

# Department of Geology

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## MS in Geology

Candidates pursuing the Master of Science program in Geology must complete seven graduate courses (21 cr.) and a thesis (9 cr.). Students may select courses from the graduate courses offered in the department according to their fields of interest.

## Course Descriptions

**GEOL 303      Geochemistry      3.0; 3 cr.**  
An application of chemical concepts to the evolution of the Earth, particularly its weathering, magmatic and metamorphic cycles, and the distribution of elements; cosmochemistry, crystal chemistry and aqueous geo-chemistry. *Prerequisite: GEOL 211.*

**GEOL 304      Geophysics I      3.0; 3 cr.**  
An introduction to seismic, gravitational and magnetic methods and their interpretation procedures and applications in the exploration of petroleum and other natural resources.

**GEOL 305      Geophysics II      3.0; 3 cr.**  
A course on electrical, radiometric and thermal geophysical methods, in addition to well logging for general geophysical applications and their methods of interpretation. *Pre- or corequisites: GEOL 221 and GEOL 222.*

**GEOL 306      Economic Minerals Geology      3.0; 3 cr.**  
A course on the occurrence and classification of mineral ore deposits and theories of their formation; ore forming processes and ore deposit models; advanced techniques to evaluate ore genesis; and mineral exploration techniques. *Prerequisite: GEOL 211.*

**GEOL 307      Advanced Petroleum Geology      3.0; 3 cr.**  
A course that covers the origin, migration and accumulation of petroleum; applications of surface and subsurface geological and geophysical exploration methods, production, and development processes; and Middle East hydrocarbon exploration and development.

- GEOL 308      Alternate Energy Sources      3.0; 3 cr.**  
A course on energy and energy use, including a detailed treatment of non-fossil fuel energy options including nuclear, biomass, hydro, wind, solar and geothermal methods, with practical applications.
- GEOL 310      Global Tectonics      3.0; 3 cr.**  
A course on large-scale processes of rock deformation within the Earth, the theory of plate tectonics, and the origins and modes of deformation of major tectonic features. These include ocean ridges and continental rifts, transform and transcurrent faults, subduction zones and mountain ranges. *Prerequisite: GEOL 213.*
- GEOL 313      Photogeology      2.2; 3 cr.**  
A course on the principles of airphoto interpretation and remote sensing; the construction of planimetric geological maps, profiles and mosaics from vertical photographs using pocket and mirror stereoscopes, and an introduction to the analysis of satellite imagery.
- GEOL 317      Micropaleontology      2.2; 3 cr.**  
An introduction to the study of the main groups of microfossils, with emphasis on the foraminifera, and their application and techniques in preparation for examination.
- GEOL 318      Hydrogeology      3.0; 3 cr.**  
A course on the fundamentals of hydrogeology; groundwater occurrence, movement, development and management; pumping tests; and groundwater chemistry, quality and contamination.
- GEOL 319      Geostatistics      2.2; 3 cr.**  
This course deals with the study and application of different statistical techniques of interest to the geological sciences. Topics to be covered include analysis of sequences of data, map analysis and analysis of multivariate data. *Prerequisite: GEOL 213 or consent of instructor.*
- GEOL 320      Graduate Seminar      3.0; 3 cr.**  
Seminar given by the department. Graduate students attending the course are required to cover a particular theme on one of the various aspects of the geology of the Middle East, such as earthquakes, tectonism and stratigraphy of the region, magmatism in the Nubian shield.
- GEOL 321      Diagenesis I: Advanced Petrography of Sedimentary Rocks      3.0; 3 cr.**  
A course that covers some advanced petrographic techniques used in the study of sedimentary rocks (e.g., conventional and cathodoluminescence microscopy, scanning electron microscopy), major diagenetic processes and the resultant products in sedimentary environments. *Prerequisites: GEOL 212, GEOL 214 and GEOL 222; or consent of instructor. Biannually.*
- GEOL 322      Diagenesis II: Advanced Techniques in Geochemistry of Sedimentary Rocks      3.0; 3 cr.**  
A course on the various geochemical methods (e.g., trace elements, stable isotopes, radiogenic isotopes, fluid inclusions and microthermometry) commonly used in the study of diagenesis of both carbonate and clastic reservoirs. *Prerequisites: GEOL 212 and GEOL 222; corequisites: GEOL 214 and GEOL 222; or consent of instructor. Biannually.*

**GEOL 323 Geological Oceanography 3.0; 3 cr.**  
A general introduction to climatic and oceanographic interactions, characteristics of oceans, and a detailed analysis of near shore and coastal environments.

**GEOL 324 Engineering Geology I 2.2; 3 cr.**  
A course on engineering geology and earth materials that focuses on the interaction between engineering and geology in relation to the geotechnical properties of soil and rock mechanics and site investigations.

**GEOL 325 Engineering Geology II 3.0; 3 cr.**  
A course on environmental and applied engineering geology that deals with environmental planning, natural disasters and terrain evaluation, with special applications to mass movements, geology of man-made structures and the urban environment.

**GEOL 330 Selected Topics in Advanced Geology 3 cr.**  
*May be repeated for credit.*

**GEOL 395A/B Comprehensive Exam 0 cr.**  
*Prerequisite: Consent of advisor.*

**GEOL 399 MS Thesis 9 cr.**  
*Prerequisite: Consent of advisor.*