

DEPARTMENT OF GEOLOGICAL SCIENCES

Mickey E. Gunter, Dept. Chair (203 McClure Bldg. 83844-3022; phone 208/885-6192; www.uidaho.edu/sci/geology). Faculty: Leslie Baker, Elizabeth Cassel, Jerry Fairley, Dennis Geist, Mickey Gunter, Peter Isaacson, Simon Kattenhorn, Eric Mittelstaedt, James Osiensky, Kenneth Spreнке, Tom Williams, Brian Yanites.

Geology is the study of the origin and evolution of the earth, emphasizing the concepts of geologic time and plate tectonics. The applied aspects of geology include the search for hydrocarbons, ores, and water; the assessment of geologic hazards associated with earthquakes, volcanoes, and landslides; and the study of the global environment. Also included in these studies are geologic aspects of waste disposal and pollution abatement.

The bachelor's degrees offered in geology is one that emphasizes practical and field science along with theory. It is the goal of the department that our graduates not only be ready for immediate employment, but also that they have the broad education that will help them to grow professionally, be successful in graduate school, and advance through positions of greater responsibility during their careers.

The geology program provides the student with the necessary background courses in cognate sciences and mathematics plus a spectrum of courses in the sub-disciplines of geology. Specialized elective courses can be chosen to prepare for various careers such as exploration for minerals or petroleum, the search for and management of ground water, environmental geology, and earth science education.

A minor in geology is offered for students in allied fields who have an interest in geology. The minor curriculum can be tailored to meet the needs of individual students.

Research laboratories are equipped for work in applied economic geology, geochemistry, geochronology, geomechanics, geophysics, hydrogeology, mineralogy, paleontology, petrology, structural analysis, tectonics and volcanology. Laboratories are maintained for work in all of the basic courses, with large study collections of fossils, rocks, minerals, crystal models, ore suites, thin sections, polished sections, and topographic and geologic maps. Equipment used in advanced courses includes several sets of microscopes, photomicrographic apparatus, x-ray diffraction equipment, and a variety of instruments for geochemical analysis. Also available are computers, resistivity survey equipment, gravity meters, GPS receivers, seismographs, magnetometer, soil drilling and sampling kits, and water-level recorders.

The department offers Master of Science degrees in geology and hydrology. A thesis is required in the geology program, whereas a non-thesis option is available in hydrology. The Doctor of Philosophy is offered in geology.

The undergraduate preparation expected of the entering graduate candidates depends upon the degree sought. Some of our most promising graduate students have come to us with bachelor's degrees in other subjects. Deficiencies for master's candidates are determined by the major professor.

BSU-ISU Cooperative Programs. The department participates in cooperative programs with the Earth Science Departments at Boise State University and at Idaho State University. Students interested in pursuing bachelor's degrees in geology at those institutions may take transferable preparatory courses at UI.

Courses

See the course description section for courses in Geology (Geol) and Hydrology (Hydr).

Geological Sciences Undergraduate Curricular Requirements

Geological Sciences (B.S.)

Required course work includes the university requirements (see regulation J-3) and:

Chem 111 Principles of Chemistry I (4 cr)
Engl 317 Technical Writing (3 cr)

Geog 385 GIS Primer (3 cr)
Geol 102, Historical Geology and Lab (4 cr)
Geol 102L
Geol 249 Mineralogy and Optical Mineralogy (4 cr)
Geol 290 Field Geology I (3 cr)
Geol 324 Principles of Stratigraphy and Sedimentation (4 cr)
Geol 326 Igneous and Metamorphic Petrology (4 cr)
Geol 345 Structural Geology (4 cr)
Geol 422 Principles of Geophysics (4 cr)
Geol 423 Principles of Geochemistry (3 cr)
Geol 490 Field Geology II (3 cr)

One of the following (4 cr):

Geol 101, Physical Geology and Lab (4 cr)
Geol 101L
Geol 111, Physical Geology for Science Majors and Lab (4 cr)
Geol 111L

One of the following (4 cr):

Phys 111, General Physics I and Lab (4 cr)
Phys 111L
Phys 211, Engineering Physics I and Lab (4 cr)
Phys 211L

And the completion of one of the following options:

