

Academic Offerings

This section contains descriptions of programs, majors, minors, areas of concentration, fields of specialization, and courses. Semesters following course titles indicate when each course is normally offered. On rare occasions, a course may not be available when indicated because of low enrollment or unexpected staffing changes.

Courses listed as Fall Odd and Spring Even are scheduled to be offered during the 2011-2012 academic year. i.e., fall 2011-2012 is Fall Odd, spring 2011-2012 is Spring Even.

Environmental Studies

The major in environmental studies seeks to cultivate stewardship of the creation as a lifestyle and profession through an interdisciplinary program of study. This program asks: 1) how does the world work; 2) what is right for us as Christians in our relationship to the rest of creation; and 3) how should we then live and work to be obedient stewards?

General Major- Foundation (common to both emphases): Environmental Studies 151, 152, 161, 303, 396; Biology 115, 122, 200; Economics 200 or 202; Mathematics 131 or 151.

Students must select one of the following emphases:

Environmental Science: Foundation; Chemistry 103, 104; Environmental Studies 251; one course from Chemistry 122, 212, 221, 312; two courses from Biology 316, Environmental Studies 270, 320; two courses from Agriculture 201, Environmental Studies 201, 202; one course from Biology 213, 302, 310; two courses from Environmental Studies 333, 334, Political Studies 333. Students must also complete one of the following: The Environmental Studies 358 and 380 sequence, a departmentally approved summer internship (Environmental Studies 393) or a departmentally approved off-campus course that complements their program.

Policy and Management: Foundation; Chemistry 101, 122; Environmental Studies 333, 334; Political Studies 245, 312, 333; Engineering 390; Political Studies 202 or 214; Political Studies 210 or 370; Agriculture 290 or Economics 321; Communication 311 or 314. Students must also complete one of the following: the Environmental Studies 358 and 380 sequence, a departmentally approved summer internship (Environmental Studies 393) or a departmentally approved off-campus course that complements their program.

Courses in the following off-campus programs may substitute for up to four of the above with approval of the chair of environmental studies. For both emphases: Latin American Studies Program, Au Sable Institute of Environmental Studies, Creation Care Studies Program, or other approved off-campus study.

General Minors-

Environmental Science: Environmental Studies 151, 152, 161, 396; Biology 200 or Agriculture 370; Chemistry 251; one from Agriculture 201, Environmental Studies 201, 202, 303; one from Biology 316, Environmental Studies 270, 320.

Environmental Studies: Environmental Studies 151, 152, 161, 303, 396; one from Agriculture 201, Environmental Studies 201, 202; one from Biology 316, Environmental Studies 270, 320; one from Environmental Studies 333, 334, Political Studies 333.

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- 151 **Introduction to Environmental Studies (4)** Fall
 An introduction to contemporary environmental studies and creation care, with emphasis on class discussion of relationships between human population and resource use in light of biblical teaching about environmental stewardship. Particular attention is given to the biotic and ecological dimensions of creation stewardship and planetary distress. Three lectures and one laboratory period of three hours per week. [Cross-listed: CORE 211, Earth Science 151]
- 152 **Introduction to Environmental Studies II (4)** Spring
 Further exploration of the foundations of contemporary environmental studies. Particular attention is given to the physical dimensions of creation care including energy sources and consumption, use of materials, and environmental pollution. The human social aspects of creation stewardship are also explored. Environmental Studies 151 is not a prerequisite. Three lectures and one laboratory period of three hours per week. [Cross-listed CORE 222]
- 161 **Field and Laboratory Investigations in Environmental Studies (1)** Fall
 A field and laboratory exploration of fundamental issues, concepts, and techniques of contemporary environmental studies with a biological and ecological focus. Includes visits to sites of natural history and stewardship interest both locally and regionally. Also includes an introduction to important technological tools in environmental studies and analysis of physical and biotic parameters of the environment. Required for students majoring or minoring in Environmental Studies. Corequisite: Environmental Studies 151.
- 201 **Introductory Geology and Physical Geography (4)** Fall
 A general introduction to the physical nature and structure of the solid Earth, including, briefly, its physical geography and a more detailed look at its geology. The environmental implications of these subjects are detailed. Three lectures and one laboratory period of three hours per week and one or two field trips. [Cross-listed: CORE 223, Earth Science 201, Geography 201]
- 202 **Meteorology, Climate Change, and Aquatic Ecosystems (3)** Spring Even
 Provides a general introduction to meteorology and weather. Climate and climate change in Quaternary times to the present are also considered. The implications of an anthropogenically enhanced greenhouse effect will be addressed, with particular attention given to the impact of these changes on the structure and function of aquatic ecosystems. [Cross-listed: Earth Science 202, Geography 202]
- 251 **Environmental Chemistry (4)** Spring Odd
 A study of the nature and transport of chemical species—both natural and human-introduced—in the natural environment (atmosphere, hydrosphere, geosphere, and biosphere). The lab will include methods of sampling and analysis of samples from natural and/or human influenced environments. Three lectures and one three-hour lab per week. Prerequisites: Chemistry 101, 122 or Chemistry 103, 104. Prior completion of Chemistry 221 recommended but not required. [Cross-listed: Chemistry 251]
- 270 **Avian Biology and Conservation (3)** Spring Even
 The identification, natural history, ecology, and stewardship of birds. Topics include morphological and physiological ecology of birds, habitat selection, communication, migration, reproductive ecology, territoriality, taxonomy, and conservation. The connections between avian ecology and creation stewardship will be explored. Recognition of a diverse set of birds by sight and sound is an important component of the course. Two lecture/discussion sessions and one three-hour lab per week. Field work will concentrate on local birds, but at least one trip to a distant site will be included. Prerequisite: one of Agriculture 101, Biology 122, CORE 212, Environmental Studies 151.
- 281- **Service-Learning (1-3)** Fall, Spring, Summer
 283 See page 161, Individual Studies
- 303 **Geographic Information Systems (3)** Fall Even

