issues. However, the course provides a valuable background for much of what students study in the Applied Linguistics/TESOL Programme.

TSL351 Language Testing-TA- (3 CH)

This course aims to expose students to the task of teaching English for specific purposes (ESP), i.e., English to students in various professional fields and areas of knowledge, and to its methods and techniques of teaching. Students are introduced to (1) ESP as a new branch of ELT, (2) course design and what it involves (determining learners' needs, knowledge of models of language learning, knowledge of ways of describing language structure, and knowledge of the different approaches to course design), (3) ways of using/applying the basic principles of course design (writing a syllabus, designing materials and teaching methods, evaluating teaching materials, and assessing students' learning). Finally, students will be encoraged to reflect on the role of the ESP teacher and the possible resources available to him/her.

TSL360 Discourse Analysis (3 CH)

This is an introductory course in language testing which aims at introducing students to the basics of language assessment. The first section of the course focuses on basic terminology in language testing, such as reliability, validity, washback, and stages of test development. The second section addresses the issues of testing different language skills and features including assessment of reading, writing, listening, speaking, grammar, and vocabulary. The final part of the course deals with issues related to assessing young

children, alternative methods of assessment, using technology in language testing, and ethics in assessment. During the course, students will be given the opportunity to write and moderate test items

Prerequisites
TSL100
TSL110

TSL421 Practicum: Continuing Professional Development-TA (3 CH)

This course aims to expose students to the task of teaching English for specific purposes (ESP), i.e., English to students in various professional fields and areas of knowledge, and to its methods and techniques of teaching. Students are introduced to (1) ESP as a new branch of ELT, (2) to course design and what it involves (determining learners? needs, knowledge of models of language learning, knowledge of ways of describing language structure, and knowledge of the different approaches to course design), (3) to ways of using/applying the basic principles of course design (writing a syllabus, designing materials and teaching methods, evaluating teaching materials, and assessing students? learning), and finally (4), students will be brought to reflect on the role of the ESP teacher and the possible resources available to him/her.

TSL431 Skills & Strategies (3 CH)

This course will facilitate students' integration into the professional field of TESOL. Students will learn how they can continue to develop their teaching skills once they have graduated and entered the field. Students will be required to join TESOL Arabia, the professional association for English language teachers in the Arabian Gulf. They must also attend CTELT, TESOL Arabia, ARC or other conferences. They must also participate in various TESOL Arabia events as well as professional development opportunities for teachers that are offered by other organizations at various times outside the classroom.

Prerequisites
TSL100 with a minimum grade D
TSL110 with a minimum grade D
TSL220 with a minimum grade D

TSL442 Second Language Methodology (3 CH)

This course helps students develop a repertoire of teaching competencies that could be used in a language classroom. More specifically, the class activities place emphasis on the development of skills, strategies, and techniques in an EFL context. The course follows a how-to-do-it approach since students will find tips and examples on how to carry out different skills. Examples include how to present new vocabulary, how to teach grammar, how to plan a language lesson, how to manage classes etc. The course is mainly divided into two main sections. The first section provides a theoretical background and addresses specific skills and strategies in a language classroom. As for the second part, it touches on global aspects of the teaching process including planning and management, materials and

aids, and professional development. Students are encouraged to participate in class discussions, which is an important component of this course.

Prerequisites
- TSL100 with a minimum grade D
- TSL110 with a minimum grade D
- TSL220 with a minimum grade D

TSL451 Practicum / Internship (3 CH)

This course examines approaches and methods in second-language teaching, including current and historical methodologies. There is a focus on conceptual frameworks for skills-based teaching and learner-centered approaches. Students become familiar with the pedagogical techniques employed in different language teaching methodologies. They will also evaluate the principles and the techniques of methods they have studied. (The internship is conducted over a complete semester. No courses are allowed to be registered during the internship).

Prerequisites
- TSL230
- TSL240
- TSL331
- TSL351
- TSL442

Mass Communication

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

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)

Philosophy

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.

PHI224 Medical Ethics (3 CH)

This course examines various ethical choices, actions and issues which arise in the practice of medicine as a profession. Issues to be discussed include: theories of morality and elements of professionalism, the nature of the doctor-patient relationship, reproductive technologies, euthanasia, resource issues (access to health care, resource allocation), cultural perspectives on medicine, health and professionalism (Islamic and Western perspectives), and research and testing issues.

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.

PHI311 Medieval (3 CH)

This course examines some of the major figures in medieval philosophy, from both the occidental and the oriental traditions of intellectual thought: Ibn Sina, Ibn Rushd, Al Farabi, Augustine, Boethius, Abelard, Albert the Great, Thomas Aquinas, and William of Ockham. In the process, it introduces students to the principle themes, concepts and theories of philosophy in the period, including metaphysical questions about universals, philosophy of language, philosophy of religion and logic.

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.

PHI360 Philosophy of Nature (3 CH)

This course examines the concepts of nature in Western, Asian and Middle Eastern Philosophy, and tackles some special problems that arise in attempting to define both human nature and the natural world in scientific terms. Its focus is on how the concept of nature is used in environmental ethics, philosophy of science and in defining human beings, and especially on the hidden normative dimensions of the term.

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.

PHI411 Senior Capstone (3 CH)

This course builds on the skills and knowledge base which students have acquired during the major and investigates how the core areas of philosophy all contribute to the overall development of the chosen subject. The capstone is designed to develop and refine independent philosophical research skills, analysis and reasoned argument, and culminates in the production of a senior research paper.

PHI412 Internship (3 CH)

This course gives practical experience in philosophical research by students assisting in current research projects of faculty at UAEU or elsewhere, or by means of an individual research project that examines practical philosophical problems tailored to the needs and interests of the student. Where possible the latter research project will be undertaken in a workplace chosen by the student, which affords opportunities for applied philosophy or for gathering data or experience relevant to the research project.

PHI421 Advanced Topics in Ethics (3 CH)

The course covers current philosophical thinking in the area of Ethics. Many of the topics considered in PHI 310 will be considered in this course, but at a much more sophisticated level as appropriate to a senior year course. In particular the course will develop an understanding of the relationship between metaethics and normative ethics, as well as the relationship between normative ethics and applied ethics.

PHI432 Contemporary Western Philosophy (3 CH)

This course will provide students with analyses of the main trends and systems of contemporary western philosophical thought. Topics covered may include Analytic Philosophy, Pragmatism, and Continental Philosophy (including Existentialism, Structuralism, Phenomenology, Hermeneutics and Deconstruction). Themes include: philosophical method, epistemology, philosophy of language, philosophical psychology and ethics. Philosophers may include: Russell, Peirce, Sartre, Heidegger, Merleau-Ponty, Gadamer, Habermas, Foucault and Derrida.

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.

PHI442 Modern Arabic Thought (3 CH)

The course examines Arab philosophical, social, and political thought from the 19th century till the present time. It traces the motives, sources and developments that influenced Arab thought during that period. It uses analytic and historical perspectives to examine the prevailing theories, concepts and applications of modern Arab thought in both regional and global contexts and examines the work of a selection of key Arab thinkers in detail.

PHI461 Sustainability & Environmental Ethics (3 CH)

This course examines and discusses a selection of the basic texts for perceiving a "fragile" and exhaustible nature and environment. It critically examines key concepts of sustainability like the proclaimed "limits to growth" in the early 1970s, "ecological footprints," "management rules," the question of how far technology can be a substitute for nature, as well as ethical issues of sustainability, responsibility to nature and rights of future generations.

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.

Political Science

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).

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.

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.

Psychology and Counselling

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.

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 Biopsychology (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

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

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).

PSY521 Advanced Clinical Psychology (3 CH)

This course aims to provide students with knowledge and information in order for them to appreciate the scientific nature of clinical psychology, issues in critical thinking, contemporary training models in the field, and current research that affects practice, for example, the development of the DSM-V and prescription privilege debate. This course is aimed to launch the training career of both practice and research oriented students in a manner consistent with the contemporary developments and status in the field of clinical psychology. The syllabus will be customized to the needs of the local population adding case studies where possible.

PSY522 Cross-Cultural Issues (2 CH)

An examination of factors relevant to successful service provision to different populations within a culturally diverse society. Psychologist's characteristics and attitude are examined as well as strategies for developing cultural competence.

PSY523 Advanced Psychopathology (3 CH)

This course will focus on diagnosis and treatment of the major psychopathologies. Focus will be given to the DSM IV. Emphasis will be on the diagnosis, classification and etiology of major mental disorders most likely to be encountered in the mental health profession. The student will develop skills in identifying relevant information from interview and/or other sources in order to think like an effective clinician when considering diagnosis and treatment of mental/emotional disorders on the basis of DSM-IV criteria. Consideration will be given to how worldview issues impact the study of psychopathology.

PSY524 Personality Self-report Measures (4 CH)

This course presents the principles and practices of major objective (structure) personality instruments. 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. The course focuses on the MMPI , 16PF, and NEO-PI-R.

PSY526 Child & Family Therapy (3 CH)

This course will teach an integrative and ecological approach to family therapy that includes the whole family system in family meetings in assessment and planning. The course will include specific approaches for engaging and working with families with common problems due to developmental issues, and mental and physical health issues. There will be a special focus on working with children’s emotional and behavioral problems. Students will be introduced to recent developments in family therapy practice, including narrative and solution-focused approaches.

Prerequisites
- PSY521 with a minimum grade D
- PSY523 with a minimum grade D

PSY527 Intellectual Assessment (4 CH)

This course covers knowledge and skills relevant to the intellectual assessment. It explores the theoretical frameworks utilized in the development of cognitive assessment instruments and procedures, explains the administration, scoring, and interpretation of the most widely used intellectual assessment instruments..Specific emphasis is placed on interpretation and report writing using the normalized and standardized test to UAE population (e.g. WISC and Raven.)

PSY528 Psychotherapy: Theories & Techniques (3 CH)

This course surveys the theories and techniques of psychotherapy, including the psycho-analytic, behavioral, cognitive, and humanistic-existential approaches. Case studies, role plays, and in-class exercises will illustrate the principles of therapeutic change. The exercises often are experiential in that they encourage students to apply to their own lives the various concepts discussed in class. Students will also undertake an experiential project outside of class that will help them personally explore the psychotherapeutic process. This project is a contemporary version of an ancient practice known as the "vision quest." Participation in any of the experiential activities in this course is recommended but optional.

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 examines theories of gender as constructed or problematic, not natural or immutable. The historic development of theories of women's inequality and strategies for changes will be studied. Probes contemporary issues and conflicts within feminist and gender theory. The course forges understandings across divisions of race, class, nationality, ability, sexualities, and sexual orientation.

PSY623 Neuropsychology (3 CH)

Introduction to historical background of brain-behavior relationship. Focus upon brain pathologies and underlying brain structures: aphasia, alexia, agraphia, body schema disturbances, apraxia, agnosia, neglect syndromes, late and early onset dementias, frontal lobe syndrome, seizure disorders, and related brain syndromes.

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)

A survey of physiological and behavioral effects of the major classes of psychoactive drugs including therapeutic agents and drugs of abuse, side effects, teratogenicity and mechanisms of action.

PSY628 Master's Thesis (3 CH)

The master thesis will enable the student to obtain experience with all the phases of empirical research in clinical psychology and applying the knowledge and skills acquired in different course modules. The student selects a topic of interest and a personal supervisor from the range of ongoing research projects within the domain of the selected specialization. Master’s thesis must be empirical in nature. Literature review based thesis may however, be allowed in exceptional cases, e.g. when a student wishes not to pursue doctoral studies and is also involved in purely clinical practice. If a student is allowed to write a non-empirical thesis, the Thesis Committee Chair must seek written approval from the Department Graduate Program Committee. The thesis research topic should be approved by the student thesis committee. The program scientific committee will examine the proposal and discuss it with the student during a presentation.

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.

PSYC4294 School Mental Health (3 CH)

This course covers topics such as the concept of mental health; normal and abnormal behavior; adjustment; the role of teacher, curriculum and school system in providing and maintaining mental health; teacher selection; psychological services for students; and behavior problems in schools and how to deal with them effectively.

Social Work

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

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

Sociology

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.

SOC102 Social Theories (3 CH)

This course is an introduction to the nature and development of classical and contemporary sociological theory. It introduces students to the central ideas, concepts and arguments of the classical sociological writers such as Durkheim, Weber and Marx and the contemporary sociological theory such as Functionalism, Conflict theory, Symbolic Interactionism and Exchange. The course also examines the relationship between the development of Sociological Theory and social changes, the relationship between the classical sociological writers and the contemporary and the relationship between theory and social research methods.

Prerequisites
SOC101

SOC200 Social Research Methods (3 CH)

The course identifies the scientific approach and the principles of social research. It also attempts to demonstrate the relationship between social research and social theory and the roles of theory in the formulation of hypotheses. The course offers the students the opportunity to practice the steps of social research, data collection, and data analysis using advanced technology.

Prerequisites
SOC102

SOC201 Social & Cultural Change (3 CH)

This course deals with change as a human phenomenon. Basic concepts and theories of socio-cultural change are presented. Major changes that have occurred in different aspects of social life, with particular reference to Arab societies, will be examined. The course also focuses on global social changes & its impact on modern society.

Prerequisites
SOC101

SOC202 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.

Prerequisites
SOC101

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.

SOC301 Sociology of Development (3 CH)

This course explores central issues and matters of Third World development. It tackles various theories through examining important works of major thinkers in the field. Students will have the opportunity to study issues of great concern to the Third World in general, and to the Arab world in particular. This course will contribute to the development of students' critical thinking through the comprehensive suggested readings, and effective class discussion and participation.

Prerequisites
SOC101

SOC302 Urban Sociology (3 CH)

This course deals with urbanization and the formation of new communities in the world with special reference to Arab and Gulf Arab societies. The course discusses major theories of urbanization, types of urbanization, the urban way of life, and problems related to the urbanization process. The course also discusses other issues relevant to urban planning policies and the growth of modern cities.

Prerequisites
SOC101

SOC303 Bedouin & Rural Society (3 CH)

This course is designed to provide students with the scientific knowledge concerning structural and cultural characteristics of Bedouin and rural communities from a comparative point of view. The course offers topics on rural development and Bedouin resettlement, illustrated by examples from Arab society, the UAE society in particular.

Prerequisites
SOC101

SOC304 Demography (3 CH)

This course deals with history and development of population theories. It focuses on sources of population data. In addition, it provides the study of population structure (size, composition, and distribution), and population process (fertility, mortality, and migration) including world population problems and population growth trends, especially in the UAE.

Prerequisites
SOC200

SOC305 Industrial Sociology (3 CH)

In this course, students will be provided with the definition of industrial sociology, its beginnings and development, and its relationship with other social sciences. It also deals with industrial relations, some Industrial social problems, the social structure of industrial organizations, and the relation between industry and society.

Prerequisites
SOC101

SOC306 Population & Environment (3 CH)

The course is designed to study the relationship between population and environment and the impact of this relationship on personal and group behavior. It also studies environmental problems like desertification, environmental pollution, and food shortages. The effect of these problems on population characteristics will be studied. Population increase or decrease and the problem of providing services to meet changing demographics will be studied as well. (Prerequisite: SOC 304)

Prerequisites
SOC304

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

SOC308 Migration Studies (3 CH)

The course is designed to provide students with the concept of migration, the different theories that explain types of migration, and its role in forming the social structure. It further aims at examining the social, economic, and cultural effects of migration in both sending and receiving societies. The course discusses the impacts of migration at the international, Arabic & the Arab Gulf levels.

Prerequisites
SOC304

SOC309 Sociology of Organizations (3 CH)

This course discusses the beginnings and theoretical perspectives of organization. It provides a survey of important ideas to help in understanding and interpreting organizational problems, especially those related to social relationships in the organizations. The course will study how this affects social reality. Methods connected with the management of development projects as well as social welfare institutions will be also discussed.

Prerequisites
SOC101

SOC313 Sociology of 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

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.

SOC317 Social & Cultural Anthropology (3 CH)

This course deals with the emergence and development of social and cultural anthropology in terms of its theory, methodology, research topics, and sub-fields. It also looks at its relationship with the humanities and other social sciences. The course also investigates the application of social cultural anthropology in development & modernization. The application of social and cultural anthropology in areas of modernization and development processes are also examined. (Prerequisite: SOC 319)

Prerequisites
SOC319

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

SOC319 Anthropology (3 CH)

This course deals with the interactive relationship between the organic features of human being and his social features and his cultural production. The course discusses subjects that are related to the characteristics of human race, the diversity in human cultures and the impact of the existing communication among people on the present and the future of human race.

SOC324 Applied Sociology (3 CH)

This course explores the relationship between theory and practice in sociology. Students will learn about the ways in which sociological perspectives are used in various career fields. Students will be exposed to scenarios of sociological practice in various settings. They will be required to complete class projects.

Prerequisites
SOC200

SOC325 Sociology of Aging (3 CH)

This course focuses on the social and social-psychological aspects of later life. It will examine the stereotypes about and realities of growing old in the UAEU. The course discuses the sociological factors that are associated with treating and abusing elder people, in addition to reviewing methods of how to address Elderly problems. Social policies and social services will be studied. Students will compare aging in other societies.

Prerequisites
SOC304

SOC403 Research Project (3 CH)

This course provides students with the practical training to apply the sociological research methods to the study of social issues and problems. In this course, the student carries out a field study under the supervision of one of the department staff who will guide him/her in formulating, theorizing, and hypothesizing the research question, and collecting and analyzing the data using statistical programs.

Prerequisites
SOC405 or SOC407

SOC404 Internship (3 CH)

The internship in sociology is designed to provide an opportunity to apply classroom learning, to practice and enhance skills, to experience professional socialization, and to explore a career. It also serves as a vehicle for the student to become more aware of personal strengths and identify areas in which further growth is needed. (This course is conducted on 2 days/week during a complete semester. A maximum of 6 Cr. Hrs. of courses can be registered in the other days of the week).

Corequisites

SOC403 with a minimum grade D

SOC405 Assessment of Social Projects (3 CH)

The course deals with concepts, theories, and methods of the assessment and evaluation of social projects with a special emphasis on the following issues: the impact of projects on society and environment, the relevance of projects to societal needs and socio-economic development, the participation of local groups and communities in planning and implementation of social projects, and the common obstacles in the planning and execution of social projects. Students are expected to choose a social project from real life and attempt to evaluate it.

Prerequisites

SOC324

SOC407 Research Methods in Anthropology & Folklore (3 CH)

This course shows how anthropology and folklore work together in order to develop workable methods including collecting, classifying, and analyzing folklore data, for the purpose of studying traditional societies. It provides students with ethnographic or qualitative and quantitative methods dealing with various subfields of folklore including folk literature or verbal folklore, folk beliefs, folk performance and material culture. It provides students with ethnographic or qualitative and quantitative methods dealing with various subfields of folklore including folk literature or verbal folklore, folk beliefs, folk performance and material culture.

Prerequisites

SOC324

Translation Studies

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

Prerequisite
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.

Prerequisite
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.

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.

Prerequisites

GER100 with a minimum grade D

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

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.

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

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
KOR102 with a minimum grade D
KOR202 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
KOR301 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.

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.

College of Information Technology

Information Systems and Security

ECBP310 E-Commerce Principles (3 CH)

B2C and B2B e-commerce models; Electronic auctions; E-marketplace models; E-retailing; E-procurement; Electronic supply chains and related e-business processes.

