

Department of Geological Sciences
School of Natural Sciences, Mathematics, and Engineering
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Program Description

The Department of Geological Sciences offers a comprehensive graduate program leading to the Master of Science in Geological Sciences degree. A Petroleum Geology and a Hydrogeology option are available for the MS degree. The program is intended to prepare students for professional positions in the petroleum industry, the environmental and geotechnical consulting industries, government agencies, and for graduate studies at the doctoral level. A broad range of faculty research interests, the proximity of the campus to the petroleum industry, easy access to diverse geological environments, and a range of modern research facilities permit the student to select from a wide spectrum of research topics.

Research facilities include: (1) a Hitachi S-3400 variable pressure scanning electron microscope equipped with Oxford Inca energy-dispersive and wavelength-dispersive x-ray spectrometers, iXRF micro-x-ray fluorescence source and Gatan ChromaCL live-color catholuminescence imaging system; (2) a geochemistry lab with a Perkin Elmer Elan 6100 ICP-MS, a Cetac LSX-200 Laser Ablation system, a microwave digester, an ion chromatograph, and a GC/MS; (3) complete facilities for rock-sample cutting and crushing, mineral separation, and sample preparation. (4) petrographic microscopes including luminescence and epifluorescence; (5) geophysics equipment including a paleomagnetism lab, 12-channel seismograph, magnetometer, gravimeter, and electrical resistivity meter; (6) a Rigaku x-ray diffractometer; (7) a PC lab with software including GeoGraphix and ArcGIS for petroleum reservoir modeling and geographical information systems (GIS), and industry-provided seismic datasets; (8) a sediment core laboratory with a UIC CM150 carbon coulometer, a Costech 4010 CNOSH Elemental Analyzer and a Malvern Mastersizer 2000 particle size analyzer; (9) a refrigerated core storage and sampling laboratory; and (10) a wide range of field hydrology equipment. The California Well Core Sample Repository, containing cores and samples from more than 5,000 wells from both on- and offshore California and 1,500 catalogued micropaleontological samples, is located on campus.

Post-Baccalaureate Certificate in Hydrogeology

In addition to the MS degree, the Department of Geological Sciences offers a post-baccalaureate Certificate in Hydrogeology. The certificate is designed primarily to give professionals additional training in Hydrogeology and Hydrogeochemistry.

APPLICATION PROCESS AND PROGRAM REQUIREMENTS

Application for the Master of Science in Geological Sciences

Persons seeking an MS in Geological Sciences must apply to the University and the Geological Sciences Department through CSU Mentor (www.csumentor.edu) by March 1st. Students will receive a single letter from the University indicating admission into CSUB and into the Graduate Program, including any additional requirements necessary to begin graduate studies.

After admission by the Graduate Committee of the Department, the Graduate Program Coordinator serves as adviser. Once the student embarks on the MS Thesis research, the faculty member directing the research project will serve as advisor. Once a student has started on the MS Thesis research project, the research adviser will assemble a thesis committee. Academic advising is available through the Graduate Program Coordinator and the research adviser of the student.

Admission Requirements for the Master of Science in Geological Sciences

1. An acceptable baccalaureate degree from an accredited institution.
2. An undergraduate GPA of at least 3.0 in the last 90 quarter (60 semester) units of course work; or Graduate School Examination scores of 1,000 or greater (verbal and quantitative); or a GPA of 3.0 or higher in all previous graduate course work (at least 20 quarter units); or an approved petition to the Graduate Committee of the Department waiving this requirement by proposing other evidence of adequate prior academic preparation.
3. Formal decision by the Department Graduate Committee to accept the student into the graduate program. The decision will be based on a formal application procedure, which includes evaluation of GPA, Graduate Record Examination scores, letters of recommendation, and other materials which may be required by the Committee and/or offered by the student.

Classification of Graduate Students Classified Standing

Acceptance as a Classified Student indicates that all prerequisite course work has been completed, that a formal Plan of Study has been developed, and that the student's

progress in graduate level courses warrants continuation in the program. Specific requirements for Classified Status are listed below.

