

## **Graduate Courses**

### **Geography / 32**

#### **500 Special Offerings (1-4 hours)**

One-time course offering in a timely area of geography.

#### **501 Conservation of Natural Resources (3 hours)**

A study of the earth's environment and resource limits as related to population growth and humankind's need to provide food, water, mineral resources and energy in order to survive and prosper. Emphasis is placed on developing an appreciation for the interconnectedness of the natural world and the potential consequences of disrupting those connections. (alt. trimesters, alt. years)

#### **510 Geographic Education: Themes and Materials (2 hours)**

Designed for elementary or secondary teachers wishing to incorporate an instructional unit in geography in either the social science or science curriculum. (SS)

#### **511 Special Topics in Geography (1-4 hours)**

Will be offered according to student needs and interest. Each offering will be designed to incorporate the latest information pertaining to a timely topic in geography. May be repeated once to earn no more than 6 credits total. Topics may include: applied geographic information systems, urban and regional planning, location analysis, geography of sport, etc. (F, S, SS)

#### **521 Political Geography (3 hours)**

An advanced course in geopolitics with emphasis on fundamental principles and their application to the major regions and nations of the world today. (S, alt. years)

#### **522 Urban Geography (3 hours)**

An advanced course offering an in-depth study of the physical characteristics of cities and some of the problems humans are faced with in a world where urbanism is a rapidly increasing phenomenon. (S)

#### **543 Applications of Remotely Sensed Data (3 hours)**

Covers the use of remotely sensed information in a geographic information system environment. Emphasis is placed on understanding different data sources, tools, and techniques used in remote sensing. (online, alt. trimesters, alt years)

#### **545 Principles of GIS (3 hours)**

A rigorous study of fundamental GIS principles, including the nature of spatial data, vector and raster data models, and key GIS analysis operations. (online, alt. trimesters)

#### **562 Digital Cartography and Geovisualization (3 hours)**

An advanced cartography course utilizing computer assisted cartography and advanced techniques of map construction. Prerequisites: Geog 32-362 and CSIS 44-130 or CSIS 44-131. (F)

**563 Digital Image Processing (3 hours)**

Further explores the techniques and concepts learned in Remote Sensing (Geog 32-363). Explores advanced techniques in image analysis and processing not covered in Remote Sensing. Prerequisites: Geog 32-363. (F)

**565 Advanced Geographic Information Systems (3 hours)**

Builds on the techniques and concepts learned in Geographic Information Systems (Geog 32-365). Stresses research and project design strategies and advanced analytical techniques using geographic information systems to solve spatial problems. Prerequisites: Geog 32-365. (S)

**580 Spatial Analysis and Geostatistics (3 hours)**

Designed to make the student familiar with the analysis and statistical tools used by geographers. Covers the fundamental aspects of geostatistics that are used in research and business environments. (online, alt. trimesters, alt. years)

**601 GIScience Research Seminar (3 hours)**

A research writing seminar for new GIScience graduate students to develop awareness of various research methods, as well as their own GIScience research interests. Students become familiar with writing, thinking, and criticizing at the graduate level. (online, F,S)

**611 Special Topics in Geographic Information Science (3 hours)**

Special topics including new areas outside the current GIScience curriculum, or further study in more detail of other coursework. Individual course offerings and descriptions will vary. May be repeated once with different topics. (online)

**620 GIS Theory and Research (3 hours)**

A study of advanced vector data models and analytical methods using vector data. Prerequisite: Geog 32-545 or equivalent. (online, alt. trimesters, alt. years)

**630 Raster-based GIS and Modeling (3 hours)**

Covers advanced topics in GIS using the raster data structure. Emphasis is placed on the use of raster-based data for spatial modeling applications. Prerequisite: Geog 32-545 or equivalent. (online, alt. trimesters, alt. years)

**640 GIS Customization (3 hours)**

An advanced course in the use of programming techniques in geographic information systems. Emphasis will be placed on user-interface customization, macro-script programming, and simple simulation and modeling. Prerequisite: Geog 32-545 or equivalent (online, alt. trimester, alt. years)

**650 GIS Database Design (3 hours)**

A comprehensive study of the process of GIS database design, including user needs assessment and conceptual, logical, and physical database design. Emphasizes design of the spatial component of GIS data. Prerequisite: Geog 32-545 or equivalent. (sonline, alt. trimesters, alt. years)