Prerequisites
ITBP307

ECBP331 E-Commerce Lab I (1 CH)

The objective of this course is to covers E-commerce system design and implementation. Key technologies are used to develop an e-commerce dynamic website as well as an m-Commerce mobile application implementing the same features of the developed website. Web development technologies include JSP, JSF, XML, and Web services; however, mobile development technologies cover Android development environment, and HTML5

Prerequisites
ECBP310

Corequisites
ECBP411

ECBP401 E-Marketing (3 CH)

Basic marketing concepts and their application in an Internet environment; Consumer online behavior; Online customer relationship management; Characteristics of effective marketing websites; Using IT to turn channel conflict into channel synergy; Internet marketing research; Regulator issues of internet marketing.

Prerequisites
ECBP310

ECBP411 Mobile Commerce (3 CH)

Technologies, applications, services and opportunities accessible from mobile devices; Strengths, limitations, and opportunities of mobile devices; Mobile and wireless software and technology; Networking standards and regulations; Mobile data management and synchronization; Security issues; User interface design issues; Market development for mobile applications and value-added services; Location-based services.

Prerequisites
ECBP310

ECBP412 E-Services (3 CH)

The course aims at providing fundamental knowledge on the delivery of Electronic Services and their importance to society. It examines basics of e-governance, in addition to models of best practices in existing and emerging Electronic Services. A particular emphasis will be put on discussing the appropriateness of services for electronic distribution and the strategic importance of e-services. The course is organized alongside different key service sectors that are particularly important for our society and highly relying on IT. The service sectors discussed in this course will include (but are not limited to): E-Government, Finance, Banking and Health Care. A particular emphasis will be put on current practices and systems as well on future developments. Students will be able to discuss and reason about the strategic importance of such systems enabling e-services to the user. Students will learn about the determinants of service quality. Moreover, they will understand the IT dynamics of some key service sectors that are important for our society.

Prerequisites
ITBP307

ECBP413 E-Commerce Security and Payment Protocols (3 CH)

E-Commerce security concepts; Privacy; Typical protocols for electronic payment; E-commerce payment methods; Services of common authentication and payment protocols, such as SSL/TLS and SET; Public-key methods; Digital certificates.

ECBP425 Multimedia Systems (3 CH)

Design and implementation of technologies used to implement interactive multimedia applications such as streaming video playback, video conferencing, video editing, and hypermedia authoring; Digital media representations; Compression and synchronization; Implementation technologies including hardware architectures for media processing (e.g., processor, bus, and input/output devices); Operating System support; Multimedia systems services.

Prerequisites
CSBP316 with a minimum grade D

Corequisites
ECBP433 with a minimum grade D

ECBP432 E-Commerce Lab II (1 CH)

This course covers all aspects relating to the design and implementation of dynamic and interactive web sites using E-services and portal technologies. To achieve such an objective, this course will use different technologies (e.g., Java, .Net, SOAP/REST, SOA, WSDL, UDDI, etc.) to develop a portal made of integrated set of web services and Portlets. State-of-the-art electronic marketing concepts and designs will be used to develop the portal interface (e.g., G2C) and taking into consideration users' preferences and needs.

Prerequisites
ECBP412

Corequisites
ECBP401

ECBP433 Multimedia Systems Lab (1 CH)

This course covers Multimedia systems design and implementation. It introduces concepts related to the design, implementation, and production of interactive stand-alone and Web-based multimedia applications. Different technologies will be used for audio, image, and video manipulation. These include Adobe Flash, HTML5, Ajax, JavaFX, Java, and .Net. Also, this course will introduce multimedia systems design that integrates Multimedia information collected from many sources (Web (HTTP), live streaming, local server).

Corequisites
ECBP425

ECBP611 Fundamentals of Electronic Business (3 CH)

E-commerce is transforming every element of contemporary business. This course enables E-commerce developers to integrate a wide range of computing technology, business models and information system components. Salient models of e-commerce are reviewed as well as other related topics such as security, legal, ethical and social issues. This course also describes the various elements that comprise the IT infrastructure needed to support E-commerce including authentication and electronic payment mechanisms. A framework for analyzing and designing E-commerce Web applications is presented as well as customer behavior model and IT resources model.

ECBP612 Service Oriented Computing (3 CH)

Service-Oriented Computing (SOC), also known as Service-Oriented Architecture (SOA) is a computing paradigm that has been adopted by major e-business companies as well as government agencies for developing Web applications. The goal is to enable pervasive code reuse using standardization service interfaces and platform-independent run-time environments. Incorporated with the Internet and search engines, service discovery and service composition are inherent to SOC. In the future, the market will need more people who can use and compose services, rather than those who develop specific software applications. To meet this demand, the course introduces core SOC concepts, principles and methods. Quality and reliability of Web services are also discussed in this course as well as the business agility provided by adopting SOC to deliver IT flexibility promised by Web Services.

ECBP613 Business Process Management and Integration (3 CH)

This course provides an overview of Business Process Management (BPM) as both a management discipline and as a set of enabling technologies. Key concepts, methodologies and technologies in BPM are presented. A basic process definition is introduced as well as process modeling, analysis and design techniques. An overview of the tools and technologies used to support BPM including process modeling platforms is described. E-Business processes pertaining to supply chain management are also discussed and illustrated through case studies such as e-procurement. Other IT solutions used to automate Supply Chain Management (SCM) and coordination are discussed, including ERP (Enterprise Resource Planning) modules, which contribute to SCM integration

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.

ISBP301 E-Enterprise (3 CH)

Transforming a business firm into an electronic enterprise; Role of IT in enterprise processes; Potential IT capabilities to support business objectives and functions; Alignment of business and IT strategies and applications in a complex and evolving enterprise; Enterprise management e-services (information portal, e-business, e-procurement, e-finance and e-audit); Mobile technologies; Human factors (usability, web assurance and mental workload); Document management and workflows using XML and other web standards; Existing enterprise management applications.

Prerequisites

CSBP319 with a minimum grade D

ISBP309 Enterprise Information Systems (3 CH)

This course focuses on enterprise-level information systems, technologies, and infrastructures used by large organizations. The course provides the fundamental knowledge associated with the managerial, technological, and organizational issues of enterprise-wide information systems, which are beyond the traditional organizational boundaries. Course topics include: introduction to enterprise systems; enterprise systems architecture; systems integration; enterprise-wide information systems development life cycle; implementation strategies; software and vendor selection; pre- and post-

implementation; project management; organizational change and business process reengineering (BPR); global, ethics, and security management issues; supply chain management systems; and customer relationship management (CRM) systems.

Prerequisites
ITBP307

ISBP331 Business Integration Lab I (1 CH)

This lab is designed for students who wish to be functional implementers for the Oracle E-Business Suite as it covers the foundation concepts needed by the first level of ERP certification. Students will learn how to navigate within R12 Oracle E-Business Suite, explore the major architectural components, and try the features and benefits of Multiple Organization Access Control (MOAC). Students will practice defining Key and Descriptive Flexfields, identify shared entities across the R12 Oracle E-Business Suite, and learn the key features and benefits of Oracle Workflow.

Prerequisites
ISBP301

Corequisites
ISBP309
ISBP350

ISBP350 Enterprise Resource Planning (3 CH)

Principles and techniques for planning and managing resource use in organizations; ERP procurement, vendors (Oracle, SAP, etc.), framework, supply-chain management, demand management, inventory management, master scheduling, and material and capacity planning; Technology, architecture and implementation of integrated package solutions; Tools and functionality of leading ERP systems. Case studies and current trends.

Prerequisites
ITBP307

ISBP370 System Analysis & Design (3 CH)

Successful management of system development or enhancement projects for enterprise-level systems; Managing the system life cycle: requirements elicitation, logical design, physical design, testing, and implementation; System and database integration; Network and client-server management; Metrics for project management and system performance evaluation; Managing user expectations; Project staffing; Analysis of cost-effectiveness; Reporting and presentation; Managing both the behavioral and technical aspects of a project; Change management.

Prerequisites
ITBP307

ISBP431 Advanced Database Systems (3 CH)

Database design theory; Database queries; Storage and Indexing methods; Query Evaluation; Transaction Management and Concurrency Control; System Crash Recovery; Parallel and Distributed Databases; Data Warehousing and Data Mining.

Prerequisites
CSBP340 with a minimum grade D

Corequisites
ISBP432 with a minimum grade D

ISBP432 Advanced Database Systems Lab (1 CH)

The objective of this course is to provide a practical introduction to the participants of the functions of database administrator. The participants are introduced to a professional environment where advanced database systems topics like scalability, optimization, and efficiency of information management and retrieval are tested.

Corequisites
ISBP431

ISBP433 Business Integration Lab II (1 CH)

This lab is designed for students to get hands on experience on Knowledge Management (KM) through the application of Business Intelligence (BI) on real world problems. The ORACLE Business Analytics, which comprises of the Business Intelligence (BI) suite, will be introduced. Students will learn to use this tool for reporting, analysis, modeling, forecasting, and decision making. Besides, a special data mining open source tool, WEKA, will be introduced to get deeper interaction with state-of-the-art data mining techniques. Students will also learn to exercise Expert Systems through open source tools such as CLIPS.

Corequisites
ISBP440
ISBP455

ISBP440 Business Intelligence (3 CH)

This course introduces students to the concepts of Business Intelligence and Decision Support. The course will provide an opportunity for students to explore the role of Business Intelligence in the decision making of business organizations and the types of decision support systems used. The course covers topics including: Design of Decision Support Systems; Data Mining for Business; Web Mining; Collaborative & Group Support Systems; Knowledge Management; Expert Systems

Prerequisites
CSBP340 with a minimum grade D

ISBP455 Knowledge Management (3 CH)

Working from a multidisciplinary perspective, this course introduces key concepts, tools, and techniques from sociology, cognitive science, content management, knowledge engineering, cybernetics, organizational behavior, change management, and information science into a three-level approach to understand Knowledge Management from the individual, community, and organization levels. Using clear illustrations, the course integrates theory and practice to provide students with a comprehensive and practical knowledge management skill set

Prerequisites
ISBP301

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.

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
ISEC311

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

ITBP103 Principles of Information Technology (3 CH)

Overview of IT; IT Related Disciplines: Intelligent Systems, Software Systems, Information Systems, Computer Systems, Networking, E-Business and Information Security; IT Application Domains; Overview of Computer Systems; Networks and the Internet; Abstraction, Modeling and Programming; Information Management; Software Systems Development Methods; Web Enterprise Systems and Technologies; Artificial Intelligence; Social and Ethical Issues that Regulate the Use of Computers.

ITBP261 Speaking And Writing (3 CH)

Oral and written communication; Coaching and practice in organizing presentations, proposals, manuals, documentation, briefings, executive summaries, business communications; Standard formats; Exercises in writing and speaking in different styles for different audiences and moods.

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

ITBP307 Information Systems Fundamentals (3 CH)

Introduction to Information Systems; Information Systems in organizations; organizing data and information; business information systems; overview of Electronic Commerce; transaction processing and Enterprise-Wide Systems; information and Decision Support Systems; systems analysis, design, implementation and maintenance; Information Systems development and acquisition; Database Management Systems.

Prerequisites

CSBP219 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
GEIL101 with a minimum grade D or 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 or NEBP310 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.

ITBP498 Independent Study (3 CH)

Research and analysis of selected problems and topics in the major. Arranged with an instructor. May be repeated once with a substantially different topic.

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.

SECB310 Cryptographic Algorithms & Protocols (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

- CENG202 with a minimum grade D
- CENG210 with a minimum grade D

SECB331 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

Corequisites
SECB405

SECB358 Network Border Control (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

SECB405 Security Protocols for Internet & E-Commerce (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
SECB310

Corequisites
SECB331

SECB408 Secure Mobile Code (3 CH)

In this course, students will be subjected to various information security aspects related to how mobile codes can be the cause of several system and software vulnerabilities and threats and protection mechanisms to apply as countermeasures. Topics cover will include: Manifestations of mobile-code based models and mobile agents; Vulnerabilities; Security

threats and problems; Protection techniques: protecting the host, protecting the mobile code, language-based protection; Specification, design and development of secure systems involving mobility.

Prerequisites
ITBP301

SECB425 Security Architecture & Mechanics (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 architectures 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
ITBP301

Corequisites
SECB433

SECB432 Networks 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
SECB455

SECB433 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
SECB425

SECB451 Policy Criteria & Evaluation (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
ITBP301

SECB455 Intrusion Detection & Response (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 mainly 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
SECB358

Corequisites
SECB432

SECB499 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

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

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,

Prerequisites
ENGU1404 with a minimum grade D

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

CENG313 Multicore Computing (3 CH)

Multicore processor architectures, implications of hardware designs, software challenges, emerging technologies relevant to hardware and software for multicore systems. Multicore microprocessors, memory hierarchy, scheduling, memory models, synchronization, transactional memory, concurrent data structures, debugging, and performance analysis.

Prerequisites

CENG221

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

CENG326 Entrepreneurship for Computer Engineers (3 CH)

This course develops students' innovation and entrepreneurship foundation skills by examining the functional roles of the business/commercial aspects of computer engineering as well as establishing a basis for innovative thinking. Basic knowledge and understanding of economic, sociological, psychological and managerial theories of enterprise creation and development Specific cases where innovation and entrepreneurship has resulted in new products innovation and new enterprise development will supplement course materials.

Prerequisites
MATH105

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 D
Pre/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)

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.

CSEB300 Computer Architecture (3 CH)

Instruction set architecture; Arithmetic and Logical Unit, memory, I/O, control, and data conversion operations; Interrupts and exceptions; Data path design; Pipelined execution; Computer Performance; Cache and DRAM memories; Buses and hard disks. Develop and debug assembly language programs and simulate specific processor components.

CSEB310 Digital Design with HDL (3 CH)

Introduction to digital design with a hardware description language; Field Programmable Gate Arrays and complex programmable logic devices; Finite state machine design; CAD tools for field programmable gate arrays and programmable array logic; Parallel and serial input/output techniques; Behavioral, schematic, and net list description of digital systems.

CSEB321 Hardware Testing and Fault Tolerance (3 CH)

Faults and fault models, Reliability, Availability, MTTF, MTBF; Reliability block diagrams; Redundancy techniques; Error detection and correction in memory, buses, networks, and execution units; Testing of digital and combinational circuits; builtin self test (BIST), scan techniques and JTAG; RAS techniques in modern computer systems.

Prerequisites
CSEB300 with a minimum grade D
CSEB310 with a minimum grade D

CSEB332 Digital Design with HDL Lab (1 CH)

Experiments and projects utilizing the hardware description language, EDA software tools, soft-core processor and FPGA devices to design, synthesize, simulate, implement and test digital systems.

Prerequisites
Pre/Co CSEB310 with a minimum grade D

CSEB400 Platform Architecture & Technology (3 CH)

Modern personal computer platforms with emphasis on x86 instruction set architecture and x86 motherboard organization; Real and protected modes; x86 registers and instructions; Addressing modes; Software and hardware interrupts; Programmable interrupt controller; MMX and SSE instructions; Microcomputer bus, memory and I/O interfaces; Wait states and platform virtualization; Laboratory assignments consist in developing x86 assembly programs.

Prerequisites
CSEB300 with a minimum grade D

CSEB425 Embedded Systems (3 CH)

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); PineDSPCore and OakDSPCore DSPs; Differences in the architectures, functions, and applications of these DSPs.

Prerequisites
CSEB300 with a minimum grade D
CSBP119 with a minimum grade D

CSEB433 Embedded Systems Lab (1 CH)

Experiments using practical implementation of the building blocks of a microcontroller including timers, counters, PWM, data interrupts, I/O techniques and requirements, A/D conversion, serial communications. Experiments to explore the design of control software, system design process using hardware-software co-design process and general issues in digital signal processors (DSPs).

Prerequisites
Pre/Co CSEB425 with a minimum grade D

CSEB440 Software Integration (3 CH)

This class covers these concepts: Integrative programming techniques; Scripting languages such as C Shell, Bash and Perl; Programming assignments to integrate software packages and reformat input/output data.

Prerequisites
CSBP119 with a minimum grade D
CSBP315 with a minimum grade D

CSEB450 Introduction to Robotics (3 CH)

In this course, the students are introduced to robots and their building blocks. The emphasis of this course is on practical application of robots. The students build robots that follow the programmed tasks and are able to interact with other robots. Their activities may include: fetching an object; following a light source; finding the way through a maze; playing with other robots; overcoming an obstacle course. The course helps in developing a variety of skills among students, for example, persistence, open-minded problem- solving, creativity and team-work.

Prerequisites
CSEB425 with a minimum grade D
CSBP119 with a minimum grade D

CSEB499 Special Topics in CSE (3 CH)

Advanced and emerging topics of special interest to undergraduates. May be repeated once with a substantially different topic. . To be taken in final semester of senior year.

NEBP310 Network Protocols (3 CH)

Class-full addressing, classless addressing, and sub-netting; Delivery and routing of IP packets; Address resolution: ARP and RARP; IP protocol; Network troubleshooting: ICMP; Network design and performance; User datagram protocol (UDP); Transmission control protocol (TCP); Routing protocols: RIP, OSPF, and BGP. BOOTP, DHCP and DNS.

Prerequisites
CENG210 with a minimum grade D

NEBP331 Network and Security Protocols Lab (1 CH)

This laboratory provides a series of hands experiments on computer networking ad network security. In this lab, students will learn how to carry basic router and switch configurations necessary for the design and deployment of basic networking and security infrastructure. The topics covered in this lab include designing and setting up subnets, configuring routing tables and running routing protocols, establishing secure communications, troubleshooting common networking and security problems.

Prerequisites
Pre/Co NEBP361 with a minimum grade D

NEBP361 Network Security Protocols (3 CH)

Principles of computer and network security with emphasis on network security architectures using firewalls, virtual private networks, VLANs, access control lists and protocols such as IPSEC and L2TP; Web security (SSL SSH, TLS), secure electronic transaction protocol (SET), intrusion detection systems (IDS) and WLAN security.

Prerequisites
NEBP310

NEBP371 Network Management & Analysis (3 CH)

Network management and protocols such as SNPM, CMIP and RMON as well as traffic analysis and network performance evaluation software systems; Reliability concepts; Architectures for system observation and control; System utilization and traffic classification; Network management tools.

Prerequisites
NEBP310 with a minimum grade D

NEBP421 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
NEBP310 with a minimum grade D

NEBP432 Wireless Networks Lab (1 CH)

Principles of radio communications; Introduction to terrestrial and satellite radio links. Mobile communication systems; Wireless network architectures and protocols; Principles of

wireless sensor networks (WSNs); Introduction to hardware and software systems associated with WSN; WSN applications and communication protocols

Prerequisites

Pre/Co NEBP441 with a minimum grade D

NEBP433 Advanced Networking Lab (1 CH)

This laboratory provides a series of hands-on experiments in scalable IP networking and QoS control in support of advanced services such as VoIP and video streaming. In this lab, students will learn how to select optimum networking solutions as well as strengthen their skills in configuring, testing and troubleshooting as well as the design and deployment of scalable IP networking infrastructure. Furthermore, students will gain the knowledge in QoS control and network management through a laboratory project. The topics covered in this lab include VLAN, STP, EIGRP, OSPF, BGP and different QoS control approaches.

Prerequisites

Pre/Co NEBP470 with a minimum grade D

NEBP441 Wireless and Mobile Communication (3 CH)

Transmission fundamentals; Principles of radio communication systems; Introduction to terrestrial and satellite radio links; Channel capacity; RF Spectrum, multiplexing and switching; Signal encoding and modulation techniques; Antennas, propagation and signal encoding; 802.11 (wireless Ethernet); 1G, 2G, and 2.5G wireless systems (AMPS, GSM, GPRS, EDGE, etc.); Spread spectrum approaches; Coding and error control; Satellites, cell phones; Wireless services; Mobile IP, WAP.

