Earth Science (ESC) - Graduate Courses

Courses
ESC/GEO 422/522 Cr.3
Meteorology
Atmospheric concepts and processes of the earth's weather are covered. Principles and laws which govern the behavior of the atmosphere are investigated, including energy exchange between the earth and the atmosphere, forces governing atmospheric motion, atmospheric moisture and stability, condensation and precipitation processes, air masses and cyclogenesis, thunderstorm and tornado development, and hurricanes. Surface and upper-air charts, synoptic patterns, thermodynamic charts, radar and satellite images, and weather patterns are analyzed. Prerequisite: ESC 221. (Cross-listed with ESC/GEO; may only earn credit in one department.) Offered Spring.

ESC/GEO 425/525 Cr.3
Biogeography
A systematic analysis of the geographic distribution of organisms from historical, ecological and regional perspectives. Emphasis is placed on the principles and the methods of biogeography. Special reference is made to biogeographic regions, the distribution of organisms in space and time, and ecological biogeography. Prerequisite: ESC 101 or ESC 211. (Cross-listed with ESC/GEO; may only earn credit in one department.) Offered Fall - Odd Numbered Years.

ESC/GEO 426/526 Cr.4
Soil Systems
A comprehensive study of soils around the world and the factors and processes that drive their formation and dynamic evolution. Emphasis is placed on soil morphology, formation, and biogeochemical influences within the soil environment. A one-credit lab section is devoted to the hands-on exploration and study of soils through laboratory and field exercises. Lect. 3, Lab 2. Prerequisite: ESC 221. (Cross-listed with ESC/GEO; may only earn credit in one department.) Offered Alternate Years.

ESC/GEO 427 Cr.3
Water Resources
A study of physical water resources systems and management and utilization of water as a resource. Class activities will include seminars on critical water resource management issues and hands-on analysis of pertinent data, including exercises in Geographic Information Systems. Prerequisite: ESC 101. (Cross-listed with ESC/GEO; may only earn credit in one department.) Offered Alternate Years.

ESC/GEO 450/550 Cr.3
Past Environmental Change
An overview of the study of environmental change during the Quaternary. Approaches used to understand past climatic conditions and effects on terrestrial and marine ecosystems at global, regional and local scales will be explored, as will physical, geochemical and biological methods associated with continuous and depositional environments. Prerequisite: ESC 221 and ESC 222. (Cross-listed with ESC/GEO; may only earn credit in one department.) Offered Alternate Years.

ESC/GEO 430/530 Cr.3
River Systems
A systematic study of the interactions between flowing water and surface landforms. Emphasis is placed on watershed and stream development, sediment transport and storage, flow frequency analysis, and applications of fluvial principles to river management and stream restoration. Class activities will include field exercises in the La Crosse region, mathematical analysis of hydrologic variables, and spatial analysis with Geographic Information Systems. Prerequisite: ESC 222. (Cross-listed with ESC/GEO, may only earn credit in one department.) Offered Spring - Odd Numbered Years.

ESC/GEO 440/540 Cr.3
Geographic Interpretation of Aerial Photographs
Systematic applications of aerial photographs in the interpretation and analysis of geographic problems. Emphasis is placed on digital photograph interpretation within a geographic information system. Topics include urban and rural land use, natural resource, and environmental assessment. Lect. 2, Lab 2. Prerequisite: ESC/GEO 385. (Cross-listed with ESC/GEO; may only earn credit in one department.) Offered Occasionally.

ESC/GEO 445/545 Cr.3
Advanced Remote Sensing
Advanced techniques of digital satellite and airborne image analysis and processing, emphasizing theory and applications in natural resource, land use and environmental assessment. Includes practical approaches to integrating imagery with geographic information systems area for spatial analyses and decision making. Data acquisition, integrity, manipulation, formatting, storage, and retrieval are also examined. Prerequisite: ESC/GEO 345. (Cross-listed with ESC/GEO; may only earn credit in one department.) Offered Spring.

ESC/GEO 455/555 Cr.3
Web Mapping
In this course, students will learn how to produce and design interactive Web maps for communication. Web maps take many forms and they are continually changing. Thus, the objective of this course is to do two things: (1) develops proficiency in the scripting languages and tools most frequently used to design and create these maps; and (2) teaches the theory and concepts underlying good Web map design so that as the technologies change in the future students will still be able to design effective Web maps. At the end of this course, students will be able to design a Web map from scratch. Lect. 2, Lab 2. Prerequisite: ESC/GEO 250; ESC/GEO 355; junior standing. (Cross-listed with ESC/GEO, may only earn credit in one department.) Offered Spring.

ESC/GEO 460/560 Cr.3
Environmental Hazards
Environmental processes are investigated in light of the hazards they might pose for development and how they may be avoided, mitigated and managed. Prerequisite: ESC 221 or ESC 222. (Cross-listed with ESC/GEO; may only earn credit in one department.) Offered Fall - Even Numbered Years.

ESC/GEO 470/570 Cr.1-3
Special Topics in Geography/Earth Science
Specifically selected topics or skills which may be designed for the interest of special groups will be offered with formalized instruction and methodology appropriate to geography and/or earth science. May be counted as an elective in the geography major or earth science minor at the discretion of the geography/earth science department. Prerequisite may be required at the discretion of the department. Repeatable for credit - maximum six. (Cross-listed with ESC/GEO; may only earn credit in one department.) Offered Occasionally.
ESC/GEO 476/576 Cr.1-3

**Geography/Earth Science Topics for Teachers**
Selected topics in geography and/or earth science pertinent to applications in the teachers’ classrooms. Courses are designed to meet the needs of teachers so that they may implement the course material into their classroom teaching. (Cross-listed with ESC/GEO; may only earn credit in one department.) Offered Occasionally.

ESC/GEO 490/590 Cr.2-3

**Independent Study**
Individual readings and investigation of selected problems in geography. Open to senior majors and minors with a "B" (3.00) average in geography. Registration with consent of regular advisor, instructor, department chairperson, and the dean of the college in which the student is enrolled. Repeatable for credit - maximum six. Maximum three credits applicable to major. Maximum three credits from any instructor. (Cross-listed with ESC/GEO; may only earn credit in one department.) Consent of instructor. Offered Fall, Winter, Spring, Summer.

ESC/GEO 495/595 Cr.1-3

**Seminar in Geography/Earth Science**
Investigation into various topics in geography or the earth sciences. Varying topics will be offered at intervals with a specific title assigned to each. This course is taught largely at an undergraduate level. Graduate students will have additional course requirements/expectations. Repeatable for credit - maximum six. Variable topics - check semester timetables. Prerequisite: two semesters of geography and/or earth science. Additional prerequisites may be required by the instructor. (Cross-listed with ESC/GEO; may only earn credit in one department.) Offered Occasionally.

ESC/GEO 790 Cr.1-3

**Directed Study**
Individual readings and investigations of selected topics in geography and earth science. Repeatable for credit – maximum three. Prerequisite: permission of the instructor and the department chair. (Cross-listed with ESC/GEO; may only earn credit in one department.) Offered Occasionally.