**655 GIS Project Management (3 hours)**

A study of GIS project management at several levels, from organization planning for GIS implementation to the management of individual GIS projects. Prerequisite: Geog 32-545 or equivalent. (online, alt. trimesters, alt. years)

**660 Trends in GIS (3 hours)**

A virtual seminar addressing the latest trends in Geographic Information Systems and Science. Additionally, students will develop a draft of their thesis proposal. Prerequisite: Geog 32-545 or equivalent. (online, alt. trimesters, alt. years)

**662 Issues in Cartographic Design (3 hours)**

An extension of basic GIS/desktop mapping encompassing the theoretical and applied aspects of cartographic problem solving pertaining to the collection, storage, retrieval, analysis and display of spatial data. An emphasis will be placed on map/graphics design issues as they pertain to delivering the output in evolving media formats such as web dissemination. Prerequisite: Geog 32-545 or equivalent. (online, alt. trimesters, alt. years)

**699 Thesis (1-5 hours)**

Required for the M.S. degree. Registration for thesis credit requires the approval of the graduate advisor and department chairperson. (F, S)

## **Geology / 27**

**500 Special Offerings (1-4 hours)**

One-time course offering in a timely area of geology or earth science.

**501 Special Topics in Geology (1-4 hours)**

Will be offered according to student needs and interest. Each offering will be designed to incorporate the latest information pertaining to a timely topic in geology. Topics may include: rock and mineral origins and classifications, groundwater, energy, age of dinosaurs, fossils and the history of life, volcanoes and earthquakes, and glacial geology. Prerequisite: One year of college-level science or permission of the instructor.

**510 Geomorphology (3 hours)**

A study of landforms, their description, recognition, classification. The origin and nature of geomorphological processes which form and continually modify landforms. The influence of rock type, climate, and other factors. Two lectures and one two-hour laboratory per week. Prerequisites: Geol 27-110/111 or 114/115. (S, alt years)

**515 Environmental Regulations (2 hours)**

An introduction to federal and state regulations and major issues associated with the environment including air quality, groundwater quality and the disposal of hazardous waste. Prerequisites: Geol 27-360 or Bio 04-420 or Geog 32-501 or by permission of instructor. (S, alt. years)

**520 Geology Field Trip (Advanced Level) (2 hours)**

Field trip to selected localities of geologic interest. Prerequisites: Geol 27-212. (F)

**530 Sedimentology (3 hours)**

A study of the production, transportation, deposition, and lithification of sediments. Includes comparison of classifications, techniques of using sediments in environmental interpretations and laboratory techniques in sedimentary rock study. Two lectures and one two-hour laboratory per week. Prerequisites: Geol 27-212. (F, alt. years)

**540 Paleontology (5 hours)**

A general study of fossils, including classification of plants and animals, development and evolution of prehistoric life, paleontological techniques, and use of fossils as time and ecological guides. Lab includes study and identification of the major fossil groups. Emphasis is on invertebrate animals, with a general review also of microfossils, plants, and vertebrates. Three lectures and two two-hour laboratories per week. Prerequisites: Geol 27-212 or permission of instructor. (S)

**555 X-Ray Analysis (3 hours)**

Theory and application of x-ray diffraction. Consideration will be given to sample preparation, American Society Testing Materials data file, laboratory procedures, and analysis of data. Prerequisite: Geol 27-220 or permission of instructor. (S, alt years)

**560 Optical Mineralogy (3 hours)**

A study of the optical properties of non-opaque minerals through use of the petrographic (polarizing) microscope utilizing both oil immersion and thin section methods. Prerequisite: Geol 27-220. (F, alt years)

**590 Seminar in the Earth Sciences (2 hours)**

Seminar and studies of advanced topics in selected fields in geology and other earth sciences. Two hours per week in lecture, seminar or lab appropriate to the topics. Prerequisites: Geol 27-110/111.

**599 Special Investigations in the Earth Sciences (1-3 hours)**

Independent studies in the earth sciences including but not limited to research and library studies. Enroll only with consent of department chairperson. Requires written proposal at time of registration. (F, S)

**600 Special Offering (1-4 hours)**

One-time course offering in a timely area of earth science. Includes special short courses for earth science teachers. Prerequisites: Geol 27-110/111.

**696 Problems of Teaching Earth Science (3 hours)**

A study of the curriculum in earth science: content, materials, laboratory investigations, field trips and field work, resources such as museums, planetariums, and government agencies, and other aspects of laboratory-centered earth science teaching. For elementary or secondary teachers. Prerequisites: Geol 27-110/111 or 114/115 or equivalent.