Prerequisites

NEBP310 with a minimum grade D

NEBP460 Network Application Software (3 CH)

The client-server model and related APIs; Concurrency and multi-threaded applications; Hypertext transfer protocol (HTTP); Common gateway interface (CGI); Remote method invocation (RMI); Architectural view of CORBA; Java IDL and CORBA; XML and XSLT; SOA Architecture; Web services.

Prerequisites

NEBP310 with a minimum grade D

NEBP470 Network Design and Implementation (3 CH)

Network planning and design; Network emulation and implementation quality of service networking (QoS) and integration of network technologies to design and build networks based on specific requirements; Network migration techniques; Configuration of networking hardware devices (routers, firewalls and switches); Network performance and troubleshooting.

Prerequisites

NEBP310 with a minimum grade D

NEBP472 Wireless Sensor Networks (3 CH)

This course provides an introduction to Wireless Sensor Networks (WSNs) and their design issues and strategies at the various layers of the networking stack. Sensor architecture and design. Medium access control (MAC), routing, and transport layer techniques in WSNs. WSN operating system model, and services. Sensor data management. RFID technology. Projects and experiments designed to setup and configure sensors and WSNs for use in latest applications such as sensor/actor networks, underwater and video sensors.

Prerequisites

NEBP310 with a minimum grade D

NEBP473 Internet Architecture (3 CH)

This course covers the major networking solutions that are currently used in support of the global Internet. The course includes the following topics: xDSL, Cable Modem and EPON/GPON for Internet access technologies; the Internet routing architecture, including Border Gateway Protocol (BGP), buffer control, QoS and traffic aggregation; architecture, design and implementation of large ISP networks; topology selection criteria, capacity planning, network configuration and traffic engineering.

Prerequisites

NEBP310 with a minimum grade D

NEBP499 Special Topics in Network Engineering (3 CH)

Topics of special interest to undergraduates; may be repeated once with a substantially different topic.

NEBP641 Broadband and Wireless Networks (3 CH)

This course is designed to provide in-depth knowledge of wireless and broadband communication principles and cover new technologies in this domain. Topics covered include radio propagation channel characteristics and models, modulation and coding multiple access techniques for wireless systems, broadband wide-area network (WAN) technologies such as MPLS, IPv6, Gigabit Ethernet, broadband access technologies. Other topics include: GSM communication networks; 3G networks, WiMaX and LTE. Moreover, an over view of wireless network security will be covered.

NEBP642 Network Design and Management (3 CH)

The course covers the principles and techniques of network management, including network planning, implementation and deployment. The topics of this course include: network analysis and design tradeoffs. The course helps identifying and applying the services and performance levels that a network must satisfy criteria like capacity, delay, reliability, maintainability, availability, and supportability. The techniques and tools used for this purpose include Simple Network Management Protocol (SNMP) and Remote Monitoring (RMON).

NEBP643 Mobile and Pervasive Computing (3 CH)

This course provides in-depth coverage of research topics dealing with pervasive and ubiquitous mobile computing, which includes a newer class of computing devices, architectures and platforms. The topics include an introduction to pervasive devices and their applications, an overview of the key technologies, protocols, the Wireless Access Protocol (WAP), pervasive web application architecture, and audio/video support. In addition, the course will cover new and promising areas of research in the design and analysis of Mobile Ad Hoc Networks (MANET), Wireless Sensor Networks (WSN), and Wireless Mesh Network (WMN) platforms, models, and protocols.

NEBP644 Network System Software (3 CH)

This course provides an understanding of software techniques in developing communication systems and network applications. The course explores development models that address broad range of issues in the design of network software including hardware and software partitioning, layering, and network programming techniques. Other topics are communication resource managements and multi-board communications software design. Communication middleware and agent technologies as enabling technology in networking will also be covered. Additional topics of current industry trends and technologies will be introduced. In addition to the traditional class lectures, students will have the opportunity to earn hands-on knowledge and implementation experiences via the course project.

NEBP645 Network Services and Applications (3 CH)

This course covers the technical aspects for converged communications systems. The main topics include: image and video compression standards such as JPEG 2000 and MPEG-4, H.264, audio compression techniques, VOIP protocols such as SIP and MGCP, communications requirements of converged systems, such as synchronization, quality of service; the architectures and protocols associated with multimedia communications networks like real-time transport protocols. Other topics include protocols such as, RTP/RTCP and VOIP associated security issues.

NEBP647 Special Topics in Network Engineering (3 CH)

The content of this course is customized on every offering depending on current trends and interests.

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.

Prerequisites
ENGU1404

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

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

ITBP219 with a minimum grade D
Pre/Co ITBP221 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

CSBP331 Artificial Intelligence and Robotics Lab (1 CH)

CSBP 331 Artificial Intelligence Robotics Lab is about applying the AI, and related subject-matter knowledge in a practical way by means of a robotics embodiment. We use 45544 LEGO MINDSTORMS Education EV3, Arduino UNE / MEGA and Nao Robot. This is a hands on course where students are expected to assemble and operate robots

Prerequisites

Pre/Co CSBP301 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

CSBP412 Introduction to Engineering and Design (3 CH)

The focus of the Introduction to Engineering Design course is to expose students to design process including: research and analysis, teamwork, communication methods, impact of engineering solutions on society, engineering standards, and technical documentation, with emphasis on topics specific to computer science and software engineering. The course offers the students the opportunity to develop skills and understanding concepts through activity, projects and problem-based learning.

Prerequisites
ITBP103 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

CSBP432 Computer Graphics Lab (1 CH)

This is a lab course to learn to use tools to create Computer Graphics. Computer Graphics Lab is about applying Computer Graphics and related subject-matter knowledge in a practical way by means of a practical hands-on lab projects. You will use the industry standard Unreal engine to gain knowledge on how to apply computer graphics methods and techniques to produce games, special effects and simulations.

Prerequisites
CSBP319 with a minimum grade D

CSBP433 Intelligent Systems Studio (1 CH)

Intelligent systems are increasingly becoming relevant to daily life. There is a demand in the market to develop intelligent systems that are autonomous, flexible and intelligent. This project-based course introduces techniques for developing intelligent systems to solve practical problems. Students will work on a project to develop intelligent systems.

Prerequisites
CSBP432 with a minimum grade D
CSBP331 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

CSBP492 Computer Science Project Lab (1 CH)

This lab focuses on defining and implementing computer science projects. At the end of the lab the students will design, develop and test a software application that implements aspects of computer science approaches.

Prerequisites
CSBP319 with a minimum grade D

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.

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.

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

SWEB319 Software Design (3 CH)

The course covers approaches, concepts, and notations for the design of small-to-medium sized software systems. Design approaches include function oriented (Data Flow Oriented)

and object oriented (e.g., Unified Modeling Language, UML). It focuses on fundamental design concepts, such as abstraction, refinement, modularity, information hiding, and reusability. The course introduces also design principles that promote design quality such as degree of coupling and cohesion. The coverage of design notations focuses on graphical representations, such as Data Flow Diagrams (DFD) and UML diagrams. Structural and behavioral design are elaborated in the context of object-oriented analysis and modeling. Other topics that are covered include software architecture design and design patterns.

Prerequisites
SWEB300
Pre/Co SWEB331 with a minimum grade D

SWEB320 Formal Methods and Models (3 CH)

This course covers formal software specifications using the Z approach and the Z notation. The role and importance of formal specifications are described. A brief review of logic, set theory, and relations is used to emphasize the formal foundations of Z. The Z notation is thoroughly covered in gradual stages. At each stage, examples are used to illustrate the power and formality of the Z approach. The various Z approach concepts include the specification process, specification structure, types, relations, functions, schemas, and other advanced operators. The Z syntax checker is used to check specification examples developed in class. A simple example of data refinement is elaborated to highlight the transformation from specifications to code. Other specification methods are briefly described to show the diversity of specification models.

Prerequisites
SWEB300 with a minimum grade D
CENG202 with a minimum grade D

SWEB331 Software Analysis & Design Lab (1 CH)

The complexity of modern software systems requires the use of modern techniques for their specification and realization as well. The course provides hands-on practices in system analysis and design perspectives. The Lab starts with the process of capturing, defining, analyzing and documenting software requirements. Then the lab introduces the role of design in the Software Life Cycle and hence the process of developing the static structure and the dynamic behavior of the intended software system. The course will attempt to discuss rapidly changing software tools within the context of their category and their availability as commercial products. The objective is that the topics covered should remain meaningful, even after the current generation of tools is obsolete.

Prerequisites
Pre/Co SWEB319 with a minimum grade D

SWEB401 Reuse and Component-based Development (3 CH)

The course covers the methods and techniques for constructing large-scale software systems from preexisting components. Students learn how to build, specify, locate, and integrate components. The course focuses on topics that include component models, component architectures such as Service Oriented Architecture, distributed computing (Remoting/RMI), and other emerging relevant topics. Students must finish a term project in which multiple components are integrated and deployed.

Prerequisites
SWEB320 with a minimum grade D

SWEB423 Software Testing & Quality Assurance (3 CH)

This course introduces the concepts and techniques of testing and assuring the quality of software. It provides to learn practical ways to design high quality tests during all phases of software development. Students learn the theory behind black-box testing and white-box testing and to apply that theory in practice. The course introduces software reliability and the main characteristics of software quality. Topics include testing process, test design, equivalence partitioning testing, boundary value analysis, control flow graph, statement coverage, branch coverage, path coverage, condition coverage, regression testing, software testing and reliability, software quality assessment and assurance.

Prerequisites
SWEB300 with a minimum grade D
Pre/Co SWEB433 with a minimum grade D

SWEB432 Software Implementation Lab (1 CH)

The course focuses on the software implementation phase. It uses various strategies for constructing and implementing software systems. The course provides hands-on experience for reusing software components. The course concepts are reinforced in weekly laboratory exercises. A term project serves as a capstone of the course.

Prerequisites
SWEB319 with a minimum grade D
SWEB331 with a minimum grade D

SWEB433 Software Testing Lab (1 CH)

Description: Software testing lab underlines fundamental concepts of software testing and develops an expertise of how-to-do for future software testers. The lab focuses on delivering testing Plan, test cases and test suites. Most of the lab sessions will be dedicated to apply techniques and tools to test software units. The lab exercises will use test beds from different programming language. In particular, test beds will include student-implemented code. This will provide immediate feedback to the students and help him/her to avoid program errors

Prerequisites
SWEB432 with a minimum grade D
Pre/Co SWEB423 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

SWEB499 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, and critiquing current literature. Summarizing, surveying, and presenting this state-of-the-art allow the students to understand research approaches, themes, and directions.

Prerequisites
SWEB300 with a minimum grade D

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.

SWEB797 Special Topics in Software Engineering (3 CH)

The content of this course is customized on every offering depending on current trends and interests.

College of Law

Islamic Studies

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.

Prerequisite
ARBU1402

ISLM110 Hadith Studies (3 CH)

This course is intended to show the importance of the study of Hadith in preserving Sunna, and to acquaint students with the principles of this science and its basic terminologies. The course touches upon such topics as basic terms and definitions and the basic-sub-disciplines of Hadith such as: criticism of authorities, etiology, variant Hadith, and transmission of Hadith; and the kinds of Hadith.

Prerequisites
ARBU1402 with a minimum grade P

ISLM111 Qur'Anic Studies (3 CH)

The course aims at acquainting students with the Holy Qur'an, the stages and occasions of its revelation, the principles of its recitation and its variant readings, its impact on Arabic and Islamic culture, the inimitability of the Qur'an, and a brief survey of the history of its interpretation.

Prerequisites
ARBU1402 with a minimum grade P

ISLM112 Fiqh Of Sira (3 CH)

This course aims at acquainting students with all aspects of the prophet's personality and his method in spreading Islam. It also provides an analysis of the various stages of the prophet's life: the period before the call to prophethood, the period in Mecca and then in Madina, with all the events that occurred thereafter until his death.

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.

Prerequisites

ARBU1402 with a minimum grade P

ISLM202 Islamic Doctrine (3 CH)

This course explains the basic doctrines of Islam and its views on pillars of Islam namely divinity and prophet hood. It provides arguments for these doctrines and refutes all attempts at casting doubts on them. The course also stresses the importance of belief in life and of absorbing the spirit of Islam in theory and practice.

ISLM203 Analytical Interpretation (3 CH)

This course is intended to explain the concept of analytical interpretation which is based on analyzing Qur'an texts and understanding their linguistic and rhetorical features. The course illustrates the inimitability of the Qur'an through the study of its style, structures, and variant readings. The verses of the Qur'an will be related to their historical context.

Prerequisites

ISLM2303 with a minimum grade D

ISLM206 Studies in Hadith (3 CH)

This course covers Selections from (Hadith) :sayings of the Prophet Mohamed (peace be upon him), in which students analyze these conversations interpreting its meaning, , and the need for it in our Islamic Teachings , values and morals contained therein, as well as the analysis focuses on the educational applications in the Hadith.

Prerequisites

ISLM110 with a minimum grade D

ISLM207 Morals & Education in Islam (3 CH)

This course aims at acquainting students with the moral principles on which Islamic education is founded. It shows how all Islamic disciplines are based on these principles, and studies the objectives of Islamic education and educational methods.

ISLM304 History Of Religions (3 CH)

This course aims at acquainting students with the history of scriptural and idolatrous religions in order to differentiate between their doctrines and principles. Special attention is given to Judaism and idolatrous religions such as Brahmanism, Buddhism, Confucianism, and Sikhism.

ISLM305 Selected texts from the Quran and Sunnah (3 CH)

This course includes two themes: the first theme: texts of the Qur'an: which includes texts on the Quranic verses from Surah (alnaas) until surah (Ma'un) In addition to some text that contain a social morality such as authorization (Surat Al-Nur verses 21-34), and worship (Baqarah 253-286), and manifestation of blessings of Allaah (Al anaam verses 1-85). The second theme: the texts of the Sunnah: which studying hadith will be in the first cycle of basic education: from first grade to fifth.

Prerequisites
ISLM110 with a minimum grade D
ISLM2303 with a minimum grade D

ISLM333 Figh of Islamic Da'wa (3 CH)

This course deals with the determination of the concept of the Call to Allah: its objectives and characteristics, and the importance of the Fiqh of the Islamic Call in the Muslim life. The course also concentrates on the study of the foundations and bases of Islamic Call, the rules connected to governing good actions and prohibiting reprehensible actions (amr bil-ma'ruf wa nahy 'an al-munkar), and the best procedures to fulfill these aims. The course also deals with the most important Foundations of Call in Islam, and selects certain texts of the Qur'an, Sunna and Scholars' sayings to be studied and analyzed, in order to derive values of Call from them.

ISLM473 Mordern Islamic Legal Issues (3 CH)

The purpose of this course is to introduce the student to comparative jurisprudence form the point of view of the subject matter of the comparison, its inception, the reasons for disagreement of the jurists, the methods for giving greater weight to one jurisprudence over the other. It includes a comparative study of some jurisprudential topics such as fasting, almsgiving, personal ceses, transactions, punishment and the rules of evidence.

Prerequisites
SHAR112 with a minimum grade D

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.

Prerequisites

ARBU1402 with a minimum grade P

SHAR205 Principles of Islamic Jurisprudence (Fiqh) 1 (3 CH)

This course mainly deals with an introduction to the principles of Fiqh and its subjects, and the various schools of thought. It covers the legal sayings in its two kinds- procreative and practical. These aspects are dealt from the view point of the researchers, governor, governed by, governed on, Ejtehad, and the tradition that are related.

Prerequisites

SHAR112 with a minimum grade D

SHAR2073 Personal Status (1) (3 CH)

This course covers the study of marriage, its status and essence in Islamic law. Special emphasis is given on the concept of engagement, on various conditions of marriage contract and the rights of each spouse. The entire study is made in light of the UAE Personal Status Law and its implementations.

Prerequisites

SHAR112 with a minimum grade D

SHAR208 Family Regulations in Islam (3 CH)

This course covers the study of marriage, its importance and the rules governing it. It touches upon such topics as betrothal and its obligations; conditions of the marriage contract; obligations ensuing there from; the rights of husband and wife; divorce and its constraints and conditions; the difference between divorce and dissolution of contract; permissibility of divorce; kinds of divorce; divorce by single will, mutual agreement or with the approval of the judge.

SHAR3213 Personal Stutes (2) (3 CH)

The course covers the study of definition of divorce and legitimacy of divorce, and it further includes the rules and philosophy of divorce in Islam, compared with the divorce in former canons. The course adequately covers various types of divorce, like; - Legal (conventional) & heretical, revocable & irrevocable, accomplished & suspended (conditional). It includes qualifications required to be satisfied, in divorce and for a divorcee. The study relating to the effects of divorce, other forms of marital separations,

rights of children and relatives for alimony upon divorce/separation are dealt with in the light of the UAE Personal Status Law and its various implementations.

Prerequisites
SHAR2073 with a minimum grade D

SHAR3262 Personal Status (3) "Heritage" (2 CH)

The study deals with 'An introduction to inheritance and succession in the Pre-Islamic Period and its legality in Islam. It covers the basic elements of inheritance, its conditions, impediments and rights of share holders. Various aspects covering "rightful heirs, kindred inheritance, diminution, screening, maternal kinship, treasury, and fetus inheritance rights are adequately covered. The course also includes studying the compulsory legacy (legally).

Prerequisites
SHAR112 with a minimum grade D

SHAR3283 Hudood in Islam (2 CH)

The course revolves around the philosophy of Hudood. It covers the definition of Hudood, distinction between Hudood and Ta?azeer, and various categories of Hudood, such as, the adultery, accusation of adultery, drinking of liquor, theft, armed robbery, apostasy, and transgression. The focus of the study would be on the application of Hudood in the Federal Criminal Law in the United Arab Emirates.

SHAR3363 International Relations in Islam (2 CH)

This course includes an introduction to the Government system in Islam and the concept of International Relations in Islam. Regulations of relationship between States in Islam; which includes both the relations in times of peace and in times of war are covered under this course with a special emphasis on the comparative study of related instruments of International Conventions.

Prerequisites
SHAR112 with a minimum grade D

SHAR402 Principles of Islamic Jurisprudence (Fiqh) 2 (3 CH)

This course deals with the Introduction part of Islamic Jurisprudence and involves interpretation of religious provisions, and the importance of such interpretation in the legal and religious fields. The evidence of pronunciation and its sections are included as a part of the study in this course.

Prerequisites
SHAR205 with a minimum grade D

SHAR4413 Retribution and Blood Money (2 CH)

The course includes the study of the importance of 'protection of life as the fundamental objective of Sharia'. The course deals mainly with the definitions of various crimes affecting human life and their punishments; such as; definitions of the offences of murder, manslaughter and unintentional manslaughter and their punishments, various offences of felonies affecting the human body and their punishments and lastly, the offence of feticide (murder of fetus).

Prerequisites

SHAR112 with a minimum grade D

SHAR4463 Legecy and Mortmain (Waqf) (2 CH)

The course focuses on the study of "Optional Legacy, its definition and Probate, its basic elements", and deals with the terms of validity; its correlative terms and pertinent rules and nullity of will. The study also includes the definition of endowment, its legality, its classification, types, and their basic elements. The conditions and rules relating to endowment and termination of endowment are also adequately dealt with, in the course.

Prerequisites

PRVT1052 with a minimum grade D

SHAR452 Shaira Studies for Islamic Banking Operations (2 CH)

The course covers banking deposits, banking transfer, current account, bank guarantees, transactions on commercial papers and securities, speculation and partnership from an Islamic prospective.