1. Completion of 60 units in Geology; the last 40 units must be courses above the introductory level. Required courses (or their equivalents) are GEOL 303, 309 and 306 and 307 and a summer field course in Geology.
2. Completion of the following prerequisite courses in cognate areas: CHEM 211, 211L, 212, 212L, PHYS 201 or 221, PHYS 202 or 222, MATH 140 or PHYS 203, MATH 201 or 211, MATH 202 or 212.
3. Satisfactory completion of examinations or course work which may be assigned by the Graduate Committee of the Department.
4. Formal acceptance of the student's Plan of Study by the Graduate Committee of the Department.

Conditionally Classified Standing

Applicants may be admitted as Conditionally Classified Graduate Student if, in the judgment of the Graduate Committee, the applicant has potential for successful completion of all the "conditions" specified by the faculty committee for admission as a Classified Graduate Student and potential for successful completion of all the requirements for the graduate program. Upon satisfactory completion of all "conditions" specified by the Committee, the student's status will be administratively changed to Classified Graduate Student. **Note:** No more than three courses (15 units) may be taken for graduate credit until all prerequisites have been satisfied.

Time limits have been set for completion of requirements at each level of status. Advancement to Classified Status must be accomplished within two calendar years after acceptance as a Conditionally Classified Student.

All requirements, and graduation, must be completed within five calendar years after formal acceptance to the graduate program. The five-year time limit may be extended by petition to the Graduate Committee of the Department.

Completion of all requirements for the Master of Science in Geological Sciences requires satisfactory completion of all courses in an approved Plan of Study, maintenance of a 3.0 GPA in those courses, and either satisfactory completion of a thesis, including oral examination and any revisions required by the Thesis Committee or Departmental Graduate Committee, or completion of the non-thesis track described below. Students must commit to thesis or non-thesis track prior to the completion of 15 units of coursework. All courses are 5 units unless otherwise noted. Note that at least 60% of the coursework must be at the 500 level or higher.

Requirements for the Master of Science in Geological Sciences

Thesis track (45 units)

A minimum of 45 units of course work is required for the MS in Geological Sciences.

1. The following courses are required of all students: GEOL 606, 604 or 609, 585, 690A and 690B.
 - a. For students choosing the **Petroleum Geology** option the following courses are required: GEOL 460 and 570.
 - b. For students choosing the **Hydrogeology** concentration (this concentration will appear on the diploma) the following courses are required: GEOL 475 and 555.
2. All students need at least 15 additional units from the following (all courses are 5 units credit unless noted): GEOL 420, 450, 460, 475, 477 (variable credit), 515, 525, 555, 570, 577 (variable credit), 580 (variable credit), 604, 605, 606, 607, 609, 610, 625, 650. Appropriate graduate level classes in related fields subject to approval by Department.

Requirements for the Master of Science in Geological Sciences

Non-thesis track (50 units)

1. The following courses are required of all students: GEOL 601, 604, 607, 680 and 675 or 678.
2. A minimum of 35 credits from: GEOL 420, 450, 475, 477, 515, 525, 555, 570, 575, 577, 580, 605, 606, 625, 650, 675, 677, 678, MATH 415, 440.

In addition to the above requirements, students may also wish to consider the following courses to supplement their degree: ERM 301, 302, 310, 320.

Application for Professional Certificate in Hydrogeology

Applicants must be accepted as post-baccalaureate students at CSUB. Admission Requirements for Certificate in Hydrogeology Applicants should have a BA or BS in Geology or a directly related field. Applicants in related fields should have completed course work in Physical and Historical Geology, Stratigraphy and Sedimentation, Structural Geology, and one year each of college chemistry, physics and calculus. Some of the courses in the Certificate program may have additional prerequisites.

Requirements for Certificate in Hydrogeology

The certificate will require at least 25 units of credit, 15 units of which must be completed at the CSUB campus, and shall be composed of the following required and elective courses.

1. Courses required for a certificate in Hydrogeology are: GEOL 475, 525 and 555.
2. A minimum of two courses (10 units) are to be selected from the following: GEOL 420, 477 when pertinent (variable credit), 580 (variable credit), 625, 650, 577/677 when pertinent (variable credit).