A. General Geology Option

Geol 212 Principles of Paleontology (4 cr)
Geol 335 Geomorphology (3 cr)
Advisor-approved electives in geology (9 cr)

One of the following (4 cr):

Math 160 Survey of Calculus (4 cr)
Math 170 Analytic Geometry and Calculus I (4 cr)

One of the following (3-4 cr):

Math 175 Analytic Geometry and Calculus II (4 cr)
Math 330 Linear Algebra (3 cr)
Stat 251 Statistical Methods (3 cr)

Courses to total 120 credits for this degree

B. Hydrogeology Option

Geol 410 Techniques of Ground Water Study (3 cr)
Math 170 Analytic Geometry and Calculus I (4 cr)
Math 175 Analytic Geometry and Calculus II (4 cr)

One of the following (3 cr):

Geol 309 Ground Water Hydrology (3 cr)
Hydr 409 Quantitative Hydrogeology (3 cr)

One of the following (3 cr):

Stat 251 Statistical Methods (3 cr)
Stat 301 Probability and Statistics (3 cr)

Hydrology electives chosen from the following (6 cr):

Hydr 409 or Quantitative Hydrogeology (3 cr)
Hydr 509
Hydr 412 or Environmental Hydrogeology (3 cr)
Hydr 512
Hydr 414 or Ground Water-Surface Water Interaction (3 cr)
Hydr 514
Hydr 496 Hydrogeology Senior Thesis (3 cr)
Hydr 564 The Geochemistry of Natural Waters (3 cr)
Hydr 576 Fundamentals of Modeling Hydrogeologic Systems (3 cr)

Hydrogeology electives chosen from the following if not used above (3 cr):

BAE 450 Environmental Hydrology (3 cr)
CE 421 Engineering Hydrology (3 cr)
ChE 470 or Hazardous Waste Management (3 cr)
ChE 570
Engr 210 Engineering Statics and Engr 335 Engr Fluid Mechanics (6 cr)

Hydr 409 or Quantitative Hydrogeology (3 cr)

Hydr 509
Hydr 412 or Environmental Hydrogeology (3 cr)

Hydr 512
Hydr 414 or Ground Water-Surface Water Interaction (3 cr)

Hydr 514
Hydr 496 Hydrogeology Senior Thesis (3 cr)

Hydr 564	The Geochemistry of Natural Waters (3 cr)
Hydr 576	Fundamentals of Modeling Hydrogeologic Systems (3 cr)
Math 275	Analytic Geometry and Calculus III (3 cr)
Math 310	Ordinary Differential Equations (3 cr)
Soil 205, 206	The Soil Ecosystem and Lab (4 cr)
Soil 415	Soil and Environmental Physics (3 cr)
Stat 428	Geostatistics (3 cr)

Courses to total 120 credits for this degree

C. Resource Exploration Option

Econ 272	Foundations of Economic Analysis (4 cr)
Geol 212	Principles of Paleontology (4 cr)
Geol 407 or Geol 507	Basin Analysis (3 cr)

Advisor approved electives in geology (6 cr)

One of the following (4cr):

Math 160	Survey of Calculus (4 cr)
Math 170	Analytic Geom and Calculus I (4 cr)

One of the following (3 cr):

Stat 251	Statistical Methods (3 cr)
Stat 301	Probability and Statistics (3 cr)

Courses to total 120 credits for this degree

D. Environmental Geology Option

Geol 212	Principles of Paleontology (4 cr)
Geol 335	Geomorphology (3 cr)

One of the following (3 cr):

Geol 309	Ground Water Hydrology (3 cr)
Hydr 409	Quantitative Hydrogeology (3 cr)

One of the following (3 cr):

Geol 344	Earthquakes and Seismic Hazards (3 cr)
Geol 361	Geology and the Environment (3 cr)

One of the following (4cr):

Math 160	Survey of Calculus (4 cr)
Math 170	Analytic Geom and Calculus I (4 cr)

One of the following (3-4cr):

Math 175	Analytic Geometry and Calculus II (4 cr)
Math 330	Linear Algebra (3 cr)
Stat 251	Statistical Methods (3 cr)

Environmental geology electives chosen from the following (9 cr):