Prerequisites

PRVT227 with a minimum grade D

SHAR477 Transactions Jurisprudence (3 CH)

It covers the study of definition of money and its types, procession and its types, easement rights, causes of full procession, contract and its topics.

Prerequisites

SHAR112 with a minimum grade D

Private Law

INTL6101 World Trade Organization Agreements (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. Key topics also include statutory forms of relief from unfair import competition (such as antidumping), and regional trade agreements (i.e., free trade agreements and customs unions), such as the Gulf Cooperation Council (?GCC?) and free trade agreements with the United States and European Union. This course involves intensive study of GATT-WTO legal texts, as well as regional trade agreements, plus jurisprudence (case law) from the WTO Appellate Body. The course also considers economic and policy rationales for and against trade liberation, and globalization generally. The course is taught in English.

INTL6102 Internation Commercial Law (3 CH)

This course covers the transactional aspect of the sale of goods across national boundaries. The focus is on private international business transactions, with three main parts: the sale of goods; the contract of carriage; and trade finance. Among the subjects covered regarding the sale of goods are contract drafting, documentary sales, commercial terms, electronic commerce, agency and distributorship, and contract performance. Attention is paid to INCOTERMS (promulgated by the International Chamber of Commerce), specifically, standard contract terms like FOB and CIF, and to the 1980 Vienna Convention on Contracts for the International Sale of Goods (?CISG?). With respect to the contract of carriages, topics including leading regimes for transport documentation, and insurance of goods in transit, such as the Hague-Visby and Hamburg Rules. As for trade finance, different arrangements for funding cross-border sales, such as bills of exchange and commercial and standby letters of credit, as well as applicable rules such as the Uniform Customs and Practices for Documentary Credits (?UCP?), are examined. Methods to guarantee payment, including sureties, promissory notes, and performance guarantees are discussed. Throughout the course, attention is paid to the risk and benefits associated with each type of contract of sale, carriage arrangements, and payment mechanism. Emphasis is also is placed on the different sources of international commercial law, including customs and practices and the law merchant. The course is taught in English.

INTL6103 Foreign Direct Investment (3 CH)

This course examines the legal and economics aspects of international investment. Topics include the structure of investment, such as joint ventures, agencies, branches, franchises, and subsidiaries, and the financing of investment, that is, project finance (which encompasses structures for owning, developing, construction, buying, transferring, and pay for infrastructure and other projects). Significant attention is paid to the conduct of investors, as established by corporate codes of conduct and anti-corruption rules, and to

special methods for attracting investment, exemplified y the Dubai International Financial Center (DIFC) and free zones such as Jebel Ali. Accordingly, salient features of free zones (such as tax benefits, technical standards, (permanent and temporary exit of goods, employment relations, customs supervision and control) are studied. Topics also include expropriation, and compensation formulae for expropriated assets, as well as national security implications of foreign investment. A general overview of tax issues (especially transfer pricing), and labor issues (particularly pertaining to hiring and treatment of expatriate workers), is provided. Among the legal documents studied are draft multilateral agreements on investment (MAIs), bilateral investment treaties (BITs), and sample private investor arrangements. The economic costs and benefits associated with investment from overseas, including the impact of such investment on income growth and local culture, are considered. Taught in English.

INTL6104 Advanced International Trade Law (3 CH)

This course covers not only advanced aspects of the multilateral and regional legal regimes governing importation of goods, but also the legal frameworks relating to cross-border trade in services, and intellectual property protection. Thus, the course examines remedies against unfair foreign trade practices, especially countervailing duties to offset subsidies (both pre- and post- privatization), and remedies against fair foreign competition, namely general and special safeguards. The course further deals with trade remedies to protect intellectual property rights against infringement. Special economic sectors, such as agriculture and services, are examined in depth. Significant attention is paid to linkages, that is, issues linking trade and labor, trade and the environment, trade and human rights, and trade and culture. Such issues also include trade and national security, which encompasses export controls and sanctions. On e ach topic, economic and policy rationales are debated, with considerable attention given to perspectives of Islamic countries, developing and least developed countries, and special and differential treatment. This course involves intensive study of GATT-WTO legal texts, as well as regional trade agreements, plus jurisprudence (case law) from the WTO Appellate Body. Students taking this course and the International Trade Law course will have read all of the major GATT and WTO agreements, and several regional trade agreements. The course is taught in English.

INTL6105 International Dispute Resolution (3 CH)

This course studies litigation, arbitration, mediation, negotiation, and other methods for resolving disputes in international trade law. In addition to serving as alternatives to domestic courts systems, these processes play an increasingly prominent role in cross-border transactions in multilateral, regional, and bilateral contexts. This course includes exercises to develop skills such as interviewing, counseling, negotiation, and advocacy. Thus, with respect to negotiation, simulated trade negotiations may be drawn from multilateral trade talks (e.g., the Doha Round), or free trade agreement talks (e.g., the U.S.-UAE free trade agreement). Regarding arbitration, attention is paid to drafting arbitration agreements, the enforceability of arbitration agreements, selecting arbitrators, the arbitration hearing, and the enforceability of arbitration awards. Special emphasis is given to arbitration of international commercial disputes and the institutional rules under

which such arbitrations proceed, including regimes established by the United Nations Commission on International Trade Law (UNCITRAL), the International Center for the Settlement of Investment Disputes (ICSID), and the International Chamber of Commerce (ICC). With respect to litigation, for example, simulations based on actual WTO cases may be constructed, with attention paid to issues of jurisdiction. The simulations may involve not only students, but also practitioners and other professors with specialized expertise in areas like intellectual property (IP), labor and the environment. To facilitate these simulations, and engage persons who may be unable to travel to the UAE, video-conferencing may be used. Thus, for example, students at the UAE university could engage in simulated negotiations on a free trade agreement with students from the University of Kansas. The course is taught in English.

INTL6106 International Financial Law (3 CH)

This course deals with international financial capital transactions and regulation. It consists of two parts, private banking and securities markets, and official multilateral and regional lending institutions. Regarding banking markets, the course covers international banking topics, specifically, foreign exchange and payments (namely, electronic funds, or wire transfers). It also covers bank supervisory concerns, such as capital adequacy guidelines developed by the Basle Committee, and inbound and outbound bank regulation. With respect to securities markets, the course examines initial public offerings (IPOs) and secondary market trading, using examples from major and regional financial centers. Attention is paid to rules on offering securities across borders, and on participation of foreign investors in local stock markets. Thus, SEC Regulation S, Rule 144A placements, private placements, Eurobonds and other Euromarket transactions, are studied. The course also provides an overview of important derivative instruments, both on- and off-organized exchanges, such as forwards, futures, options, and swaps. Regarding official lending, the course examines the options of the World Bank, International Monetary Fund (IMF), and regional development banks such as the Islamic Development Bank (IDB). The Third World debt crisis ? both problems and prospects ? are debated. The criticisms of these organizations are articulated and evaluated. The course is taught in English.

INTL6107 International Intellectual Property Law (3 CH)

This course introduces the major forms of intellectual property (IP), and substantive patent, trademark, and copyright law. It provides the doctrines, policies, and practices concerning this law, not only in prominent domestic legal systems such as the United States, European Union, and China, and in the Gulf region, but also in major multilateral conventions. Accordingly, the course covers the 1961 Rome International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations, 1967 Paris Convention for the Protection of Industrial Property, 1971 Berne Convention for the Protection of Literary and Artistic Works, 1989 Washington Treaty on Intellectual Property in Respect of Integrated Circuits, and 1995 WTO Agreement on Trade Related Aspects of Intellectual Property Rights (TRIPS). The course also covers provisions on IP contained in free trade agreements and customs unions. This course also examines leading contemporary issues in IP protections. Such issues include challenges posed to patent law by new technologies (e.g., biotechnology, pharmaceuticals, the Internet and

nanotechnology), HIV/AIDS and other public health crises, and genetically modified organisms (GMOs). Regarding copyright law, such issues include challenges posed by categories of digital works such as software, databases containing factual and other public domain content, multi-media materials, computer generated, or assisted works, and audio recordings, containing digital sampling. Finally, the course deals with the protection of geographical indications, problems of enforcement, and perspectives of developing and least developed countries. The course is taught in English.

INTL6108 Islamic Finacial Law (3 CH)

This course reviews the history, doctrine, texts, and role of Islamic law (Shari?ah) throughout the world. It begins with a survey of the life and times of the Prophet Mohammed (Peace Be Unto Him), background and birth of the Arab-Islamic Empire, the development and spread of Islam, the Moghul and Ottoman Empires, the Classical theory of Islamic law and sources of the Shari?ah (usul al fiqh), that is, Holy Qu?ran, sunna of the Prophet, analogical reasoning (qiyaas), and consensus (ijmaa), and the principal schools (madhhab) of Islamic law. Following this survey, the course focuses on Islamic legal topics relating to international trade. Specific coverage includes contract, business, and banking law. Issues of forbidden contracts, riba (excess, interest), gharrar (risk), and property protection are discussed in relation to obligations created by the World Trade Organizations (?WTO?) agreements and various free trade agreements and customs unions. The course is taught in English.

INTL6109 Legal Research and Writing (3 CH)

Students will be required to prepare at least two legal memoranda of modest length based on provided materials. These materials will include primary materials, such as statutes, treaties, and judicial decisions. They will also include secondary materials, such as treatises and journal articles. As a final requirement, students will have to research and write a memorandum of some length (2,000 ? 2,500 words) based on their own research on a presented problem.

INTL6110 Thesis (1 CH)

The Masters thesis may be on any topic related to International Trade 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.

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.

Prerequisites
ARBU1402 with a minimum grade P

PRVT2051 Obligations (1) (2 CH)

This course deals with the study of various obligations and their freewill sources in the U.A.E. Law of Civil Transactions and Islamic Jurisprudence. The study focuses more on 'contract and single will'.

Prerequisites
PRVT113 with a minimum grade D

PRVT2111 Legal Aspects of e-commerce(E) (2 CH)

The course covers the concept of e-commerce, problems and difficulties facing its application, methods of civil protection, especially the validity and proof of the electronic contract, electronic-commerce consumer protection, applicable law, intellectual property, and competent court.

Prerequisites
PRVT227 with a minimum grade D

PRVT2151 Obligations (2) (2 CH)

The course includes the study of Law of Torts and beneficial acts in the light of the UAE Law of Civil Transactions and Islamic Jurisprudence.

Prerequisites
PRVT2051 with a minimum grade D

PRVT2152 Obligations (3) (2 CH)

The course covers the Law of Evidence and the methods of evidence according to the Federal Law of Evidence (UAE), and it also includes a practical study of research and application tools in Sharia and Law.

Prerequisites
PRVT2051 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

PRVT3034 Labour Law (2 CH)

The course covers the general principles of the Labour Law, individual labour contracts and labour disputes. It also deals with the aspects relating to labour hours, types of vacancies, obligations and the duties of labourer. The study includes various aspects relating to the termination of service contracts and the rights arising out of termination.

Prerequisites

PRVT2151 with a minimum grade D
PRVT2152 with a minimum grade D

PRVT3073 Obligations (4) (2 CH)

This course deals with the "Theory of Obligation" and its application in the UAE Law of Civil Transactions and Islamic Jurisprudence. The course covers the consequences of obligation, its features, termination and types of guarantees.

Prerequisites
PRVT2151 with a minimum grade D
PRVT2152 with a minimum grade D

PRVT3243 Nominated Contracts (Sale&Lease) (3 CH)

The course covers the study of some basic contracts prepared in application of ?General Theory of Contract? in the Federal Civil Transactions Law of UAE; and their origin in the Islamic Jurisprudence. More focus is given to the respective judicial adjudications. The contracts covered in this study are the sale and lease contracts, with a special focus on points of similarity and dissimilarity between them and other contracts relating to possession, utility or labour.

Prerequisites
PRVT3073 with a minimum grade D

PRVT333 Selected Studies in Comparative Private Law (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
PRVT113 with a minimum grade D
ESPU1472 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 (2 CH)

This course introduces the students to the role of the arbitration in settling disputes as an alternative methods for resolving disputes. It covers all legal aspects related to arbitration, such as: the legality of arbitration, its forms and types, the composition of the arbitral tribunal and its jurisdiction, dismissal of the arbitrator, the validity of the arbitral award, vacating the award and its enforcement.

Prerequisites
PRVT227 with a minimum grade D
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

PRVT4492 The Law of Execution (2 CH)

This course offers the students with all legal aspects of the post judgment rendition. It studies the two approaches for enforcing court judgments: the summary enforcement and the ordinary one. It also covers the filing of the executive lawsuit at the court of execution, types of lawsuits, the legal mechanisms for garnishments, attachment and repossession, in addition to the various disputes arising out in the context of execution.

Prerequisites
PRVT302 with a minimum grade D

PRVT450 Contracts (2) (2 CH)

The course covers the definition, characteristics, consequences of the 'Construction contracts', and the definition, legality, types and consequences of the 'Insurance contracts'; under the Federal Civil Transactions Code.

Prerequisites
PRVT2151 with a minimum grade D

PRVT451 Primary Rights in Rim (2 CH)

This course contains the general theory of the basic rights In rem under the UAE Civil Transactions Code and Islamic Iaw (Sharia); and covers various personal rights and the rights In rem. The various aspects of Ownership; focusing more on its characteristics, extremity, restrictions and collateral rights accruing from ownership, joint ownership and means of acquiring the right of ownership; are adequately covered.

Prerequisites
PRVT3073 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

PRVT454 Personal and Real Securities (2 CH)

The course aims to study the general principles of debt security in light of the UAE Civil Transactions Code and the Islamic jurisprudence. The study mainly focuses on the related judicial decisions. It also covers the concepts of guaranty, mortgage by way of security, possessory pledges and privileges (or liens).

Prerequisites
PRVT3073 with a minimum grade D

PRVT462 Intellectual Property Laws (2 CH)

This course consists of three parts. Part I deals with the Copyright Law; its scope, its nature and importance; the subject of copyright and the term of copyright protection. It includes the ownership of copyright, its transference and methods of protecting the copyright. Part II deals exclusively with the Law of Patents and covers the legal administration of patents locally and internationally; conditions of granting patents, procedures required to acquire a patent and the emanating legal effects. Part III deals with the Trade Mark Law and includes the legal rules of trademarks, trade names, the required conditions for protection, and national and international legal protection.

Prerequisites
PRVT227 with a minimum grade D

PRVT4725 Maritime Law (2 CH)

Students will be required to prepare at least two legal memoranda of modest length based on provided materials. These materials will include primary materials, such as statutes, treaties, and judicial decisions. They will also include secondary materials, such as treatises and journal articles. As a final requirement, students will have to research and write a memorandum of some length (2,000 ? 2,500 words) based on their own research on a presented problem.

Prerequisites
PRVT227 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
- RVT602 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

Public Law

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

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.

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.

Prerequisites

ARBU1402 with a minimum grade D

LW202 Writing and Legal Research (2 CH)

The course includes the methods of searching for legal rules and principles that are necessary for the legal profession. This is accompanied with introducing some practical written cases which require students to write a legal memorandum about them indicating the applicable legal rules on them. The course also includes the study of the methodology and the process by which a legal research should be prepared.

Prerequisites

PRVT302 with a minimum grade D

LW240 External Training (6 CH)

The training program is conducted in al full semester. The student spends two days of the week in some institutions related to the legal profession, such as courts, the public prosecutions and law firms. In such institutions. The student will be exposed to the real legal practice. In addition to that the student spent the rest of the week in the legal clinic at the College, where he/she practices the legal profession through conducting some legal research, offering consultations, and writing legal memos to real clients. All this will be conducted under the supervision of the faculty members.

Prerequisites

PRVT302 with a minimum grade D
PRVT3034 with a minimum grade D
PRVT3073 with a minimum grade D
PRVT3243 with a minimum grade D
PRVT338 with a minimum grade D
PUBL442 with a minimum grade D

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.

Prerequisites

ARBU1402 with a minimum grade P

PUBL203 The Criminal Law- Part(1) (2 CH)

This course is about the general principles of the substantive law of crime. This involves studying the characteristics of the law and its connection to the law of criminal procedures and other criminological and penological disciplines. The application of the substantive law of crime in connection to the place and time is also dealt with in this course. The course also focuses on the elements of crime and related theories. This involves the study of the principle of legality and related definces, The actus reus and means rea of crime and related theories governing the crimes of incitement, conspiracy and attempt. The whole study will be in the light of UAE criminal law.

Prerequisites

PRVT113 with a minimum grade D

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

PUBL220 The Criminal Law-Part (2) (2 CH)

The study in this course focuses on the theory of criminal punishment. This involves the definition of criminal punishment and its nature, the type of punishment and its application and the role of the judiciary in such application. In addition, criminal treatments and other precautionary measures are also studied and this will be in comparison with punishment. The whole study will be in the light of UAE criminal law.

Prerequisites
PRVT113 with a minimum grade D

PUBL226 Selected Studies in Comparative Public Law (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
PRVT113 with a minimum grade D
ESPU1472 with a minimum grade D

PUBL303 Legal Status of Foreign Residents (2 CH)

This course consists of: firstly, study of the rules of entry and residence of foreigners into the United Arab Emirates; secondly, the rules of employment of foreigners and guarantees prescribed to them in the workplace; thirdly, rights of foreigners according to the UAE

constitution; fourthly, the deportation of foreigners through administrative and judicial procedures.

Prerequisites
PUBL206 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 - Private Specific (2) Emerging Crimes (2 CH)

This courses deals with special types of crimes such as: offenses against the public interest, financial crimes, and crimes of Information Technology, drug related crimes, money laundering crimes, and human trafficking crimes. A selection of homogeneous crime types contained in the vocabulary of this courses will be taught in each semester.

Prerequisites
PUBL220 with a minimum grade D

PUBL316 Environmental Law (2 CH)

This course covers the definitions of 'environment' and 'environmental pollution', different kinds of pollution, its causes, factors and reasons of environmental pollution; and various means of combating environmental pollution. It deals with the Rules of Laws of the UAE and some International Conventions and Agreements related to the mitigation and the prevention of different kinds of environmental pollution. The course also covers the damages arising from environmental pollution and the liabilities of individuals and authorities, who perpetrate of environmental pollution.

Prerequisites
PUBL206 with a minimum grade D

PUBL3222 Criminology and penology (2 CH)

This course is divided into two parts. Part I deals with various aspects of criminology which includes the definition, historical background and the relation between criminology and other criminological sciences and disciplines. The methods of studying crimes and the theories of delinquency are also adequately covered under this course. Part II deals with various aspects of penology which includes the criminal punishment and other criminal

treatments. Various reformation institute and related agencies, such as prisons and rehabilitation centers are also dealt with in this part.

Prerequisites
PRVT113 with a minimum grade D

PUBL3294 Public Employment (2 CH)

This course aims at to study of the legal system governing public employment (civil services) in the UAE. It deals with the appointment of civil servants, their powers & rights, their duties & obligations, the disciplinary system and the end of the term of their service according to the Law of Civil Services and its related By-Laws in the UAE.

Prerequisites
PUBL206 with a minimum grade D

PUBL401 Human Rights (2 CH)

This course deals with the concept of human rights, its evolution, origin, and historical development. It also covers the study of different kinds of rights; including civil, political, economic, social, and cultural rights. These rights are studied within the context of international and regional conventions and treaties. In addition, it provides a general idea about the protection mechanisms at both international and regional levels.

