

UAE UNIVERSITY
GEOLOGY DEPARTMENT



GEOLOGY HANDBOOK



THE DEPARTMENT

The Department of Geology of the United Arab Emirates University (UAEU) is one of the original departments of the UAEU College of Science. Its programs began with the founding of the university in the 1977-1978 academic year. Since then it has grown to offer B.Sc. degrees in two subdisciplines and advanced courses as part of three graduate degrees awarded through the College of Science.

The Department of Geology seeks to provide students with a broad knowledge covering the diverse disciplines of geology, to teach students how to apply geological principles in the lab and in the field, and to make students able to participate in all aspects of environmental geology. The ultimate goal is to produce students that are fully prepared to be employed in the resource and geotechnical industries.



UNDERGRADUATE PROGRAMS

The Department of Geology offers a B.Sc. degree in one of two undergraduate subdisciplines:

- GEOLOGY
- GEOLOGY OF PETROLEUM AND WATER

The program addresses the needs of the national work market in the UAE and is meant to provide qualified and specialist graduates. These graduates are to have the highest academic qualifications and practical experience especially in the field of exploration for petroleum reservoirs and water aquifers.

GRADUATE STUDIES

The Department of Geology offers special and advanced courses for postgraduate studies through the following graduate programs:

- MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCE
- MASTER OF SCIENCE IN WATER RESOURCES
- MASTER OF PETROLEUM SCIENCE AND ENGINEERING
- MASTER OF REMOTE SENSING AND GIS

CURRICULUM, INTERNSHIP AND FIELD TUITION



CURRICULUM

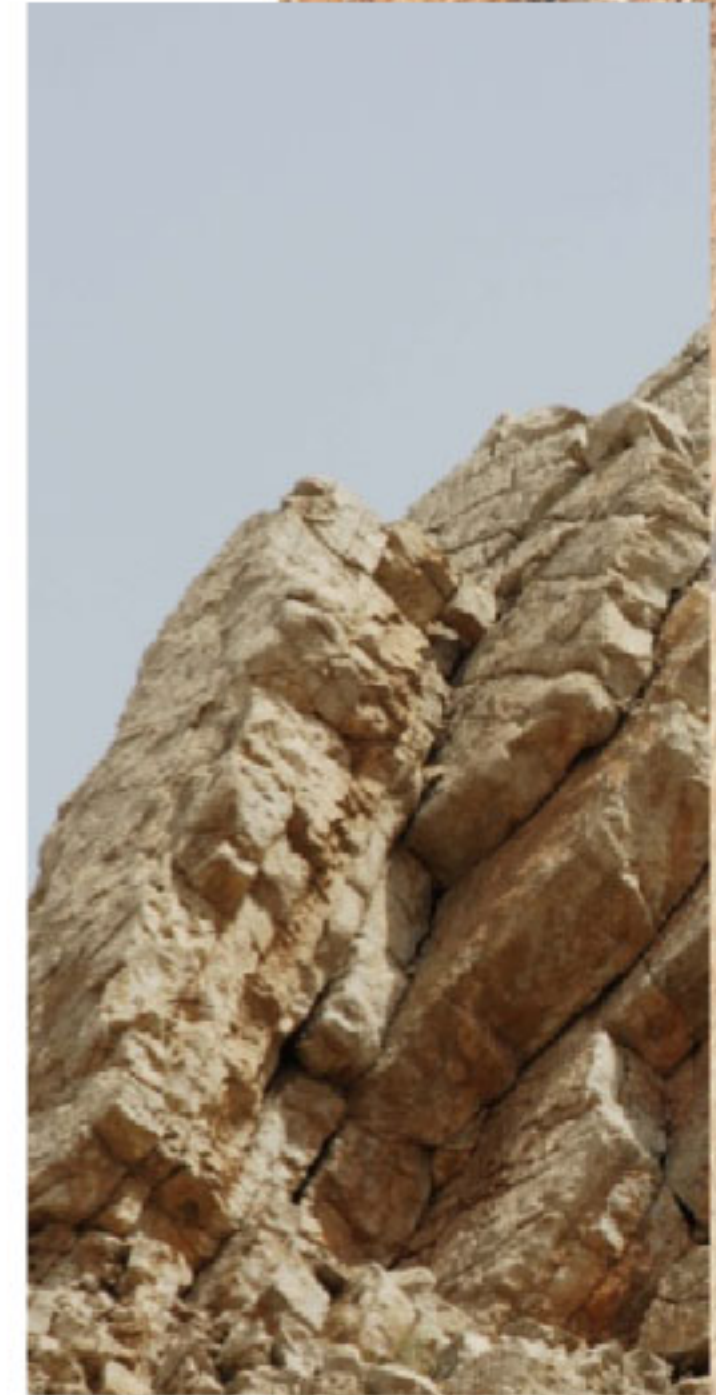
The Geology Department has comprehensively revised its curriculum in accordance with international educational standards and the strategic plan of the University to produce technically competent industry oriented graduates. These changes are supported by a greater commitment to practical aspects of training. As part of this emphasis, more field classes have been organized for Department courses at all levels, and the unit "Field Geology" has been designated as a compulsory Capstone course for all Geology track students.