BAE 433	Bioremediation (3 cr)
BAE 452	Environmental Water Quality (3 cr)
Biol 115	Cells and the Evolution of Life (4 cr)
Biol 250, Biol 255	General Microbiology and Lab (5 cr)
Chem 418	Environmental Chemistry (3 cr)
Geog 401	Climatology (3 cr)
Geol 410	Techniques of Ground Water Study (3 cr)
Geol 464	The Geochemistry of Natural Waters (3 cr)
Soil 205, Soil 206	The Soil Ecosystem and Lab (4 cr)

One of the following (4cr):

Chem 275,	Carbon Compounds and Lab (4 cr)
Chem 276	
Chem 277,	Organic Chem I and Lab (4 cr)
Chem 278	

Courses to total 120 credits for this degree

E. Geological Education Option

Biol 115	Cells and the Evolution of Life (4 cr)
Geog 100,	Physical Geography and Lab (4 cr)
Geog 100L	
Geog 401	Climatology (3 cr)
Geol 212	Principles of Paleontology (4 cr)
Geol 335	Geomorphology (3 cr)
Phys 103,	General Astronomy and Lab (4 cr)
Phys 104	
PISc 205	General Botany (4 cr)

One of the following (4cr):

Math 160	Survey of Calculus (4 cr)
Math 170	Analytic Geom and Calculus I (4 cr)

One of the following (3-4cr):

Math 175	Analytic Geometry and Calculus II (4 cr)
Math 330	Linear Algebra (3 cr)
Stat 251	Statistical Methods (3 cr)

Courses to total 120 credits for this degree

F. Structural Geology and Tectonics Option

Geol 335	Geomorphology (3 cr)
Geol 344	Earthquakes and Seismic Hazards (3 cr)
Geol 432	Geologic Development of North America (3 cr)
Geol 498	Senior Thesis (4 cr)
Math 170	Analytic Geometry and Calculus I (4 cr)

One of the following (3-4cr):

Math 175	Analytic Geometry and Calculus II (4 cr)
Math 330	Linear Algebra (3 cr)

Courses to total 120 credits for this degree

Geological Sciences Academic Minor Requirements

Geology Minor

Geol 101, Geol 101L	Physical Geology and Lab or
Geol 111, Geol 111L	Physical Geology for Science Majors and Lab (4 cr)
Geol 102, Geol 102L	Historical Geology and Lab (4 cr)

Electives in geology (12 cr)

Courses to total 20 credits for this minor

Geological Sciences Graduate Degree Programs

Candidates must fulfill the requirements of the College of Graduate Studies and of the Department of Geological Sciences. See the College of Graduate Studies section for the general requirements applicable to each degree. All graduate students in this department are expected to attend the appropriate departmental seminar each semester.

Master of Science. General M.S. requirements apply. Majors offered under the M.S. degree are geology and hydrology. Prerequisites are the equivalent of an undergraduate major in the area of specialization. A written thesis is required for which ten credits (of the minimum of 30 credits for the degree) are permitted. A non-thesis option is available under special conditions in hydrology.

Doctor of Philosophy. General Ph.D. requirements apply. Admission to the doctoral program is based on the compatibility of the student's research interests with those of the major professor, upon the availability of research support, and the student's academic record and potential. Applicants are expected to have the prerequisites as specified for the M.S. degree with a major in geology. Each research program is developed by the student and the major professor with the advisory committee's approval. Up to 45 credits are permitted in research and dissertation.

GEOLOGY COURSES

Mickey E. Gunter, Dept. Chair of Geological Sciences (322 Mines Bldg. 83844-3022; phone 208/885-6192).

Geol 101 Physical Geology (3 cr)

The earth, its composition, structure, and natural processes. Three lec and 2 hrs of lab a wk; one 1-day field trip.

Geol 101L Physical Geology Lab (1 cr)

The earth, its composition, structure, and natural processes. Three lec and 2 hrs of lab a wk; one 1-day field trip.

Geol 102 Historical Geology (3 cr)

Evolution of the physical earth, plants, and animals; techniques used in interpretation of geologic history. Three lec and 2 hrs of lab a wk; one 1-day field trip.

Geol 102L Historical Geology Lab (1 cr)

Evolution of the physical earth, plants, and animals; techniques used in interpretation of geologic history. Three lec and 2 hrs of lab a wk; one 1-day field trip.