Prerequisites
PUBL207 with a minimum grade D

PUBL404 International Criminal Law (2 CH)

The course deals with the study of a set of legal rules that deal with international crimes committed by individuals which establishes the international criminal responsibility. The course study includes the following topics: Inception and evolution of international criminal law, the emergence of the principle of individual criminal responsibility for international crimes, the establishment of international criminal tribunals, the establishment of the International Criminal Course, the jurisdiction of the International Criminal Court and the principle of state sovereignty, the jurisdiction of the International Criminal Court and the role of the UN Security Council, the types of international crimes contained in the Rome Statute, the Rules and procedures and the Criminal Court's jurisdiction in accordance with the Rome Statute.

Prerequisites
PUBL401 with a minimum grade D

PUBL405 International Humanitarian Law (2 CH)

The course tackles the study of a group of international legal concepts which seek (for humanitarian reasons) to limit the effects of international and non-international armed conflicts. These rules aim to provide protection for certain categories of persons who have no role (or no longer have a role) in the conduct of military operations such as civilians,

the wounded, the prisoners, and the shipwrecked. It also seeks to restrict the means and methods of warfare by restricting the actions of warring parties. The course of study addresses, interalia, the following topics: definition of international humanitarian law, a brief background on the evolution of humanitarian law, international conventions that constitute humanitarian law categories of protected places, methods and means of warfare, the distinction between international humanitarian law the international law of human rights, and the enforcement of international humanitarian law at the international and internal levels.

Prerequisites
PUBL401 with a minimum grade D

PUBL4092 Criminal Procedures Law (1) (2 CH)

This course deals with the philosophy, crime and relation between Criminal Procedures Law and other related criminal laws. The study is also concerned with the principle of legality governing criminal process, public and private claims resulted after the commission of crime and parties involve in the criminal process. The pre-trail stage is examined thoroughly in this course. Such examination will involve the study of police and public prosecution authorities, their jurisdictions in UAE legal System as well as the process undertaken.

Prerequisites
PUBL220 with a minimum grade D

PUBL4093 Criminal Procedures Law (2) (2 CH)

The subject matter of this course deals with the trail stage process. This involves studying the criminal case with reference to its procedures, parties, verdicts rendered by the court, and the methods for appealing against such verdicts. This will include the study of criminal process in front of first instance courts, appeal courts and the cassation court.

Prerequisites
PUBL4092 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.

PUBL442 International Organizations (2 CH)

The course includes studying the concept and general rules governing the work of various international organizations which includes the study of the requirements to seek membership and joining international organizations, the administrative bodies and employees in international organizations, authorities of international organizations and the legal personality of international organizations. The course also includes a study of some main international, regional and specialized organizations, and their role in the settlement of international disputes.

Prerequisites

PUBL207 with a minimum grade D

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.

College of Medicine and Health Sciences

Anatomy

ANAT302 Fundamental Techniques in Cell Biology (3 CH)

This course will discuss topics in Advanced Cell Biology at the bachelor level.

ANAT601 Developmental Anatomy (2 CH)

Understanding Developmental Anatomy is fundamental to understanding human anatomy. It is important to realize how an embryo grows from a single cell to achieve full body form and then continues growing during life in utero. Whilst this growth in body form is occurring, the systems of the body are also developing in unison and in concert so that a completed form and function are able to emerge at ~8 weeks after conception. Studying the normal development is important to understanding the gross anatomy of the adult. Most importantly, understanding normal development is a prerequisite to understanding abnormal development with the possibility of developing better treatment strategies should such abnormalities occur. This course will include both normal and abnormal development of the human and will be related to the gross anatomy of the adult human.

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.

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 - Medicine

BMB601 Techniques in Biochemistry (2 CH)

This course is designed to introduce students to the range of experimental techniques that are in routine use in a functioning biochemistry laboratory. Whenever possible, the course combines lectures illustrating the scientific principles underlying a particular technique with hands-on experience 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.

MBIO303 Principles of Biochemistry and Molecular Biology (3 CH)

This course is designed to teach students advanced level of molecular structure and functions of nucleic acids and proteins. Range of experimental techniques that are in routine use in identifying the structure and functions of DNA, RNA and proteins will be taught and/or demonstrated. The course will also include topics on how cells communicate and die. Whenever possible, the course combines lectures illustrating the scientific principles underlying a particular technique with hands-on experience of the methodology in the advanced molecular biology laboratory.

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 Advanced Molecular Biology (3 CH)

This course will have an in-depth coverage of the structure, function, and synthesis of DNA, RNA, and proteins. In this course, 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 will be discussed. In addition, pathways of gene expression (transcription, RNA processing, and translation) and the mechanisms of regulating these pathways, with special emphasis on transcriptional control will also be covered.

BMSC701 Advanced Research Techniques (3 CH)

This course aims to give broad but comprehensive information on the majority of the important techniques used today in biomedical research. It aims to give a background on the theory, practice and applications of the various techniques, as well as their limitations and pitfalls. After completing 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 the sessions may vary according to the needs of each topic. 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)

This course deals with advances in the mechanisms of the various disease processes. This program offers the students a comprehensive review of the theoretical and practical aspects of general pathology. The students will be exposed to formal lectures and laboratory teaching 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 neplasia.

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)

This course tackles advanced principles and recent findings in pharmacology. It is intended that the seminar should provide a more didactic and interactive meeting than usually occurs in a more traditional research seminar.

BMSC705 Advances in Genetics (3 CH)

This course will provide students with the latest advances in genetics with a major focus on conceptual and technical advances in human genetics. This includes illustration of the current knowledge and views on the cellular and molecular basis of single gene and multifactorial disorders. In addition, recent advances in the genomic aspects of human disease will be emphasized.

BMSC706 Advanced Cancer Biology (3 CH)

This course will focus on molecular and cellular mechanisms behind cancer progression, invasion, metastases and consequences of cancer. In addition, it will cover the host-organ microenvironment and the role of inflammation, tumor immunology, viral oncology, the role of hormones and cytokines, molecular pathology, tumor staging and differentiation and cancer metabolism and cachexia. Particular focus on the control pathways will provide students the background to the cutting edge of drug design for targeted cancer therapy.

BMSC707 Medical Cell and Tissue Biology (3 CH)

The broad objective of this course is to develop a comprehensive understanding of the light and electron microscopic structure and function of cells, tissues and organs of the human body. Students will gain in depth understanding of: 1) how structural specializations of cells reflect their functions; 2) how cells associate to form tissues and perform their specialized functions; 3) how groups of cells (tissues) associate to form organs; and 4) how this organization enables each organ system to carry out its function; 5) how stem cells contribute to tissue formation and regeneration.

BMSC708 Advanced Topics in Neuroscience (3 CH)

Advanced Topics in Neuroscience is organized as a weekly seminar series in which various topics in modern neuroscience are discussed. Seminars are presented by faculty or when suitable by visiting outside neuroscientists. Rather than presenting a typical research seminar, speakers are asked to present material with sufficient background material to be readily understood by students. It is intended that the seminar should provide a more didactic and interactive meeting than usually occurs in a more traditional research seminar. The course covers most recent cutting-edge developments in various Neuroscience topics including learning and memory, brain plasticity, motor functions, neurodegeneration and neurobiology of disease, etc.

BMSC709 Advanced Pathophysiology (3 CH)

This course will focus on the pathophysiological mechanisms resulting in changes of body function that occur in common diseases as well as compensatory mechanisms that play a role in system dysfunction. It will also cover the assessment of organ function by monitoring/measuring relevant parameters.

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.

BSTA312 Biostatistics (3 CH)

This course will discuss topics in Biostatistics at the bachelor level.

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.

CMHS701 Research and Proposal Writing Process for Doctoral Students (1 CH)

This course covers: The structure and content of the dissertation proposal; The dissertation proposal writing process; Peer review and manuscript development; Proposal development skills; Skills for oral presentation and defense of research in both academic and professional settings.

CMHS702 Journal Club I (2 CH)

The Journal club course 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. This course also involves regular attendance by the student to relevant Faculty research seminars organized monthly by the office of research & Graduate Studies as well as seminars of visiting researchers. The main academic supervisor may choose seminars or colloquium sessions that are mandatory for a student to attend. The seminar also involves a weekly class where students present and critically review recent research advances related to their working field. Participation in the Graduate seminar is encouraged to be continued throughout the student's study period.

CMHS703 Journal Club II (2 CH)

The Journal club course 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. This course also involves regular attendance by the student to relevant Faculty research seminars organized monthly by the office of research & Graduate Studies as well as seminars of visiting researchers. The main

academic supervisor may choose seminars or colloquium sessions that are mandatory for a student to attend. The seminar also involves a weekly class where students present and critically review recent research advances related to their working field. Participation in the Graduate seminar is encouraged to be continued throughout the student's study period.

Prerequisites

CMHS702 with a minimum grade D

CMHS704 Journal Club III (2 CH)

The Journal club course 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. This course also involves regular attendance by the student to relevant Faculty research seminars organized monthly by the office of research & Graduate Studies as well as seminars of visiting researchers. The main academic supervisor may choose seminars or colloquium sessions that are mandatory for a student to attend. The seminar also involves a weekly class where students present and critically review recent research advances related to their working field. Participation in the Graduate seminar is encouraged to be continued throughout the student's study period.

Prerequisites

CMHS703 with a minimum grade D

CMHS705 Journal Club IV (2 CH)

The Journal club course 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. This course also involves regular attendance by the student to relevant Faculty research seminars organized monthly by the office of research & Graduate Studies as well as seminars of visiting researchers. The main academic supervisor may choose seminars or colloquium sessions that are mandatory for a student to attend. The seminar also involves a weekly class where students present and critically review recent research advances related to their working field. Participation in the Graduate seminar is encouraged to be continued throughout the student's study period.

Prerequisites

CMHS704 with a minimum grade D

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 I (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.

CMPH608 Biostatistics, Study Design and Literature Evaluation (PharmD) (2 CH)

To introduce the basic statistical methods used in scientific pharmaceutical practice and research. As part of this introduction, students will be introduced to the statistical package SPSS.

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.

CMPH612 Qualitative Research Methods (2 CH)

This course will describe qualitative research methods and have students apply them on example datasets.

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 (0 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 (0 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.

CMPH622 Chronic Disease Epidemiology (2 CH)

This course will discuss non-communicable disease epidemics and their implications.

CMPH623 Public Health Assignments III (0 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 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.

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.

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.

CMPH706 Advanced Public Health (2 CH)

This course covers: The major public health issues of local and global importance; Communicating the major threats to health and their distribution within populations; The strengths and weaknesses of the main types of public health interventions; The problems of dealing with uncertainty in making public health policies; Ethical issues and their importance to epidemiology and public health; The philosophy underpinning public health action and how to apply it to health policies.

Prerequisites
CMPH601

CMPH707 Advanced Epidemiology Methods (2 CH)

This course covers controversies and new thinking in epidemiologic practice including measurement, causal reasoning and confounding.

Prerequisites
CMPH603 with a minimum grade D

CMPH708 Advanced Biostatistics (1 CH)

This course covers: Advanced statistical methods used in public health research; Multivariate methods; Survival analysis in public health research; Interpretation of the results of statistical analyses reported in the health literature; Modeling; Advanced statistical analyses using SPSS.

Prerequisites

CMPH602 with a minimum grade D

CMPH709 Advanced Environmental Health (2 CH)

This course covers: The multidisciplinary nature of managing the impact of the environment on health; Evaluating the body of scientific literature to assess the state of knowledge and research gaps; The methodologies used in environmental health research, assessment of environmental health impacts; Current problems and potential solutions in environmental health, management of environmental health risks; Communicating results to lay audiences.

Prerequisites

CMPH617 with a minimum grade D

CMPH723 Current Issues in Public Health (2 CH)

Aim To allow students to build on their appreciation of current public health priorities and controversies by participating in a series of cutting edge graduate seminars.

PHCM309 Population Health (2 CH)

The course is designed to teach the fundamentals in Population Health. It will introduce students to the social and behavioral determinants of health, communicable and chronic diseases, environmental and occupational health protection, and other public health topics.

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.

CSA1688 Clinical Sciences Program 1 Average (0 CH)

This is a placeholder for the Clinical Sciences Year 1 Average used for promotion to the next year.

CSB2777 Clinical Sciences Program 2 Average Before Exam (0 CH)

This is a placeholder for the Clinical Sciences Year 2 Average used to determine eligibility to sit the Final Integration Examination.

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.

MEED304 Medical Informatics (3 CH)

This course will discuss topics in Medical Informatics at the bachelor level.

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).

MSA1288 Pre-Medical Program Year 1 Weighted Average (0 CH)

This is a placeholder for the Pre-Medical Program Year 1 Weighted Average used for promotion to the next year.

MSA2388 Pre-Medical Program Year 1+2 Weighted Average With Exam (0 CH)

This is a placeholder for the Pre-Medical Program Year 1+2 Weighted Average With Exam used for promotion to the next year.

MSB2377 Pre-Medical Program Year 1+2 Weighted Average Before Exam (0 CH)

This is a placeholder for the Pre-Medical Program Year 1+1 Weighted Average Before Exam used to determine eligibility to set Pre-Medical Program Exam.

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.

ORAV800 Overall Average (0 CH)

This is a placeholder for the Clinical Sciences Year 2 Average used to determine eligibility to graduate.

OSA1488 Pre-Clinical Program Year 1 Weighted Average (0 CH)

This is a placeholder for the Pre-Clinical Program Year 1 Weighted Average used for promotion to the next year.

OSA2588 Pre-Clinical Program Year 1+2 Weighted Average With Exam (0 CH)

This is a placeholder for the Pre-Clinical Program Year 1+2 Weighted Average With Exam used for promotion to the next year.

OSB2577 Pre-Clinical Program Year 1+2 Weighted Average Before Exam (0 CH)

This is a placeholder for the Pre-Clinical Program Year 1+1 Weighted Average Before Exam used to determine eligibility to set Pre-Clinical Program Exam.

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.

PHCE700 Comprehensive Exam (0 CH)

For advancement to PhD candidacy, all PhD student must take and pass the Comprehensive Examination before the end of their second year of study. This examination will assess the breadth of knowledge in major acquired by the student, evaluate the student's research proposal and determine whether or not the student should continue with the doctoral studies.

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.

RSCH306 Research Methodology (3 CH)

This course will discuss topics in Research Methodology at the bachelor level.

RSCH313 Research or capstone project (9 CH)

This course will discuss topics in Research or capstone project at the bachelor level.

RSCH600 Research (12 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.

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

JRC603 Biomedical Sc. Journal Club III (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

JRC602 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.

MCRO311 Host-Parasite Interactions (3 CH)

This course is designed to provide students with an advanced level knowledge to the basic pre-requisite course in the mechanisms of microbial pathogenesis and an appreciation of the continuing and serious impact of infectious disease on modern life. Students will learn basic principles of host-parasite interactions with focus on some pathological properties and examples of particular pathogens that play an important role in major human diseases. Mechanisms of disease development and evasion mechanisms employed by the parasites in response to the activated immune mechanisms. Diagnostic tools to assess immune function as well as Intervention strategies such as vaccination will also be taught.

MCRO315 Human Nutrition (2 CH)

This course will discuss topics in Human Nutrition at the bachelor level.

MCRO316 Healthcare Systems (2 CH)

This course will discuss topics in Healthcare Systems at the bachelor level.

MEDJ700 Biomedical Sciences Journal Club 2 (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.

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 Pathogensis (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.

MMIM604 Molecular Cell Biology of Parasites (2 CH)

This course is designed to introduce students to both traditional parasitology and more recent developments in molecular and imaging technologies. Diseases caused by parasitic infections have shown considerable evolution over the last few decades. Major parasitic infections and diseases used to be gastrointestinal parasites such as amoebae, roundworms, hookworms, tapeworms, flukes and malaria. With the improvement of socioeconomic and hygienic conditions, many of these diseases have disappeared from the developed countries while new problems have emerged, such as drug resistance and increased transmission due to induced and acquired immunosuppression. Examples of such infections are malaria, strongyloidiasis, giardiasis and leishmaniasis. Methods of diagnosis too have been revolutionized. In the past, microscopic examination of blood, feces and urine was the mainstream of parasitology. Today, these have been largely replaced by DNA based methods and imaging technologies such as ultrasound, CT and MRI. Approximately half the course will be on conventional parasitology, systematic, microscopy etc. The other half will deal with molecular mechanisms of disease, molecular methods of diagnosis, application of imaging technologies, role of immunosuppression in the transmission of disease, vaccine development and molecular mechanisms of drug resistance.

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.

MMIM610 Elective on Vaccines (1 CH)

This is a 1 CH Elective designed to provide a broad understanding of vaccines, immunology and molecular biology of vaccine development and recent developments. Special emphasis will be on the failure of vaccine development during the last 3-4 decades, primarily in HIV, Malaria and Tuberculosis as opposed to relatively successful vaccines for influenza and bacterial infections. The advantages and limitation(s) of recombinant and molecular biological approaches to develop molecularly defined vaccines will be discussed. More than 50% of the content delivery will be by students in the form of discussions and classroom presentations.

SEM601 Biomedical Sciences 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

SEM603 Biomedical Sc. Seminar III (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

SEM602 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-ClEx), 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.

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.

MGEN305 Molecular Genetics and Genomics (3 CH)

This course aims at developing the principle of genuine inheritance at a molecular level in different living systems from viruses to mammals. This course includes investigation of gene structure and its susceptibility to alteration that results both in benign and malignant outcome, mechanism of recombination and its effect on diversity and amplification of genome, and chromosomal breakage.

Prerequisites

BIOM399 with a minimum grade D

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.

PATH310 Advanced Pathology (3 CH)

The course is designed to teach the fundamentals of practical laboratory medicine. It will provide the main basics taught in a professional medical laboratory technology course. It will expose students to the workings of a pathology laboratory in a hospital, and could potentially lead to a job in one of the many hospitals in the country.

PATH601 Principles of Histopathology (2 CH)

The course is of General Histopathology which deals with the basic concepts of various disease processes. This program offers the student 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.

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.

PATH603 Molecular Pathology (2 CH)

Molecular Pathology is an emerging discipline within pathology which focuses on the study and diagnosis of disease through the examination of molecules within organs, tissues or bodily fluids. It shares some aspects of practice with both anatomic pathology and clinical pathology, molecular biology, biochemistry, proteomics and genetics. Tumor molecular pathology is the branch that encompasses the development of molecular and genetic approaches to the diagnosis and classification of human tumors; the design and validation of predictive biomarkers for treatment response and disease progression, the susceptibility of individuals of different genetic constitution to develop cancer and the environmental and lifestyle factors implicated in carcinogenesis. Molecular genetics pathology deals with basic and translational research aimed at broadening the understanding of gene/protein structure and function, disease processes and molecular diagnostics of genetic conditions.

PATH604 Hematology (2 CH)

This program offers the students a comprehensive review of the theoretical and practical aspects of Hematology. The students will be exposed to formal lectures and laboratory practicals which will emphasize the most modern concepts and methodologies in the fields of hematopoietic, lymphopoietic and hemostatic disorders (see course contents). The course will include sections in which the students will receive instruction in the physiopathologic mechanisms, diagnosis and therapy of the different types of anemias, leukemias, lymphomas and hemorrhagic/thrombotic disorders. In addition, a section dedicated to immunohematology in which the students will extensively learn current theoretical concepts and practice of blood transfusion will also be included. In that regard the students will also be taught present infectious disease donor screening programs essential to the practice of safe blood and blood component therapy.