An introduction to the acquisition, analysis, display, manipulation, and management of geographic information. An overview of survey methods used to gather and quantify features of physical geography will be practiced. Course topics will include geographical data input, storage, maintenance, analysis, and retrieval. Students will utilize common GIS software and associated hardware. The course will meet in two studio lab classes to provide an integral learn-by-doing experience applying surveying methods, GPS technology, and GIS applications. Application of GIS to agriculture, business, environmental management, and other disciplines will be provided in this course. Prerequisite: sophomore standing or above. [Cross-listed: Agriculture 303, Business Administration 303, Construction Management 207]

- 320 **Wildlife Ecology and Stewardship (3)**.....Spring Odd
Advanced examination of animal (especially terrestrial vertebrate) populations, communities, and habitats, particularly as such analysis is applied to the manipulation and exploitation of animal populations and communities to regulate their abundance and distribution and/or to restore them. Considerable exploration and critique of the development and practice of wildlife management, particularly as it compares to biblical principles for creation stewardship. Two lecture/discussion sessions and one three-hour lab per week. Prerequisite: Agriculture 370 or Biology 200. [Cross-listed: Biology 320]
- 333 **Philosophy of the Environment (3)**.....Fall Even
A historical and systematic study of the structure and normed character of the various relationships between human beings and their environment. Prerequisites: CORE 200; junior or senior standing. [Cross-listed: Philosophy 333]
- 334 **Economics of Natural Resources and the Environment (3)**Fall Odd
A study of economic aspects of Christian stewardship in relation to the environment and use of natural resources. Major topics include biblical norms on creation, property rights, economic justice, the economic dimensions of current environmental problems and trends in resource use, institutions and social structures that affect environmental policy, economic theories related to resource use and environmental quality, and evaluation of current and proposed policies from a Christian point of view. Prerequisite: Economics 200 or 202 or 203. [Cross-listed: Economics 334]
- 341- **Special Topics (3)**Occasional
348 Courses on topics of special interest and importance in creation stewardship, depending on student demand and instructor availability. These courses address topics that are not treated in depth in established courses.
- 358 **Introduction to Biological Research (1)**.....Fall, Spring
This is a mini-course designed to prepare students for directed senior research. The course will introduce the idea and practice of biological research. It will include the nature and scope of a research project, how to conduct literature searches, and how to design methods and protocols for problem solving. The class will meet weekly in seminar or tutorial format. Students will be expected to make two short presentations, finalize their proposal for Environmental Studies 380, and (if appropriate) begin the work for the directed research project. Graded on a pass/no credit basis. Prerequisites: Environmental Studies 151, 152; Biology 115, 122, 200. [Cross-listed: Biology 358]
- 380 **Directed Senior Research (3)**Fall, Spring
Focuses on identifying a stewardship problem and bringing rigorous analytical and critical thinking to bear in examining the problem, reporting on it, and making recommendations for its resolution. The research project will be chosen and conducted under the guidance of a faculty mentor and may investigate a problem from a natural science perspective in the field and/or laboratory or from a social science perspective. With approval, the research may be conducted at an off-campus location. Prerequisite: Environmental Studies 358. [Cross-listed: Biology 380]
- 391- **Individual Studies (1-3)**Fall, Spring, Summer
393 See page 161, Individual Studies
- 396 **Seminar on Creation Stewardship (3)**.....Spring Odd
An interdisciplinary, capstone seminar designed to explore current research, thought, and issues in environmental stewardship. The seminar will emphasize holistic thinking that seeks connections; that desires sustainable, just

living; and that moves participants from understanding and commitment toward stewardly living in a place. A significant portion of the course will comprise hands-on, group analysis of a campus or community stewardship issue involving human-designed systems and leading to recommendations for stewardly design and life. Prerequisites: Environmental Studies 151; junior or senior standing.