Geol 111 Physical Geology for Science Majors (3 cr)

Introductory course in earth science for geology and other science majors. Three lec and one 2-hr lab a wk; two 1-day field trips.

Geol 111L Physical Geology for Science Majors Lab (1 cr)

Introductory course in earth science for geology and other science majors. Three lec and one 2-hr lab a wk; two 1-day field trips.

Geol 203 (s) Workshop (cr arr)

Geol 204 (s) Special Topics (cr arr)

Geol 212 Principles of Paleontology (4 cr)

Studies of morphology, classification of fossil groups, and utility of fossils in interpreting depositional environments and ages of sedimentary rocks. Three lec and one 2-hr lab a wk; one 1- to 2-day field trip. Recommended Preparation: Geol 102.

Geol 249 Mineralogy and Optical Mineralogy (4 cr)

Principles of crystallography, crystal chemistry, and crystal structure; mineral identification; principles of optical mineralogy and use of the polarized light microscope. Three lec and one 2-hr lab a wk; two 1-day field trips.

Prereq: Geol 111/111L or Geol 101/101L, and Chem 111

Geol 290 Field Geology I (3 cr)

Introduction to field mapping and field techniques; interpretation of sedimentary sequences; introduction to tectonic structures; preparation of reports based on field observations and interpretations. Accident and health insurance required. Three week, off-campus field course. (Summer only)

Prereq: Geol 101/101L or Geol 111/111L, and Geol 102/102L

Geol 299 (s) Directed Study (cr arr)

Geol 309 Ground Water Hydrology (3 cr)

Occurrence, movement, and properties of subsurface water; intro to ground water geology and hydrology.

Prereq: Geol 101/101L or 111, and Math 130 or Math 143 with a grade of 'C' or better

Geol 324 Principles of Stratigraphy and Sedimentation (4 cr)

Description and identification of sedimentary rocks; organization and correlation of layered rocks in all scales, including factors controlling their distribution; cycles in sedimentation and stratigraphy; sequence stratigraphy and basin dynamics. Two lec and two 2-hr labs a wk; two 1-day field trips; optional 7-day field trip.

Prereq: Geol 102/102L and Math 143 with a grade of 'C' or better

Geol 326 Igneous and Metamorphic Petrology (4 cr)

Hard rock petrology plus megascopic and microscopic petrography of igneous and metamorphic rocks. Two lec and two 2-hr labs a wk; two 1-day or one 2-day field trips.

Prereq: Geol 249 and Math 143 with a grade of 'C' or better

Geol 335 Geomorphology (3 cr)

Classification, recognition, origin, and significance of land forms; land form analysis in interpretation of geologic structure and history. One 2-day field trip.

Prereq: Geol 101/101L, Geol 102/102L, Geol 111/111L, or Geol 100/100L; and Math 143 with a grade of 'C' or better; or Permission

Geol 344 Earthquakes and Seismic Hazards (3 cr)

The geology of earthquakes including the cause of fault rupture, seismic waves, focal mechanisms, and earthquakes associated with all fault types in a variety of tectonic settings; methods of identifying paleo-earthquakes in the geologic record, and the assessment of seismic hazard and risk in active fault environments. One 3-day field trip.

Prereq: Geol 101/101L or Geol 111/111L; and Math 143 with a grade of 'C' or better

Geol 345 Structural Geology (4 cr)

Investigation of deformed rocks; mechanics of brittle and continuum failure, stress and strain relations, characterization, description, classification of folded and fractured rocks. Three hours of lecture and one 2-hr 45-min lab a wk; one week-long mandatory field trip. (Spring only)

Prereq: Math 143 with a grade of 'C' or better; One semester high-school trigonometry or Math 144; and Geol 101/101L or Geol 111/111L; and Phys 111/111L or Phys 211/211L

Geol 361 Geology and the Environment (3 cr)

Environmental consequences of development of geologic resources; including issues of waste disposal, pollution and human health; natural hazards and their impact on humans and the environment. Two 1-day field trips.

Prereq: Geol 101/101L or Geol 111/111L; and Math 143 with a grade of 'C' or better

Geol 375 Geology of National Parks (3 cr)

Primarily for non-geology majors who want to acquire a better knowledge of geologic concepts and processes through study of geology of national parks. One 6-day field trip.