PATH605 Laboratory Medicine and Diagnostics (2 CH)

This course is designed to familiarize postgraduate PharmD students with the concepts of clinical chemistry, hematology and translate them into laboratory work and apply it to patient care. The course will focus on the basics of clinical chemistry, hematology and clinical laboratory methods. It will emphasize the importance of laboratories in the work-up of patients for diagnosis, follow-up and screening of disease. The seminars are structured and followed-up by practical case analysis in hospital laboratories to help in understanding the theory and practice of laboratory medicine. This course will be in a seminar fonnat as well as group discussions and laboratory based cases.

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.

PHTX605 Pharmacy Economics and Health Management (2 CH)

Pharmacy Economic Management provides an overview of the role of economic evaluation in health care with a special emphasis on pharmacy- related issues. Topics include the need for economic evaluation in health care, types of health economic evaluation, and health outcomes measurement and assessment. Leadership concepts will also be studied. This course will incorporate seminars, readings, case exercises and guided discussions to accomplish these goals and will utilize different learning techniques. This course will help students understand what sources of information are appropriate to use in a variety of situations. It uses examples to help students learn to use the Internet to obtain drug information and determine the strengths and weaknesses of various types of drug information.

PHTX606 Clinical Pharmacokinetics (2 CH)

This course combines the theoretical and case-based approaches to teaching students how to manage drug therapy from a kinetic point of view. Students will evaluate variability in pharmacokinetics due to physiological as well as pathophysiological conditions. They will also learn to approach dosage determinations based upon kinetic properties (i.e. low or high extraction ratio of hepatically cleared drugs, renally cleared and mixed renally-hepatically cleared drugs). Students will, also, be given the opportunity to practice dosing of the selected drugs using a case-study scenario.

PHTX607 Pathophysiology and Theraputics I (3 CH)

This course focuses on the pharmacotherapy in disease management. It covers Infectious Diseases, Multiple Sclerosis Alzheimer's disease, Parkinson's disease, Seizure Disorders, Depression, anxiety Disorders and personality disorders. Emphasis will be placed on the integration of pathophysiology, pharmacology and therapeutics to for appropriate care plans. These plans will include rationale for drug use, selection and dosing regimens, expected outcomes of drug therapy, key monitoring parameters, clinically important drug-drug or drug-disease interactions, counseling and compliance issues. The class format includes online reading assignments, study guides, and assignments, interactive Internet-based lectures and case studies.

PHTX608 Pathophysiology and Therapeutics II (3 CH)

This course focuses on the pharmacotherapy in disease state management of Hypertension, Ischemic Heart Disease, Myocardial Infarct, Heart Failure, Stroke, Anticoagulation, Upper GI Disorders, Asthma & COPD, and Renal Diseases. Emphasis will be placed on the integration of pathophysiology, pharmacology and therapeutics to devise appropriate pharmacy care plans. These plans will include rationale for drug use, selection and dosing regimens, expected outcomes of drug therapy, key monitoring parameters, clinically important drug-drug or drug-disease interactions, counseling and compliance issues. The class format includes online reading assignments, study guides, and assignments, interactive Internet-based lectures and case studies.

PHTX609 Pathophysiology and Therapeutics III (3 CH)

This course focuses on the pharmacotherapy and the management of diseases and conditions including Hormone Replacement, Osteoporosis, Rheumatoid and Osteoarthritis, Lipid Disorders and Diabetes. Emphasis will be placed on the integration of pathophysiology, pharmacology and therapeutics to devise appropriate pharmacy care plans. These plans will include rationale for drug use, selection and dosing regimens, expected outcomes of drug therapy, key monitoring parameters, clinically important drug-drug or drug-disease interactions, counseling and compliance issues. The class format includes online reading assignments, study guides, assignments, interactive Internet-based lectures and case studies.

PHTX610 Pathophysiology and Therapeutics IV (3 CH)

This course focuses on the pharmacotherapy and the role of the pharmacist in disease state management of diseases and conditions including Cancer, Critical Care and Infectious Diseases. Emphasis will be placed on the integration of pathophysiology, pharmacology and therapeutics to devise appropriate pharmacy care plans. These plans will include rationale

for drug use, selection and dosing regimens, expected outcomes of drug therapy, key monitoring parameters, clinically important drug-drug or drug-disease interactions, counseling and compliance issues. The class format includes online reading assignments, study guides, assignments, interactive Internet-based lectures and case studies.

PHTX611 Poisoning and Drug Toxicity (2 CH)

The Poisoning & Drug Toxicity course deals with the understanding of general management strategies of poisoning and drug toxicity cases. Furthermore, this course gives an introduction to studying medicines, drugs and poisons. The course considers legal and illegal medicines and drugs used in society, toxic substances in the workplace, environment and homes, and venoms and toxins.

PHTX612 Pharmaceutical Care (2 CH)

The pharmaceutical care practice rotation is a four-week required rotation for Pharm-D students. The focus of this rotation is the provision of medication related care for the purpose of achieving definite outcomes that improve patient's quality of life.

PHTX613 Ambulatory Care (2 CH)

The Ambulatory Care rotation is a four-week required rotation. This rotation provides provision of pharmaceutical care for patients seen in Tawam Hospital polyclinic including but not limited to the Anticoagulation, Diabetes, Cardiology and Nephrology Clinics. These ambulatory care services provide chronic disease management and patient/caregiver education including initiation of therapy, drug therapy monitoring and medication adjustment for diagnosed and treated patients referred by their primary care physician.

PHTX614 General Internal Medicine (2 CH)

The General Internal Medicine rotation is a four-week required rotation which allows the provision of evidence-based patient-centered care to patients admitted to the Adult Internal Medicine Service at Tawam Hospital. The Pharm-D students are expected to join the daily multidisciplinary rounds with the medical teaching unit, focusing on management of drug therapy in patients with multiple medical problems.

PHTX615 Drug Information (2 CH)

The Drug Information (DI) rotation is a four-week required rotation in the Drug Information Service. DI under medication management and use is responsible for providing comprehensive, unbiased, evidenced-based medication information; coordination of the activities of the Pharmacy and Therapeutics Committee (PTC); coordination of the medication use evaluation program and other quality improvement initiatives. Additional activities of the DI include management of the hospital formulary system and non-

formulary process, development of departmental/hospital policies/protocols to standardize practices and improve overall safety of the medication use process, education of staff regarding medication use policy guidelines and formulary changes through publications, written communications and presentations. A general overview of basic elements in clinical research and good clinical practice will be covered.

PHTX616 Adult Oncology (2 CH)

The Adult Oncology is a four-week elective rotation. Oncology patients are admitted in to the Oncology/Hematology. The Adult Medical Oncology/Hematology Service in Tawam Hospital is divided into two units. 1. Students are expected to join the medical oncology service multidisciplinary rounds each morning 9-11 AM, Sunday-Thursday. At any given time, the majority of patients are hospitalized for complications of their treatment regimens and/or disease. 2. The rest are hospitalized for chemotherapy and/or radiation. Commonly encountered solid tumors are breast, colon, lung, head and neck, and ovarian cancer. Commonly encountered supportive care issues include pain, nausea/vomiting, bone metastasis and neutropenic fever. Students on rotation will have the opportunity to work with a multidisciplinary team to care for patients with oncologic disorders and related emergencies.

PHTX617 Pediatric Oncology (2 CH)

The Pediatric oncology rotation is a four-week elective rotation. Pharm-D students on rotation will have the opportunity to work with a multidisciplinary team to care for pediatric patients with hematologic disorders, oncologic emergencies, acute complications related to cancer, acute leukemia, aggressive lymphomas, and solid tumors requiring complicated or aggressive chemotherapy regimens.

PHTX618 Infectious Diseases (2 CH)

Infectious Diseases is a four-week elective rotation that focuses on the provision of pharmaceutical care to patients seen by the Adult In-patient Infectious Diseases (ID) Service. Patients therefore span all services, in-patient locations, and levels of acuity. The Pharm D student will be responsible for assessing the appropriateness of each patient's medical therapy, designing and modifying therapeutic regimens, and identifying and maintaining therapeutic goals.

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 General Pediatrics (2 CH)

The General Pediatrics rotation is a four-week required rotation that focuses on the provision of complete pharmaceutical care services to the pediatric patient population admitted to the general medical unit. The pediatric general medical unit is a 36-bed unit. The patients range in age from newborns to young adults. In addition to general medical cases, other admissions include transfers from PICU and NICU. The student must assume responsibility and accountability for all pharmacotherapy management issues for their assigned patients.

PHTX621 Critical Care Medicine (2 CH)

The critical care rotation is a four-week required rotation allowing the provision of pharmaceutical care to a complex critically ill adult, pediatric and neonatal patient population. The adult and pediatric intensive care (PICU) units are 20-bed and 6-bed medical / surgical / cardiac and oncology tertiary care units, respectively. The neonatal intensive care unit (NICU) is a 35-bed unit; patients include both premature infants and term babies with underlying disease. Exposure to a variety of disease states and pharmacotherapy management experience occurs during the rotation. The PICU / NICU are also capable of providing many new and investigational therapies. The student must assume responsibility and accountability for all pharmacotherapy management issues for their assigned patients.

PHTX622 Emergency Medicine (2 CH)

The Emergency Medicine Rotation is a four-week, elective, experientially oriented rotation where the student will be exposed to a broad representation of medical and surgical cases encountered in an emergency department. The focus of experience will emphasize knowledge of evaluation skills and methods for screening the emergencies. There will be a special focus on obtaining relevant history, especially medication history, and performing medication reconciliation. The rotation will provide the student with opportunities to observe the application of special skills in the emergency setting (e.g. interpretation of electrocardiograms, x-rays, CPR and other resuscitation techniques). A major goal of this experience is involvement in pharmacokinetic drug dosing, management of poisoning and drug overdose, as well as the provision of drug information to the multidisciplinary healthcare team on therapeutic/pharmacological intervention. Students are expected to collaborate with emergency physicians, emergency nurses, and other healthcare professionals to promote medication use in the Emergency Department that is evidence-based. Additionally, they will have the opportunity to practice their patient education skills through educating patients and their caregivers about safe and effective medication use.

PHTX623 Research Project (4 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 involved in mentoring the clinical rotation courses 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 written project by the last week of the semester.

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 Surgery (2 CH)

The Surgery rotation is a four-week, elective, experientially oriented rotation where the PharmD 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.

PHTX630 Drug Information and Literature Evaluation Course (3 CH)

This course is designed to provide students with important skills needed for the provision of drug information in pharmacy practice. Emphasis will be placed on interpretation and critical evaluation of primary medical literature in order to make patient-specific recommendations. Formulary management, clinical practice guidelines, and mechanisms for evaluating and reporting adverse drug events will also be reviewed. This course will enhance both verbal and written communication skills through multiple small group discussions and several written assignments, including the preparation of a drug formulary monograph.

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.

CANB602 Advanced Cancer Biology (2 CH)

This course will focus on molecular and cellular mechanisms behind cancer progression, invasion, metastases and consequences of cancer. Particular focus on the control pathways will provide students the background to the cutting edge of drug design for targeted cancer therapy. This course should provide the students with the tools to be able to identify the cellular and molecular changes lead to cancer development, invasion, consequences and therapy. Students should be able to outline the cellular pathways involved in angiogenesis, invasion and metastatic progression and the basic principals involving inflammation and cancer and cancer immunology. The students should also be able to describe the basic principles of cancer therapeutic approaches

PHSY700 Principles of Pathophysiology (3 CH)

The Principles of pathophysiology course will provide students with the selected topics in changes occurring in disease (pathophysiology). Several major organ system will be reviewed with special emphasize on feed-back mechanisms going wrong in different diseases. The Course will be given so that each lecture is followed by a seminar/discussion.

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.

PHYL301 Advanced Physiology (3 CH)

To cover the core principles of human physiology, to facilitate an understanding of the normal function of the major organ systems of the body, and to introduce pathophysiology of selected systems. Particular focus will be placed on the concept of homeostasis and the fundamental mechanics and regulation of each system. Success in this course will require the use of several skills. The ability to assimilate and recall a significant amount of information accurately will be extremely important. Success in this course will require integration of knowledge, the ability to interpret physiological data, and an understanding of the dynamic relationship between components of any system and how it interacts with other systems.

Psychiatry and Behavioral Science

ETHC314 Law Ethics And Professionalism (2 CH)

This course will discuss topics in Law Ethics And Professionalism at the bachelor level.

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.

PSCH307 Social Behavioral Sciences (3 CH)

This interesting course is designed to introduce students to basic socio-psychological concepts and is intended to enhance one's understanding of social and behavioral science and of oneself and others in terms of concepts developed by different social and psychological theorists. Students enrolled in the course are familiarized with the basic concepts of; how behavior is motivated, how people perceive, learn, and think, how individuals differ from one another, how personality develops from infancy to maturity and is expressed by behavior, and how interpersonal factors affect human relationships in the home, on the job, and in the community. Across each of the general unit areas, the course takes a contextual perspective, considering the influences of social, psychological, biological, developmental and cultural environmental community factors.

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.

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.

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

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.

Corequisites
BIOC205

BIOC230 General 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

BIOC250 Basic Ecology (3 CH)

This course aims at studying the science of ecology with special emphasis on ecosystems and their components. It includes definition of ecology, historical overview, relationship of ecology to other disciplines, types of ecosystems, energy flow in the ecosystems, nutrient cycles, examples of major world ecosystems as well as the major habitats and subsystems in the U.A.E., biodiversity, population dynamics, pollution and its control.

Prerequisites
BIOC205
Or
BIOE240

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

BIOC275 Genetics Laboratory (1 CH)

This course aims to provide an in-depth approach toward understanding fundamental key aspects of cell biology and genetics, including structural and functional features of cell components and organelles as well as the pattern of inheritance involved in different traits. To provide an understanding of the problems regarding principles and procedures of identifying underlying genetics basis of traits in higher plants and animal including man. To develop acquaintance of the techniques used in genetics and cell biology and how to utilize these techniques in empirical investigation of biological phenomena.

Corequisites
BIOC270

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

BIOC480 Research Project (3 CH)

This course aims at training the student, practically and theoretically in conducting scientific research under the supervision of a staff member of the department.

BIOC490 Advanced Bioapplications (Capstone) (2 CH)

This laboratory intensive course aims at providing students with important practical skills that benefit them in their work after graduation. The course will consist of three modules that cover the three tracks of the department. The students will select two out of the three modules, each with 1.0 Cr. H. Module A will cover advanced techniques in Track 1 of the curriculum. Module B will cover advanced techniques in soil and water mineral analysis, collection and preservation of plant herbarium specimens, algal isolation and growth in liquid media. Module C will cover advanced techniques in Track 3 of the curriculum.

BIOC494i Issues in Environmental Impact (3 CH)

The course aims at integrating the Knowledge and skills gained in the courses of the environmental and ecological track. It includes topics on the current and future consequences, as well as the possible solutions for the major local environmental problems, especially those of UAE, such as conservation of natural and biological resources, water problems, desertification, land degradation, hazardous wastes, oil, spills, pest and weed control and other contemporary issues.

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.

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

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

BIOE410 Field Survey & Environmental Assessment (3 CH)

This course introduces the student to several of the major tools of environmental impact assessment through lectures, readings, plan reviews, and the development of an environmental impact assessment plan. The course covers environmental assessment laws and regulations, elements of environmental assessment, and methodologies in environmental assessment.

Prerequisites
BIOE240

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

BIOE452 Oceanography (3 CH)

This course aims at developing a clear understanding of the basic concepts of oceanography as an integrated part of the student's overall curriculum. It includes basic oceanography, topography of ocean basins and physical properties of ocean water, ocean circulation, waves, tides, marine sediments, marine pollution, air-sea interaction, and exploitation of ocean resources, marine fouling, different marine phenomena, marine instrumentations and scientific diving.

Prerequisites
BIOC205
Or
BIOC250

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.

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 aims at introducing the student to the essentials of animal behavior. It includes: mechanisms of behavior, genetic bases and learned behavior, behavioral ecology,

stimuli and communication, social organization, motivation and decision-making, the phylogeny of behavior, and learning and memory.

Prerequisites
BIOC250 with a minimum grade D

BIOE459 Conservation Biology (3 CH)

This course aims at providing students with the basic concepts of conservation biology. It includes the study of biological diversity and factors leading to its loss; vulnerability of living organisms to extinction; designing, establishing and managing protected areas; and working with people to restore the environment.

Prerequisites
BIOC250 with a minimum grade D

BIOE580 Integrated Coastal Zone Management (3 CH)

The course focuses on the evolution of the concept of coastal zone management and the implication for environmental management and policy. Particular attention will be placed on the Arabian Gulf Coastal Zone and associated estuaries. In this context policies regarding the management of biotic resources and the evolution of ports and industrial areas will be illustrated. The use of mathematical models as tools for the assessment of different management options will be shown.

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.

BIOE610 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.

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.

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.

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.

BIOE627 Desert Ecology (2 CH)

Ecological concepts and dynamics of desert ecosystems. Plant and animal sociological relations and methods of assessing. Relationships and dynamics affecting management of desert ecosystems (historical, economic, sociological). Human impact on abundance, distribution and ethology of wildlife in desert ecosystems.

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.

BIOE630 Aquatic Ecology (3 CH)

This course examines the diversity of organisms in aquatic environments - population and community ecology, productivity, evolution, and biogeography. A broad overview of these elements is integrated with a detailed consideration of different aquatic ecosystems around the world. Field trips will include an examination of aquatic habitats.

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.

BIOE640 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 and 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.

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.

BIOE659 Conservation Biology (3 CH)

Students will lead group discussions of global biodiversity and extinction, human impact, assessment tools, values in conservation, approaches to conservation, managing threatened species and habitats, and conservation practice. Prerequisites: Topics in Ecology and Environmental Sciences or consent of Ph.D. committee.

BIOE665 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.

BIOE682 Desert Ecology (3 CH)

This course is an examination of the ecology of desert ecosystems with particular reference to Middle Eastern deserts. Emphasis is placed on the strategies employed by desert-living organisms, which allow them to survive and prosper under desert conditions. Field trips are an integral part of this course.

BIOE694 Ecotoxicology (3 CH)

The course provides a broad overview of different aspects of ecotoxicology, including environmental chemistry, toxicology, ecology and risk assessment related topics. Special emphasis is focused on the fate of chemicals in the environment and uptake in organisms, and the impact on food chains and webs. It also covers toxicity testing, risk assessment, toxics reduction, and examples of bioremediation. Prerequisites: Topics in Ecology and Environmental Sciences or consent of Ph.D. committee.

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.

BIOE720 Ecosystem Management & Sustainability (3 CH)

This course will introduce students to the basic 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. Different case studies will be presented to demonstrate how ecological concepts and principles can be applied to the sustainable management of 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.

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

BIOG330 Mycology (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
BIOC230

BIOG332 Parasitology (3 CH)

This course aims at introducing the basic concepts of parasitology. It includes the types of animal associations, adaptations to parasitic mode of life, infection, transmission, pathology, symptoms, diagnosis, treatment and control of parasitic protozoa and helminthes as well as host-parasite relationships.

Prerequisites
BIOC230 with a minimum grade D

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

BIOG360 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
BIOC205

BIOG400 Biology of Invertebrates (3 CH)

This course aims at covering the major aspects of invertebrate biology including: morphology and anatomy; phylogenetic relationships and evolution; physiology, behavior and ecology; reproduction and development of the major types of invertebrates whether aquatic or terrestrial, free-living or symbiotic. The course emphasizes the importance of diversity and the role of extinction in the composition of the extant invertebrate groups.

Prerequisites
BIOC205

BIOG433 Biology of Vertebrates (3 CH)

The course aims at exploring how the anatomy, physiology, ecology, and behavior of vertebrate animals interact to produce organisms that function effectively in their environments. In addition, the students will learn how biodiversity changed through evolutionary time, and how animals have come to dominate all of the world’s habitats.