FIELD GEOLOGY

Geology students genuinely benefit from an exclusive eight-week internship arranged by the Geology Department with the INTERNSHIP AND WORK INTEGRATED LEARNING (iWIL) program at the UAE University. The internship

Geology Department

is coordinated with a further eight weeks of the capstone Field Geology course offered by the Department. The Field Geology course introduces the students to the operation and applications of survey instruments, other geological instrumentation and the measurement and interpretation of stratigraphic sections and structural profiles. An essential part of the course is writing and assembling reports and drafting geologic maps using graphic software. Field trips to localities in the northern Oman Mountains and forelands help to demonstrate to the students how to put into practice in the field what they have learned in the classroom. The students are organized into work groups for the purpose of collecting data and samples in the field, and using this to construct sections and maps that will form part of their individually submitted final reports. The iWIL program links the students with a number of prospective future employers including federal Ministries, petroleum and gas companies, Municipalities, environmental agencies and industrial resource industries such as the aggregate, cement and plaster manufacturers. The internship is intended to provide students with their first professional experience to prepare them for a career after graduation.



TEACHING FACILITIES

The Department of Geology maintains and develops a set of modern teaching laboratories and classrooms, including labs dedicated to crystallography and mineralogy, geochemistry and petrology, hydrogeology and petroleum geochemistry, structural geology and tectonics, stratigraphy and sedimentology, geophysics and environmental geology. The classrooms and labs are equipped with PC desktops and video projection systems, and have Internet access. The Department also has a Geology Museum and an extensive collection of teaching samples and demonstration materials for classroom and lab use.



PETROLEUM GEOCHEMISTRY LAB

The lab is equipped with porosimeter, gas and liquid permeameter, a capillary pressure test, a graphite furnace, a spectrophotometer, a LECO CS-200, a Varian CP-3800 GC Pyrolysis instrument, and a Soxhlet Apparatus for bitumen extraction. The lab performs almost complete geochemical and petrophysical preparations from sample handling to biomarker fingerprinting. It is able to determine TOC and bitumen content, bitumen and crude oil compositions, and oil-viscosity. In addition, column chromatography for crude oil and bitumen fractionation can be prepared and comprehensive interpretations of the GC and PY/GC and GC/MS chromatograms are provided. Field instruments provided by the lab include pH and EC meters and a portable chemical kit. Software for basin modeling (PETROMOD) is also available.



APPLIED GEOPHYSICS

The Geology Department has developed an enhanced emphasis on Geophysics both in research and in teaching. The Applied Geophysics Lab at present is modestly equipped with a number of instruments; these include a multi-channel Geometrics ES-3000 Seismograph, a Sting R1 R&IP earth resistivity meter, and a Geometrics Portable Proton Magnetometer G856AX. In addition to the main instruments, computer processing facilities are available which cover all the taught geophysical techniques.



GEOCHEMISTRY LAB

The sample preparation for XRF and XRD are carried out in this lab as well as some mineral separations and simple digestions. **X-Ray Diffraction** research is conducted using a Philips PW/ 1840 XRD with Ni filter for determining the chemical composition and physical nature of manufactured and natural materials. **X-Ray Fluorescence** research is conducted using a Rigaku wavelength dispersive spectrometer (WDXRF) with a 40 kilowatt generator and Rh x-ray tube. Whole rock analyses can analyze as a powder (loose and pressed), fused beads, liquids and thin films. **Scanning Electron Microscope:** Quanta inspect scanning electron microscope (SEM) with energy dispersive X-ray (EDX) is used for inspecting topographies of materials, microstructural observations and nonconductive sample. It also provides chemical composition analysis from B5-U92.



GIS AND REMOTE SENSING LAB

Extensive collection of ETM-7, JERS-1, ERS-1, ERS-2, SAR-C, and Terra Aster images and data with ER Mapper and ArcGIS software as well as updated Workstations with printers and scanners to serve the teaching and research activities



FLUID INCLUSION LAB

The fluid inclusions lab supports the study of fluid inclusion (which preserves the chemical and physical properties of the original parent fluid from which they formed) in minerals. It involves measuring the temperature, homogenization, density and salinity at which phase transition are observed to occur in fluid inclusions. The lab houses a fluid Inc. modified gas-flow heating and freezing microscope stage, and research petrographic microscopes.



MUSEUM

The museum's collections emphasize the geology of the UAE, with a large international samples of rocks, ores, minerals, gems, and fossils.



PHOTOMICROGRAPHY LAB

Nikon photomicrographic camera fitted on a petrographic microscope and another digital camera fitted on a *Prior* stereomicroscope are available. The camera and microscope are connected to a designated computer prepared with special software for instant processing of the photomicrography.



ROCKS AND MINERAL LABS

The laboratories are fully equipped with dual-system petrographic microscopes, data-show and large 50" LCD screen. Models of crystal systems and crystal classes with variety of crystal structure representations are displayed. Rock & mineral hand specimens and thin-sections, representing all groups from different places including UAE area are available. An advanced *Abbe* refractometer and point counter will be very soon on-hand for teaching and research





CONTACT INFORMATION

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