Prereq: Geol 101/101L, Geol 102/102L, Geol 111/111L, or Geol 100/100L; and Math 143 with a grade of 'C' or better

Geol 400 (s) Seminar (1 cr, max arr)

Participation in departmental colloquium.

Prereq: Math 143 with a grade of 'C' or better

Geol J407/J507 Basin Analysis (3 cr)

Characteristics of sedimentary basins and methods for studying them. For 500-level credit an additional research project is required. One 2-day field trip. Cooperative: open to WSU degree-seeking students. (Spring only)

Prereq: Geol 324 and Math 143 with a grade of 'C' or better

Geol 410 Techniques of Ground Water Study (3 cr)

Collection and analysis of field data for reconnaissance ground water studies. Two weekend field trips.

Prereq: Math 143 with a grade of 'C' or better

Prereq or Coreq: Geol 309

Geol 417 Advanced Paleontology (3 cr)

Fossil assemblage analyses and report writing; marine faunal assemblage 1st half semester; nonmarine floral assemblage 2nd half semester. Three 2-hr labs a wk; one 1-day field trip.

Prereq: Math 143 with a grade of 'C' or better and Geol 212; or Permission

Geol 422 Principles of Geophysics (4 cr)

Outline of geophysical methods for geological investigations. One 1-day field trip.

Prereq: Math 143 with a grade of 'C' or better

Geol 423 Principles of Geochemistry (3 cr)

Physicochemical principles applied to geologic processes. Topics covered include atmospheric geochemistry, environmental geochemistry, aqueous geochemistry, crystal chemistry, radiogenic and stable isotopes. Two lec and one 2-hr lab a wk.

Prereq: Geol 101/101L or Geol 111/111L, and Chem 112; and Math

143 with a grade of 'C' or better

Geol 426 Principles of Forensic Mineralogy and Geology (3 cr)

Introduction to the use of geological and mineralogical materials and techniques within the criminal/civil justice system. Topics will include the origin and description of minerals, rocks, soils and sands, fossils, industrial materials, and pollen, the history of forensic science, instrumental & forensic laboratory techniques, and the legal aspects of scientific evidence. Two lec and one 2-hr labs a wk; one 1-day field trip.

Prereq: Geol 101/101L or Geol 111/111L, and Chem 111; and Math 143 with a grade of 'C' or better; or Permission

Geol J432/J532 Geologic Development of North America (3 cr)

Tectonic, magmatic, and sedimentary sequence studies of North American continent through time; concepts of metal and petroleum enrichment related to time and geological processes. Additional questions on two exams and written report of field trip reqd for grad cr. One 7-day field trip. Geol 532 is a cooperative course available to WSU degree-seeking students.

Prereq: Math 143 with a grade of 'C' or better

Geol J433/J533 Geodynamics (4 cr)

This class focuses on the processes and mechanisms that cause motions within and on the surface of the Earth and other planets. Topics to be covered include plate boundary deformation, plate flexure, planetary heat transfer, convection in the mantle and core, melting and melt transport, magma dynamics, and large-scale lithospheric deformation. For graduate credit students will be expected to complete a research project and report. Course includes 3 hours of lecture and one 3 hour lab per week. Offered fall semester. Recommended Preparation: Math 175 or equivalent. Cooperative: open to WSU degree-seeking students.

Prereq: Math 143 with a grade of 'C' or better; and Math 170 or equivalent

Geol J464/J564 The Geochemistry of Natural Waters (3 cr)

Geol 564 same as Hydr 564. Basic principles of aqueous geochemistry applied to natural waters (ground waters, lake and river waters, seawater), presented at an intermediate level; carbonate equilibria and alkalinity, solubility of minerals, sorption processes and surface reactions, redox reactions and Eh-pH diagrams, organic geochemistry, etc. For graduate credit, students are required to prepare two in-depth term papers and demonstrate through exam work and papers a more in-depth understanding of the material. One compressed video and one web-based lecture a wk. Recommended preparation: Geol 423.