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

BIOC230

BIOG445 Animal Physiology (3 CH)

This course aims at covering the interplay and communication that coordinates cells into organ systems and organisms as whole. Different organ systems including nervous system, hormonal system, cardiovascular system, respiratory system, immune system and urinary system will be discussed emphasizing how these system are integrated and how homeostatic is maintained during health or challenged under conditions of disease and stress.

Prerequisites

BIOG315

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

BIOG460 Botany (3 CH)

This course aims at studying the basic principles of plant life. Topics of study include: structures and functions of flowering plants and their cells, tissues, flowers, fruits, and seeds, cell metabolism emphasizing on transport of water and nutrients, and growth and development of plants from seed to maturity. Related investigations take place during three hours of lab each week. Laboratory topics include: a microscopic study of tissues, and study the diversity of plants and their relatives. A greenhouse is available for class use.

Prerequisites

BIOC205

BIOG470 Plant Anatomy (3 CH)

This course aims at covering the major aspects of the internal structure of vascular plants, with an emphasis on the angiosperms (flowering plants) but taking into consideration certain features of gymnosperms and lower vascular plants for comparison purposes. The course emphasizes the functional significance of plant structure, development and phylogeny of the plant tissues and organs, because complete interpretation of plant

function, classification, ecology, etc. depends on a good basic understanding of plant structure, morphology and anatomy.

Prerequisites
BIOC205

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

BIOL463 Immunology (2 CH)

This course aims at developing a clear understanding of the basic concepts of immunology. It includes studying the immune system (organs, cells, and molecules), types of immunity, control and dynamics of the immune system in health and disease, and immuno-techniques.

Prerequisites
BIOC290

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

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
BIOC230

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

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)

This course aims at focusing on how cells communicate in order to coordinate their growth, differentiation, and metabolism. The first section discusses the mechanisms of Cell-to-Cell communication either by direct contact via gap junctions or over longer distances. The course also covers the structure and the role of the cell junction, extracellular matrix (ECM), cell adhesion molecules (CAMs), and cell-ECM interactions in repair and regeneration. Moreover, the molecular aspects of cell differentiation in different animal tissues will be discussed. The last section examines the cell cycle and genes involved in cell division and apoptosis. It also describes how cancer cells escape the normal genetic control and fatal consequences of their transformation. Finally, the various strategies used to kill these malignant cells or to bring them back to normal life are also described with a special emphasis on stem cell and/or gene therapy.

Prerequisites

BIOC290

BIOM432 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.

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 aims at developing a clear understanding of the basic concepts of immunology. It includes studying the immune system organs, cells, and molecules, types of immunity, control and dynamics of the immune system in health and disease, and immuno-techniques.

Prerequisites

BIOM229 with a minimum grade D
Or
BIOC290

BIOM466 Genetic Engineering (2 CH)

This course aims at studying strategies and tools of gene cloning. It includes expression of foreign genes in bacterial and mammalian cells as well as the polymerase chain reaction technology PCR and its applications.

Prerequisites

BIOM399 with a minimum grade D

BIOM473 Biotechnology (2 CH)

This course aims at introducing the multidisciplinary field of biotechnology and its impact on human life through several examples of applications. This course includes techniques and applications of modern biotechnology in plant and animal agriculture, new therapies for diseases and, discusses the legal, social and ethical aspects of biotechnology.

Prerequisites

BIOM399 with a minimum grade D

BIOM482 Cell Biology II (2 CH)

This course is a continuation of the Cell Biology 1 course. It aims at studying the aspects of cell-cell and cell-extracellular matrix communications and their role in the control of cell proliferation, differentiation, and development. It studies how these processes are impaired in cancer and the various therapeutic strategies.

Prerequisites

BIOM229 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

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.

BIOM524 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.

BIOM536 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.

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

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.

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.

BIOM630 Molecular Basis of Diseases (3 CH)

The course provides the students with a fundamental understanding of molecular mechanism underlying various pathological conditions. Attention will be given to identification of mutations, chromosome abnormalities, cytogenetics, nature of the genetic alterations in carcinogenesis, germinal mutations, neurodegenerative diseases, preimplantation genetic diagnostics, prenatal molecular diagnosis. Various aspects of disease resistance and response mechanisms in plants may also be covered. Prerequisite: Topics in Cellular and Molecular Biology or consent of Ph.D. program committee.

BIOM635 Applied Immunobiology (3 CH)

Students will be exposed to applied aspects of immunology. Topics covered include: Inherited immunity, actors and mechanisms, 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. Prerequisite: Topics in Cellular and Molecular Biology or consent of Ph.D. program committee.

BIOM640 Molecular Physiology (3 CH)

Signal transduction mechanisms used by membrane ion channels and receptors that detect the microenvrionemental 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. Prerequisite: Topics in Cellular and Molecular Biology or consent of Ph.D. program committee.

BIOM645 Selected Topics in Biotechnology (3 CH)

The intent of this course is to introduce the student to industrial uses of microorganisms, and to develop an understanding of the role of microbial diversity in biotechnology. Emphasis will be given to the physiological aspects of particular microbes that make them attractive to industry and the basic research required developing them as tools of technology. The material will be presented through lectures and student presentations. Prerequisite: Topics in Cellular and Molecular Biology or consent of Ph.D. program committee.

BIOM687 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. Different aspects of plant development will also be covered. Prerequisite: At least minor in Biology including Biochemistry course (s) or consent of Ph.D. committee.

BIOM693 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. Prerequisite: Topics in Cellular and Molecular Biology or consent of Ph.D. program committee.

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.

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.

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

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

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

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

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.

Prerequisites
ENGU1404 with a minimum grade P

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

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

CHEM221 Analytical Chemistry (3 CH)

This course deals primarily with non-instrumental techniques in quantitative chemical analysis. The topics covered include volumetric and gravimetric methods which based on solution equilibria such as acid-base, complexometric, redox and gravimetric reactions. The course also aims to introduce students to the various types of errors in chemical analysis, kinetic methods of analysis and non-chromatographic separation methods. The associated laboratory experiments provide experience in applying these methods in chemical determinations.

Prerequisites

CHEM112 with a minimum grade D
CHEM115

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

CHEM2703 Organic Chemistry & Engineering Applications I (3 CH)

Types of bonding, hybridization of carbon. Naming, preparation in the laboratory and on an industrial scale, applications, chemical and physical properties of organic compounds: Aliphatic and aromatic hydrocarbons, alkyl halides, alcohols, thio alcohols, phenols, ethers, sulfides, aldehydes, ketones, carboxylic acids and derivatives, amines, polymers, structure/physical property relationships in organic chemistry.

Prerequisites
CHEM111 with a minimum grade D

CHEM2705 Physical Chemistry & Engineering Applications I (3 CH)

The first law of thermodynamics. Thermochemistry. Second law of thermo-dynamics. Entropy. Free energy. Third law of thermodynamics. Absolute zero. Phase equilibria. Solutions. Chemical Equilibria. Electrochemistry. Attention will be focused on the underlying engineering applications.

Prerequisites
CHEM112
CHEM175 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

CHEM281 Analytical Chemistry for Non-Majors (3 CH)

This course covers both classical and instrumental methods of chemical analysis. Titrimetric methods based on acid-base reactions, complex formation, precipitation, oxidation-reduction reactions are covered. Instrumental methods include spectrochemical, electrochemical and chromatographic techniques. The practical component includes experiments related to the above topics.

Prerequisites
CHEM111 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
CHEM2703 with a minimum grade D
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

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
MATH110 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

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

CHEM361 Biochemistry (3 CH)

Structure and chemical behavior of biochemical compounds, levels of protein structure, steady state enzyme kinetics and activities, fatty acid metabolism and lipoproteins utilization, phospholipids and membrane assembly, nucleotides and nucleic acids, amino acid metabolism, carbohydrate metabolism and intermediary regulation, bioenergetics and oxidative phosphorylation. The experimental component 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

Corequisites
CHEM241 with a minimum grade D

CHEM3707 Instrumental Analysis for Chemical Engineering (2 CH)

The course deals with the fundamental concepts and applications of instrumental techniques in chemical analysis. The course covers some spectroscopic, electroanalytical, thermal, mass spectrometric and chromatographic methods of analysis.

Prerequisites
CHEM112 with a minimum grade D

CHEM417 Advanced Laboratory Techniques (1 CH)

This course involves students getting some exposure to selected advanced chemical laboratory techniques across all domains of chemistry, involving a problem-based learning approach.

Prerequisites
CHEM337
CHEM345 with a minimum grade D
CHEM356 with a minimum grade D
CHEM361 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).

CHEM421 Instrumental Analysis II (2 CH)

This theoretical course aims to introduce students to the general principles, basic instrumental aspects, and analytical applications of mass spectrometry, infra red spectroscopy, nuclear magnetic resonance spectroscopy, atomic X-ray and hyphenated techniques.

Prerequisites
CHEM321 with a minimum grade D

CHEM431 Inorganic Chemistry III (2 CH)

This course covers the descriptive chemistry of main-group and transition metal elements and compounds synthesis, structures, properties, acid-base character, reactivities etc.. The course will cover selected main-group chemistry from the Periodic Table of Elements and selected elements and their associated complexes from the first-row transition metal d-block elements.

Prerequisites
CHEM331 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

CHEM451 Physical Chemistry III (2 CH)

This course is a continuation of CHEM 351. It introduces quantum mechanical treatment of the harmonic oscillator and the rigid rotor models, quantum angular momentum, the hydrogen atom, multi-electron atoms, chemical bonding, and molecular orbital theory.

Prerequisites
MATH110 with a minimum grade D
CHEM351 with a minimum grade D

CHEM452 Electrochemistry (2 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 and applications will be studied.

Prerequisites
CHEM251 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.

CHEM542 Protein Chemistry- Structure and Function (3 CH)

A study of the evolution, structure, dynamics, stability, folding and degradation of proteins as well as the relationships between primary, secondary, tertiary and quaternary structure and catalytic properties of enzymes. The student will explore the relationship between conformation and energy change and the enzyme kinetics and mechanisms of catalysis.

CHEM543 Advanced Metabolism (3 CH)

Amino acid, nucleotide, carbohydrate and lipid metabolism with focus on regulation; allosteric regulation and its relevance to enzyme mechanism and metabolic function; and/or genetic regulation of an enzyme or group of enzymes in a related pathway.

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.

CHEM553 Chemical Applications of Group Theory (3 CH)

Develops foundations for application of elementary group theory to organize or simplify problems in quantum chemistry. Applications include molecular orbitals, molecular vibrations, and ligand field environments.

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

CHEM563 Molecular Spectroscopy (3 CH)

Molecular energy levels, Spectroscopic selection rules, Applications in rotational, vibrational and electronic spectra of molecules, Chemical bonding

CHEM601 Organic Reaction Mechanisms (3 CH)

A mechanistic view of free-radical reactions, polar reactions, dipolar reactions, pericyclic reactions, frontier molecular orbital theory.

CHEM602 Polymer Chemistry (3 CH)

Chemistry of polymers, including synthetic methods, mechanisms and kinetics of macromolecule formation, and polymer characterization techniques.

CHEM603 Spectroscopic methods of structure determination (3 CH)

Elucidation of molecular structure utilizing IR, UV, and NMR spectroscopy, mass spectrometry, and other methods.

CHEM604 Biotechnology in the Modern World (3 CH)

This course will investigate how the exploitation of biological systems has been used to manufacture biological and medical products. The course will begin with the history of the biotechnology industry and move to the most common technologies employed and finish by discussing the regulation of the industry and its products. Topics will include therapeutic (proteins, antibodies, retroviruses, etc.) as well as diagnostic (ELISAs, Enzymatic assays, etc.) products that have been developed and are in the pipeline.

CHEM605 Mechanisms of cellular signal transduction (3 CH)

This course investigates signaling systems, which allow inputs from outside of a cell, such as growth factors and hormones to regulate cellular behavior. The student will study the mechanisms by which activation of intracellular and cell surface receptors control cell metabolism, motility, proliferation, survival and how different classes of molecules exert their actions. The course emphasizes a mechanistic understanding of how signaling proteins are regulated, a historical view of how signaling pathways were elucidated, and an investigation of the tools used to study signal transduction. Topics will also include the role of (aberrant) cell signaling in cancer biology.

CHEM606 Structure, Bonding and Properties of Solids (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 special emphasis on nano-materials in advanced applications such as electronics and catalysis.

CHEM607 Fundamentals of Polymeric Materials (3 CH)

Chemistry of monomers, oligomers and polymers. Polymerization mechanisms, processes synthesis and polymerization kinetics; structure of glassy, crystalline, and rubbery polymers. Emulsion, suspension , bulk and solution polymerizations. Structure of amorphous and crystalline polymeric materials Techniques for polymer characterization and analysis.

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.

CHEM610 Polymer Synthesis (3 CH)

Fundamentals of polymerization reaction mechanisms and kinetics for step growth, chain growth, free radical, anionic, cationic, metathesis and ring opening polymerizations. Treatment metal, Ziegler-Natta, and Metalloncene chemistry. Chemistry of living anionic, cationic and free radical polymerizations. Co-polymers and reactivity ratios. Block and graft copolymerization. Stereochemical and tacticity in polymers. Polymerization reaction in batch, continuous stirred tank reactor (CSTR) and tubular reactor.

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.

CHEM620 Corrosion and Wear of Materials (3 CH)

Theory and mechanisms of corrosion, thermodynamics, kinetics of corrosion. Passivity; Pourbaix diagrams; corrosion rate testing and measurements; forms of corrosion; effects of alloy and environmental variables; corrosion testing. Wear mechanisms: adhesive, abrasive, erosive. Fretting; surface roughness, wear testing. Coatings for corrosion and wear protection. Effect of mechanical stress on corrosion, examination of various topics in the area of electromechanical and corrosion science, corrosion testing.

CHEM630 Polymerization Engineering (3 CH)

Properties and synthetic routes of important industrial polymers (LDPE, HDPE, LLDE, etc.). Economic and chemical development and feeds tocks. Rubber elasticity, polymer, morphology and molecular orientation. Glass transition temperature. Liquid crystalline polymers. Blend and alloys. High-temperature polymers; Thermal stability, degradation mechanism. Viscoelastic behavior of elastomers and plastics. Reaction injection molding and resin transfer molding.

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

CHEM702 Advanced Organic Chemistry (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.

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.

CHEM704 Molecular Structure and Bonding (3 CH)

This course describes modern theories of chemical bonding 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 and electrochemical properties of main group and transition metal compounds.

CHEM705 Modern Physical Chemistry (3 CH)

Includes classical and statistical thermodynamics, chemical kinetics, advanced molecular quantum mechanics and spectroscopy, elements of computational chemistry.

Geology

GEOA250 Paleontology (4 CH)

The objectives of this course are the study of the main invertebrate fossils groups, their applications in stratigraphy, palaeoecology and their importance in the petroleum exploration especially in the United Arab Emirates. It concentrates on the study of major fossil groups (micro-and macrofossils) and selected fossils from the local outcrops including Foraminifera, Calcareous Nanofossils, Ostracodes, Conodonts, Palynomorphs, Porifera, Cnidaria, Bryozoa, Brachiopoda, Mollusca, Echinodermata, Trilobites, Graptolites and trace fossils. Study their characteristic morphology, microstructure, chemistry, mineralogy, geological time scale, their origins and systematic affinities, fossilization process, nomenclature, evolution, extinction and important role in the history of life on Earth.

GEOA290 Structure Geology & Tectonics (4 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 second half of the course deals with tectonics, particularly plate margins and their characteristic deformations. The significance of plate tectonics for resource exploration will also be mentioned.

GEOA320 Mineralogy (4 CH)

This course aims to develop a clear understanding and basic knowledge of the properties and theories of light, the polarizing light microscope, mineral optics in ordinary light and in polarized light. Optical properties of minerals in crossed polars observations. Convergent light and interference figures. Uniaxial and biaxial minerals. Rock-forming minerals. Crystallography and crystallographic projection.

GEOA322 Igneous & Metamorphic Petrology (4 CH)

This course aims to develop a thorough knowledge of the characteristics and origins of igneous rocks, igneous processes, chemical patterns in igneous rocks, igneous rock associations: description, occurrence and origin. Lamprophyre dykes. Processes in metamorphic rocks. Description and origin of contact, regional and dynamic metamorphic rocks. Review of the origin of igneous and metamorphic rock associations. Ophiolites of the UAE.

GEOA325 Sedimentology & Stratigraphy (4 CH)

This course provides comprehensive and focused education in the fields of sedimentology and stratigraphy that will enable the student to understand and evaluate geological processes on the earth's surface and deeper.

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.

GEOA412 Remote Sensing and GIS (3 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

GEOA414 Environmental Geology (3 CH)

This course deals with the principles of environmental Geology 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.

GEOA452 Economic Geology (3 CH)

This course covers the following topics: theories of ore genesis, different techniques used in the study of ore deposits: fluid inclusions, stable isotopes, chemical analyses and ore microscopy, ore-forming processes - magmatic, hydrothermal and sedimentary. Distribution of ore deposits in relation to plate tectonics and throughout Geologic time. Mineral resources of the UAE.

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.

GEOA461 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.

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.

GEOL105 Physical Geology (3 CH)

Origin of the Earth and its shells. Composition of the Earth's crust and oceans, and their Geological characteristics. Primary and secondary structures. Internal Geological processes. Plate Tectonics and the relation of Geological events to it. External Geological processes. Stratigraphic columns, details of the Geological Time Scale and case studies of Geological ages and their palaeogeographic distribution. Climate. Important biological aspects.

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.

GEOL115 Physical Geology for Petroleum Engineering (3 CH)

This subject presents the fundamental principles of geology and their context in the evolution of the Earth. It introduces the main concepts in the foundational disciplines of mineralogy, sedimentary petrology, stratigraphy, paleontology, structural geology and tectonics, with some reference to igneous and metamorphic petrology, geomorphology, resource geology and engineering geology.

GEOL245 Invertebrate Paleontology (3 CH)

The objectives of this course are the study of the main invertebrate groups and their applications in stratigraphy and palaeoecology. It includes two modules. The first deals with general palaeontology: fossilization, ecology and palaeoecology, mode of life, palaeogeography, classification and nomenclature, evolution and extinction. The second module deals with the study of the taxonomic groups: Foraminifera, Porifera, Cnidaria, Bryozoa, Brachiopoda, Mollusca, Echinodermata, Trilobites, Graptolites and trace fossils.

Prerequisites

GEOL105 with a minimum grade D

GEOL285 Structural Geology (3 CH)

This course aims at teaching an introduction and review of fundamental concepts in structural Geology. Measurement of attitudes of planes and lines. Use of the compass. Non-tectonic/Primary sedimentary structures and unconformities. Concepts of stress and strain. Mechanical behavior of rocks. Secondary structures: faults, folds and joints. Cleavage, foliations and lineations. Analysis of Geological structures.

Prerequisites
GEOL105 with a minimum grade D

GEOL320 Optical Mineralogy (3 CH)

This course aims to develop a clear understanding and basic knowledge of the properties and theories of light, the polarizing light microscope, mineral optics in ordinary light and in polarized light. Optical properties of minerals in crossed polars observations. Convergent light and interference figures. Uniaxial and biaxial minerals. Rock-forming minerals.

