INDIANA UNIVERSITY

University Graduate School
2006-2007
Academic Bulletin

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Geological Sciences

School of Science
Indianapolis

Chairperson
Associate Professor Gabriel Filippelli*

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Departmental URL
www.geology.iupui.edu

Graduate Faculty

(An asterisk [*] denotes membership in the University Graduate School faculty with the endorsement to direct doctoral dissertations.)

Associate Professors
Andrew P. Barth*, Gabriel Filippelli*, Joseph Pachut Jr. *, Gary D. Rosenberg*, Lenore Tedesco*

Assistant Professors
Pierre-Andre Jacinthe, Lin Li, Kathy Licht, Jeffrey Swope, Philippe Gilles-Francois Vidon

Emeritus Faculty

Arthur Mirsky*

Adjunct Faculty
Timothy Brothers (Geography), Christopher Craft (Public and Environmental Affairs), Frederick Kleinhans* (Physics), Greg Lindsey* (Public and Environmental Affairs), Catherine Souch* (Geography), Xianzhong Wang (Biology), Jeffrey Wilson

Graduate Advisor
Associate Professor Joseph Pachut Jr.*, Engineering/Science/Technology Building, SL 118, (317) 274-7484

Degree Offered

Master of Science in Geology, with concentration in environmental geology.

Special Departmental Requirements

(See also general University Graduate School requirements.)

Admission Requirements
Prospective students should have a bachelor's degree in geology, including a summer field course, and a minimum of a B (3.0) average in geology courses. One year of chemistry and mathematics through college algebra and trigonometry are required. Individuals with a bachelor's degree in another area of science are also encouraged to apply; the departmental graduate advisory committee will prescribe a plan of study to remove deficiencies. The Graduate Record Examination General Test is required. Each student must submit three letters of recommendation.

Course Requirements

Both thesis and nonthesis options are available. Both options require at least 18 credit hours of nonresearch course work in geology and at least 3 credit hours in courses approved for graduate credit from allied sciences, mathematics, or the environmental program of the School of Public and Environmental Affairs (SPEA). Up to 6 credit hours of 400-level courses approved for graduate credit may be counted toward the degree with the approval of the graduate advisor. The thesis option requires the completion of 30 credit hours, 6 of which are taken as G810 Research (the thesis). The nonthesis option requires the completion of 36 credit hours, 3 of which consist of a research project taken as G700 Geologic Problems. The departmental graduate committee must approve elective credits outside the Department of Geology for both options.

Admitted students will be assigned a three-person advisory committee at the beginning of the first year of graduate study. The committee will prescribe a study program based on the interests of the student and the principal graduate advisor. Students must complete all degree requirements within six years of beginning this study program. A B (3.0) average or higher must be maintained, and no grade below C is acceptable.

Grades
A B (3.0) average or higher must be maintained; no more than 6 credit hours of C are acceptable.

Courses

G525 Glacial Geology (3 cr.) Formation, dynamics, and regimen of glaciers. Erosional and depositional processes and landforms. Glaciation of North America with emphasis on stratigraphy, soils, climates, and physical changes resulting from glacial processes and environments. Field investigations and a student research project required.

G527 Geological Oceanography (3 cr.) P: Graduate standing, G334, and G413. Geological features and processes operating in the oceans; continental shelf, slope and ocean-basin geomorphology, sedimentology, structure, and composition; origin and geologic history of seawater and ocean basins.

G535 Quaternary Geology (3 cr.) P: G415 or consent of instructor. Characteristics, distribution, and origin of Pleistocene and recent deposits; stratigraphy and chronology; formation of associated landforms, landscapes, paleosols, and soils; Quaternary environments. Core: environmental geoscience.

G545 Applied Analytical Techniques in Geology (3 cr.) Principles of advanced analytical techniques including X-ray analysis, electron beam imaging and analysis, and mass spectrometry, with applications in geosciences. Lectures on theory followed by laboratory exercises. Students will complete individual or collaborative research projects.

G546 Planetary Remote Sensing (3 cr.) P: Previous course in remote sensing, or consent of instructor. Application of multi-spectal data for exploration and mapping of planetary surfaces.

G550 Surface Water Hydrology (3 cr.) P: G451 and M216, or consent of instructor. Mechanics of surface runoff and open channel flow. Rainfall-runoff equations, probability analysis of stream flow, and watershed simulation models. Chemistry of surface waters and stream pollution. Core: environmental geoscience.

G551 Advanced Hydrogeology (3 cr.) P: G451. Basic principles and quantitative aspects of physical flow systems and chemistry of ground water and surface water. The relationships between water and geologic materials. Core: environmental geoscience.

G585 Environmental Geochemistry (3 cr.) Aquatic and environmental geochemistry, including freshwater and marine systems, natural and human-induced changes to geochemical systems, and the geochemical record of paleoceanographic and paleoclimatic variations.

G595 Data Analysis Techniques in Geoscience (3 cr.) P: STAT 301 and CSCI 207, or equivalent. Application of statistical and numerical analysis techniques to geoscience data, including sampling methods, confidence intervals, least squares methods, correlation, time series analysis, and multivariate techniques. Emphasis on using a computer to solve geoscience problems.

G601 Clay Mineralogy (3 cr.) P: Consent of instructor. Composition, structure, properties, methods of identification, and origin and distribution of clay minerals.

G621 Modeling Hydrological Systems (3 cr.) Introduction to ground water flow and solute transport modeling. Includes development of equations describing ground water flow and applied ground water/contaminant transport modeling using a variety of current software packages.

G635 Soil Geomorphology (3 cr.) Application of geomorphic principles in evaluation of weathering and soil formation; systems analysis of soil-landscape models; paleogeomorphology and paleopedology. Lectures and discussion; field and laboratory problems.

G640 Fluvial Geomorphology (3 cr.) Survey of fluvial processes including sediment transport, bed and bank erosion, and river metamorphosis. Examination of the controls on channel form. Analysis of landform genesis with an emphasis on feature sedimentology and stratigraphy. Application of fluvial geomorphic principles to land management and restoration of riparian ecosystems.

G645 Carbonate Sedimentology (3 cr.) P: G334 or consent of instructor. Spring. Course focuses on origin and generation of carbonate grains, description of modern carbonate depositional environments, interpretation of ancient limestone and dolomite sequences, and carbonate diagenesis.

G690 Advanced Geology Seminar (cr. arr.) P: Consent of instructor. Seminars on critical research issues and topical themes. S/F grading.

G700 Geologic Problems (1-5 cr.)** P: Consent of instructor. Consideration of special geological problems.

G810 Research (cr. arr.)**

**These courses are eligible for a deferred grade.