Prereq: Chem 111-112; and Math 143 with a grade of 'C' or better

Geol J467/J567 Volcanology (3 cr)

Eruption mechanisms, volcanic processes and landforms, and volcanic deposits. Additional projects/assignments reqd for grad cr. Two lec and one 2-hr lab a wk; seven days of field trips. Geol 567 is a cooperative course available to WSU degree-seeking students.

Prereq: Math 143 with a grade of 'C' or better

Geol 471 Ore Deposits and Exploration (3 cr)

The geologic origin of metallic ore deposits, and the methods used to search for them. Taught in alternating years. 3-hr lec per week. One one-day and one three-day field trips.

Prereq: Geol 249 and Math 143 with a grade of 'C' or better

Geol 490 Field Geology II (3 cr)

Advanced field problems and methods; interpretation of field data, preparation of reports based on field observations and interpretations. Accident and health insurance required. Three week, off-campus. Cooperative: open to WSU degree-seeking students. (Summer only)

Prereq: Geol 290 and Geol 345; and Math 143 with a grade of 'C' or better

Geol 497 (s) Practicum in Tutoring (1 cr, max 2)

Tutorial services performed by advanced students under faculty supervision. Graded P/F.

Prereq: Math 143 with a grade of 'C' or better and Permission of department

Geol 498 Senior Thesis (1-4 cr, max 4)

Completion of original research and report. Course is taken over two semesters; first semester is graded IP until completion of second semester.

Prereq: Math 143 with a grade of 'C' or better and Senior standing and Permission

Geol 499 (s) Directed Study (cr arr)

Prereq: Math 143 with a grade of 'C' or better

Geol 500 Master's Research and Thesis (cr arr)

Geol 501 (s) Seminar (1 cr, max arr)

Participation in departmental colloquium.

Geol 502 (s) Directed Study (cr arr)

Geol 503 (s) Workshop (cr arr)

Geol 507 Basin Analysis (3 cr)

See Geol J407/J507.

Geol 510 (s) Geosystems (3 cr, max 6)

Interdisciplinary core graduate course in earth sciences. Course will involve multiple instructors and modules framed around a common theme. Specific focus may vary from year to year. Cooperative: open to WSU degree-seeking students.

Geol 520 (s) Advanced Topics in Sedimentary Rocks (2-3 cr, max 6)

Modern aspects of sedimentary rocks.

Prereq: Geol 324

Geol 532 Geologic Development of North America (3 cr)

See Geol J432/J532.

Geol 533 Geodynamics (4 cr)

See Geol J433/J533.

Geol 541 Structural Analysis (3 cr)

Structural analysis of complexly deformed rocks in orogenic belts. Field trip required. Cooperative: open to WSU degree-seeking students.

Geol 542 Advanced Structural Geology (3 cr)

Concepts of linear elastic fracture mechanics as applied to the classification, origin and evolution of all types of rock fractures; continuum theory in rock mechanics; rock strength and failure criteria; stress tensors; elastic theory. Cooperative: open to WSU degree-seeking students.

Prereq: Geol 345

Geol 548 Tectonics (3 cr)

Nature and origin of the Earth's major tectonic features. Two lec and 2 hrs of lab a wk; one or two 1- to 2-day field trips. Cooperative: open to WSU degree-seeking students.

Prereq: Geol 345 or Permission

Geol 549 Principles of Electron Microscopy (3 cr)

Theory and principles of scanning and transmission electron microscopy as an investigative tool; includes physical principles of electron microscopy, operation and maintenance of the electron microscope, specimen preparation, and digital image capture. Lab section involves hands-on use of SEM and TEM. Students registering are required to complete a research project. One 1.5-hr lec and one 2-hr lab a week. (Fall only)

Geol 550 Advanced Mineralogy (3 cr)

Advanced concepts in mineralogy not covered at the undergraduate level. Specifically the methods necessary to determine, examine, and represent the crystal structure of minerals and relate them to the mineral's physical properties. Cooperative: open to WSU degree-seeking students.

Prereq: Geol 249 or equivalent

Geol 554 Physical Petrology (3 cr)

Applications of continuum mechanics and fluid dynamics to generation, rise, storage, and eruption of magmas. Cooperative: open to WSU degree-seeking students.

Geol 564 The Geochemistry of Natural Waters (3 cr)

See Geol J464/J564.