Prerequisites
GEOL105 with a minimum grade D

GEOL322 Igneous & Metamorphic Petrology (3 CH)

This course aims to develop a thorough knowledge of the characteristics and origins of igneous rocks, igneous processes, chemical patterns in igneous rocks, igneous rock associations: description, occurrence and origin. Lamprophyre dykes. Processes in metamorphic rocks. Description and origin of contact, regional and dynamic metamorphic rocks. Review of the origin of igneous and metamorphic rock associations. Ophiolites of the UAE.

Prerequisites
GEOL320 with a minimum grade D

GEOL325 Sedimentary Rock & Sedimentation (3 CH)

The course includes the description of the processes of formation of sediments. It covers the techniques used in the analysis and description of sediments, the transformation of sediments into sedimentary rocks and the details of diagenetic processes. Description of all varieties of sedimentary rocks and their fabrics, with examples from the UAE region. The economic potential of sedimentary rocks will be highlighted.

Prerequisites
GEOL320 with a minimum grade D

GEOL330 Stratigraphy (3 CH)

This course aims to promote a clear understanding of the basic concepts of stratigraphy. It includes the law of superposition, faunal succession, lithological and faunal correlations, uniformitarianism, law of facies succession, lithostratigraphy, biostratigraphy, chrono-

stratigraphy, geologic time, magneto-stratigraphy, mass extinction, subsurface stratigraphy and stratigraphy of the United Arab Emirates.

GEOL372 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.

Prerequisites

GEOA290 with a minimum grade D
MATH105 with a minimum grade D
PHYS105 with a minimum grade D
GEOL285 with a minimum grade D

GEOL458 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.

Prerequisites

GEOL325 with a minimum grade D

GEOL499 Field Geology (4 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.

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

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.

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)

Non-renewable resources: oil, gas and coal, nuclear energy. Renewable resources: geothermal energy, solar, wind and tidal wave energy. Integration of resources. Centralized networks, economics, and future needs. Reserves and conservation measures. Middle East resources and problems.

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.

GEOL600 Source Rock Characterization (3 CH)

Origin of fossil fuels, Chemical structures and conventions. Formation , composition and maturation of Kerogen. Composition of bitumen, petroleum and natural gas. Factors affecting composition of bitumen and petroleum. Primary and secondary migration of oil. Analytical techniques of source rocks (extraction, fractionation and biomarker analysis). Source rock evaluation (quantity, quality and maturity of organic matter. Predicting thermal maturity.

GEOL601 Crude Oil Characterization (3 CH)

Gross oil composition. Molecular properties of crude oil. Source input and depositional environment of crude oil. Maturity of crude oil. Effects of migration on the biological markers of oils. Correlation of oils and source rocks. Analytical techniques of crude oil. Reservoir transformations of crude oil (cracking, de-asphalting, water washing and biodegradation). Major reservoir problems such as communication within a reservoir and formation of tar-mats.

GEOL602 Advanced Reservoir Geology (3 CH)

Analysis of geologic controls on composition and architecture of oil and gas reservoirs, with emphasis on reservoir heterogeneity resulting from depositional and diagenetic processes. Geological and petrophysical determinants of fluid flows and behavior. The depositional processes, depositional environments, and basin settings of different clastic and carbonate hydrocarbon reservoirs and their hydrocarbon potentiality will be discussed in this course.

GEOL603 Geophysical Exploration (3 CH)

The course aims to understanding the background theory of the electromagnetic exploration techniques. It includes the mechanisms of conduction and polarization in earth materials. It covers all the major exploration techniques resistivity, induced polarization, VLF-EM, time domain EM, frequency domain EM slingram and magnetotellurics, with special emphasis on survey design, data analysis and interpretation.

GEOL604 Basin Modeling (3 CH)

The modeling of sedimentary basin takes many different forms including geological modeling, structural modeling, Geochemical modeling, and reservoir simulation. In this course students will be exposed to these different types of basin models, the required input data for each of these model types, and the methodology for modeling as well as the application of the result of each model. The student will learn how to incorporate data from basin analysis, reservoir characterization, petrophysical data, structure data, and reservoir geochemistry into a reservoir simulation.

GEOL605 Advanced Structural Geology (3 CH)

This course aims at systematic assessment of the evolution of hydrocarbon basin through space and time and usefulness in exploration practices. The course will provide the students with fundamentals controlling basin development through burial and tectonic history.

GEOL606 Sequence Stratigraphy (3 CH)

This course aims to provide introduction of geological, geophysical and geochemical methods used in the evaluation of petroleum bearing sedimentary rocks. The course will also include evaluation of geological risk and optimization in exploration prospects.

GEOL607 Selected Topics in Petroleum Geoscience (3 CH)

Through this course, faculty members are given the chance to teach new or timely subjects that are not covered in other courses.

GEOL610 Geophysical Instruments & Data Acquisition (3 CH)

The aim of the course is to acquaint the 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.

GEOL615 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.

GEOL620 Carbonate/Evaporate Deposit Systems (3 CH)

This course aims at introducing different features and characteristics, such as porosity modification by diagenesis and reservoir heterogeneity, of carbonate rocks commonly encountered in petroleum producing units. Special emphasis will be given to the carbonates rocks of the UAE.

GEOL621 Diagnetic, Stratigraphy, & Reservoir Evaluation (3 CH)

This course aims to introduce principles of diagenesis in sedimentary rocks and the effects of diagnetic processes on sequence stratigraphy of petroleum reservoirs with respect to basin architecture, relative sea level change and history. The course will also introduce the students to the art of sequence stratigraphic correlation on local, regional and global scale.

GEOL623 Formation Evaluation (3 CH)

This course aims to provide introduction of geological, geophysical and geochemical methods used in the evaluation of petroleum bearing sedimentary rocks. The course will also include evaluation of geological risk and optimization in exploration prospects.

GEOL660 Computer Applications in Geosciences (3 CH)

This course introduces students to the fundamental of computing and to their practical applications in geosciences. Students will conduct computer-based analysis of data, which is mainly based on data collected using techniques of geophysical exploration.

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.

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.

GEOP413 Petrophysics (3 CH)

This course aims to make the student aware of the different types of coring as well as the methods of obtaining, handling and storage of core samples. Also, it aims to teach him the methods of measuring the petrophysical characteristics of reservoir rocks such as porosity, permeability, density, resistivity?etc

Prerequisites
PHYS110 with a minimum grade D
MATH110 with a minimum grade D

GEOP420 Basin Analysis (3 CH)

This course aims at giving the students the knowledge and clues about how much oil remains undiscovered in the sedimentary basins of the world? Where is it? and how do we find it? using crustal and global basin classification. This course identifies the key elements essential to a specific basin / play analysis that lead to oil and gas play definition. It includes a number of case studies about the petroleum basins in the world particularly the Arabian Gulf region.

Prerequisites
CHEM111 with a minimum grade D
GEOP453 with a minimum grade D

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.

GEOP453 Petroleum and Subsurface Geology (3 CH)

The course introduces all the processes which contribute to the transformation of organic matter to petroleum. All types of petroleum systems and their relation to global tectonics are discussed. All analytical techniques and geophysical methods used for exploration and

exploitation are briefly covered. Various kinds of subsurface maps and illustrations are also accomplished. Examples from the UAE are presented throughout the course.

Prerequisites
MATH105 with a minimum grade D
PHYS110 with a minimum grade D

GEOP463 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.

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.

GEOP499 Research Project (2 CH)

This course is designed to enhance the student's research capability in an area of petroleum geosciences. This course also may involve field and laboratory activities as well as literature survey. Final report is required.

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.

Prerequisites

MATU1435 with a minimum grade D

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.

Prerequisites

MATU1435 with a minimum grade D or ENGU1404

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.

Prerequisites
MATU1435

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 with a minimum grade D

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.

Prerequisites
MATH2220 with a minimum grade D

MATH2220 Linear Algebra for Engineering (3 CH)

Linear algebra: matrices; determinants; system of linear equations; eigenvalues and eigenvectors; diagonalization. Some engineering applications. Complex analysis: complex numbers; complex variables; differentiation of complex functions; complex integration; conformal mappings.

Prerequisites
MATH1120 with a minimum grade D

MATH245 Set Theory and Logic (3 CH)

Compound and simple propositions, truth table, quantifiers, propositional calculus, methods of proofs. Sets and operations on sets. Cartesian products, relations, equivalence relation, order relation. Functions, images of sets and cardinality.

Prerequisites
MATH140 with a minimum grade D
Or
MATH2220 with a minimum grade D

MATH246 Number Theory (3 CH)

Divisibility, Euclidean algorithm, prime numbers, the Fundamental Theorem of Arithmetic, the Sieve of Eratosthenes. Congruences, Diaphontine equations, Chinese Remainder Theorem. Fermat's theorem, Wilson's theorem, Euler's theorem, The Legendre symbol and Quadratic Reciprocity.

Prerequisites
MATH215 with a minimum grade D
Or
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 with a minimum grade P

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
Or
MATH205 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

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
MATH210 with a minimum grade D

MATH321 Linear Programming (3 CH)

The general Linear Programming Problem. The Simplex method. The revised Simplex method. Computer implementations. Duality. Parametric linear programming. Interior point methods. Applications including: transportation problem, inventory problems, blending problems and game theory.

Prerequisites
MATH210 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
MATH140 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

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

MATH491 Selected Topics in Pure Math (3 CH)

Selected topics in pure mathematics proposed by the instructor are offered upon the consent of the department.

MATH492 Selected Topics in Applied Math (3 CH)

Selected topics in applied mathematics proposed by the instructor are offered upon the consent of the department. Prerequisite: departmental consent

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.

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.

MATH513 Calculus on Manifolds (3 CH)

Calculus of functions of several variables and of vector fields in Euclidean space. Differentiation and the implicit function theorem. Integration, Fubini's and Sarad's theorems. Integration on chains, fields and forms, geometric preliminaries and the fundamental theorem calculus. Integration on manifolds, Stokes' and Green's theorem on manifolds, the divergence theorem.

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.

MATH516 C*-Algebras (3 CH)

Introductions to Banach and Hilbert spaces, Bounded operators on Hilbert spaces. Introduction to C*-algebras: definition and examples, projections and unitary groups. Types of C*-algebras, Finite and approximately finite dimensional algebras (AF-algebras), the Bratteli diagrams for AF-algebras. The von Neumann algebras and Factors. Irrational rotation algebras and Cuntz algebras. Dimension groups. Basics of K-theory, classifications of C*-algebras using the K-theory and the unitary groups.

MATH517 Advanced Geometry (3 CH)

Affine spaces and subspaces, barycentric combinations, independence, frames, intersections of affine subspaces, convex sets, embedding into vector spaces, Euclidean spaces, inner product, orthogonality, duality, adjoint of linear map, linear isometries (orthogonal transformations), applications. Projective spaces and subspaces, projective maps, projective frames, completion of affine spaces, the cross-ratio.

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.

MATH611 Several Complex Variables (3 CH)

Power series holomorphic functions, representation by integrals, extension of functions holomorhpically to convex domain. Local theory of analytic sets (Weierstrass preparation theorem and consequences). Functions and sets in the projective space P (theorems of Weierstrass and Chow and extensions).

MATH612 Measure Theory (3 CH)

Metric space topology, continuity, convergence, equicontinuity, compactness, bounded variation, Helly selection theorem, Riemann Stieltjes integral, Lebesque measure, abstract measure space, Lp-spaces, Holder and Minkowski inequalities, Riesz-Fischer theorem.

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.

MATH622 Finite Element Methods (3 CH)

Numerical methods for partial differential equations, Finite difference methods for elliptic equations, stability and error estimates of finite difference methods. Finite difference methods for heat equations. Preliminaries of finite element methods, Variational formulation, existence and uniqueness, Cea's theorem, Construction of finite element spaces, Barycentric coordinates, Polynomial approximation theory, Bramble-Hilbert Theorem, transformation formula.

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.

MATH641 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.

MATH643 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.

MATH644 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.

MATH662 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

MATH663 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.

MATH664 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.

MATH670 Advanced Partial Differential Equations (3 CH)

Boundary Value Problems, the Mollifier theorem, basic facts about Hilbert space, Fourier-Sobolev spaces, advanced properties of Sobolev spaces, H-space duality, weak formulation of elliptic boundary value problems, spectral properties of elliptic operators, evolution equations, Parabolic and Hyperbolic equations, linear operators, Introduction to simegroups, the Hille-Yosida theorem, the Lumer-Philips theorem, Alternative development of S/G's, summary of Sg results, analytic semigroups, nonlinear boundary value problems.

MATH671 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.

MATH673 Dynamical Systems (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.

MATH674 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.

MATH675 The Mathematics of Finance (3 CH)

Introduction to the Mathematics' of financial models. Hedging, pricing by arbitrage. Discrete and continuous stochastic models. Martingales. Brownian motion, stochastic calculus. Black-Scholes model, adaptations to dividend paying equities, currencies and coupon-paying bonds, interest rate market, foreign exchange models.

MATH676 Advanced Mathematics of Finance (3 CH)

Introduction to financial investments, Financial assets, Forward contracts. No-arbitrage pricing of forward and futures contracts, zero-coupon bonds, Coupon bonds. Pricing and hedging Exotic options. Stochastic volatility models, Pricing and hedging in Jumps models.

MATH677 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.

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)

Abstract Measure Spaces; The Hahn and Jordan Decomposition; Outer Measure; The Caratheodory-Hahn Theorem; Measurable Functions; Integration of Measurable Functions; The Radon-Nikodym Theorem; Abstract Spaces; The Completeness of ; The Riesz Representation Theorem for the Dual of ; The Kantorovich Representation Theorem for the Dual of Product Measures: The Theorems of Fubini and Tonelli; Lebesgue Measure on Euclidean Space ; Cumulative Distribution Functions and Borel Measures on R.

Prerequisites
MATH612

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

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)

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 normed spaces, countability and separation axioms. Product spaces and quotient spaces. Compactness and connectedness of spaces and properties. Complete metric space and function spaces.

Prerequisites
MATH561

MATH770 Advanced Partial Differential Equations (3 CH)

Review of linear PDEs (Laplace, heat and wave equations), Energy methods, Nonlinear first-order PDEs (characteristics, conservation laws, shocks), Other ways to represent solutions (e.g. similarity solutions, transform methods, asymptotics), Introduction to Sobolev spaces, weak solutions and regularity.

Prerequisites
MATH570

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.

Physics

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

PHYS125 Introductory Physics for IT (3 CH)

The course is offered solely to the information technology students (IT) to provide them with the necessary knowledge in physics. It includes: motion in one dimension, vectors and two-dimensional motion, laws of motion, energy, vibrations and waves, reflection and refraction of light, mirrors and lenses, wave optics, electric forces and electric fields, electrical energy and capacitance, current and resistance, direct-current circuits, magnetism.

PHYS135 General Physics Lab I (1 CH)

The lab is associated with the General Physics I which introduce the students to the basic laws of motion. The students will verify some of these laws by doing the following experiments: Measurements and units, Vectors, Kinematics of motion in one and two dimensions, Newton's laws of motion, Work and energy, Linear momentum and collisions, Rotational motion about an axis and Angular momentum. The lab was recently updated with the state-of-art equipment that uses the latest measurement techniques using sensors controlled by a computer interface. The lab is equipped with: basic length, time and mass meters, motion tracks and sensors, projectile gun, rotational stage, pendulums, data loggers and computers.

Corequisites

PHYS105

PHYS140 General Physics Lab II (1 CH)

The course objective is: to develop a clear understanding of the basic concepts in electricity. It includes: Coulomb's law, equipotential surfaces and electric field lines, capacitors, Ohm's law, Kirchoff's rules, wheatstone bridge, the RC time constant, magnetic flux density, cathode ray oscilloscope, self inductance, R-L-C series and parallel resonance.

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)

The course objectives are: developing a clear understanding of the basic concepts in waves, vibrations and laser. It includes: free damped oscillations, forced oscillations, standing waves, interference of sound waves, spherical mirrors and thin lenses, the optical spectrometer, interference of light waves, diffraction of light waves, polarization of light and polarimeter.

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, β-particle detection, and x-ray diffraction.

Corequisites
PHYS250

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

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 aims at studying the basic concepts of modern physics in comparison to classical physics. It includes: relativity of space and time, relativity of mass, mass-energy relationship, photonic nature of radiation, wave properties of particles, wave function, hydrogen atom, an introduction to quantum mechanics, Schrodinger equation and simple applications to solid and nuclear physics.

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. It includes: vector analysis, power-series methods, complex analysis, Fourier series and applications, Laplace and Fourier transforms, series solutions 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
PHYS262 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.

PHYS320 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
PHYS250

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 electric and magnetic fields, both static and time-dependent. It includes: electrostatics (Gauss's 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)

This course aims at developing a clear understanding of the basic principles of the laser action and applications of lasers. It includes spontaneous and stimulated emission of radiation, Einstein's coefficients, population inversion, laser amplification and oscillation, laser frequencies, laser rate equation, different types of lasers, laser light characteristics, laser applications.

PHYS355 Quantum Mechanics (3 CH)

This course aims at developing a clear understanding of the basic concepts in quantum physics. It includes: concepts of quantum mechanics, Schrodinger's equation, stationary states, operators, one dimensional problems, angular momentum, 3D problems like hydrogen atom, method of approximation and helium atom.

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

PHYS390 Introduction to Astrophysics (3 CH)

Introduction to celestial mechanics. Basic radiation theory; spectra. Observational determination of stellar properties; spectral classification. Binary systems. H-R diagram. Stellar populations. Stellar structure and evolution: white dwarfs, neutron stars, black holes. The galaxy: structure and composition; the interstellar medium. Other galaxies; active galaxies. Cosmology.

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

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

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)

Building upon the student’s previous knowledge on Phys 355, this course introduces a number of modern concepts in quantum mechanics. Topics 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)

This course aims at developing a clear understanding of the basic concepts in physics as an integrated part of the student overall curriculum. It includes: crystal structure, reciprocal

lattice, X-ray diffraction, lattice vibrations, heat capacity, free electrons, electrical conduction in metals and semiconductors, band theory, magnetic properties.

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

PHYS494 Research Project (3 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 instructor. (Prerequisite - Student must finish at least 90 Credit hours)

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)

This course is part of the internship program; it aims at presenting the students with opportunities to experience practical work experience in selected internship providers sites. Students are expected to carry out tasks assigned to them under the supervision of a site supervisor and an academic supervisor. The period of such internship is 8 consecutive weeks during the student's last semester before graduation. (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 PHYS494 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)

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

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.

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)

Theory of laser operation, rate-equation, properties of laser beams, three-level and four-level systems, passive optical resonators, pumping process, single-mode and multi-mode lasers, transient laser behavior, relaxation oscillations, Q-switching, cavity-dumping, mode-locking, some specific laser systems and applications to medicine, material processing, laser-driven fusion and holography.

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

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 will cover elementary plasma physics for physics and engineering students. It will include the following topics: The concept of temperature; the conditions of density and temperature necessary for the plasma state; discussion of fusion; motion of single charged particles in static and time varying electric and magnetic fields; plasmas described as (charged) fluids or magnetohydrodynamics; waves in plasmas; plasma heating with radio waves; kinetic theory description of plasmas including diffusion with and without magnetic fields; Debye shielding of a charge; Vlasov equation and collisionless plasmas; Landau dampening of waves; BGK single relaxation time model description of collisions; transport calculations of mass (diffusion); momentum (viscosity) and energy (heat conductivity).

Prerequisites
PHYS335

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

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

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)

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

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 Seminar I (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.

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
PHYS545PHYS530

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 is proposed by faculty members based on students' curricular needs and/or new trends in Physics

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
PHYS616

PHYS720 Quantum Field Theory I (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
PHYS705

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 (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

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
PHYS780

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.