Geol 567 Volcanology (3 cr)

See Geol J467/J567.

Geol 583 Radiogenic Isotopes and Geochronology (3 cr)

Nuclear structure, radioactive decay, isochrons, the age of meteorites, the earth, and the timing of various major differentiation events, applications of radiometric (including cosmogenic) dating in a wide range of fields, and the use of radiogenic isotopes as tracers of multi-reservoir evolution.

Geol 592 (s) Advanced Topics in Structural Geology (1-4 cr, max 6)

Classroom or field-based course focused on application of structural geology concepts to specific problems. Topical focus of class may vary from year to year. Cooperative: open to WSU degree-seeking students.

Geol 593 (s) Advanced Topics in Geomechanics (1-4 cr, max arr)

Advanced treatment of current topics in geomechanics and related disciplines such as structural geology, hydrogeology, engineering geology, and petroleum engineering.

Geol 597 (s) Practicum (cr arr)**Geol 598 (s) Internship (cr arr)****Geol 599 (s) Non-thesis Master's Research (cr arr)**

Research not directly related to a thesis or dissertation.

Prereq: Permission

Geol 600 Doctoral Research and Dissertation (cr arr)

HYDROLOGY COURSES

Mickey E. Gunter, Dept. Chair of Geological Sciences (322 Mines Bldg. 83844-3022; phone 208/885-6192).

Hydr 599 (s) Non-thesis Master's Research (cr arr)

Research not directly related to a thesis or dissertation.

Prereq: Permission

Hydr 404 (s) Special Topics (cr arr)

Hydr J409/J509 Quantitative Hydrogeology (3 cr)

A rigorous introduction to the description of flow in porous media; the basic equations of potential flow theory as they relate to ground water problems, with application to common engineering problems encountered by hydrogeologists and engineers; dimensional analysis, properties assignment, and heterogeneous systems. For graduate credit additional reading, presentations, and/or written reports of assigned literature required.

Prereq: Math 275, Stat 251 or 301

Hydr J412/J512 Environmental Hydrogeology (3 cr)

Methods of hydrogeologic site characterization for the delineation of environmental problems such as contaminated ground water plumes, and ground water dewatering for landslide remediation. For grad credit, students are required to complete an additional independent research paper/project.

Prereq: Geol 309

Hydr J414/J514 Ground Water-Surface Water Interaction (3 cr)

Physical and chemical ramifications of interactions between ground water flow systems and surface water bodies. Particular emphasis will be placed on water supply and surface water/ground water contamination issues. Graduate credit requires completion of an additional, separate research paper on a selected topic. (Alt/yrs)

Prereq: Geol 309 or Hydr 409

Hydr 496 Hydrogeology Senior Thesis (3 cr)

Completion of original research and report. Course is taken over two semesters; first semester is graded IP until completion of second semester.

Prereq: Geol 309 or Hydr 409/509 and Geol 410

Hydr 500 Master's Research and Thesis (cr arr)

Hydr 501 (s) Seminar (cr arr)

Graded P/F.

Prereq: Permission

Hydr 502 (s) Directed Study (cr arr)

Hydr 503 (s) Workshop (cr arr)

Hydr 509 Quantitative Hydrogeology (3 cr)

See Hydr J409/J509.

Hydr 512 Environmental Hydrogeology (3 cr)

See Hydr J412/J512.

Hydr 514 Ground Water-Surface Water Interaction (3 cr)

See Hydr J414/J514.

Hydr 564 The Geochemistry of Natural Waters (3 cr)

See Geol J464/J564.

Hydr 568 Aquifer Test Design and Analysis (3 cr)

Analysis of single and multiple well aquifer tests in a range of hydrogeologic environments. Additional projects/assignments required for graduate credit.

Hydr 576 Fundamentals of Modeling Hydrogeologic Systems (3 cr)

Development and application of models representing physical systems, with particular emphasis on ground water flow. Development and solution of the basic equations of potential flow will be covered, along with their assumptions and limitations. Properties assignment, parameter sensitivity, and dimensional analysis will also be discussed. The course will emphasize when modeling is appropriate, how to design a model, and how properties should be selected to achieve meaningful results.

Prereq: Math 275 or Permission

Hydr 598 (s) Internship (cr arr)

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