

**971. Contrapuntal Techniques**  
Winter of even-numbered years, Summer. 3(3-0) MUS 970.  
Continuation of MUS 970.

**972. Contrapuntal Techniques**  
Spring of even-numbered years, Summer. 3(3-0) MUS 971.  
Continuation of MUS 971.

**999. Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**NATURAL RESOURCES N R**

**College of Agriculture and Natural Resources**

**202. Soils and Man's Environment**  
Winter. 3(3-0) Interdepartmental with the departments of Crop and Soil Sciences, Resource Development, and Fisheries and Wildlife and administered by the Department of Crop and Soil Sciences.

Use of soil and water resources in a technological society as it relates to environmental quality. Nature of pollution problems and their possible solutions. Food production and world population.

**220. Plants and Their Environment**  
Winter. 3(3-0) Interdepartmental with and administered by the Department of Forestry.

Fundamental ecological relationships between various climatic, edaphic and biotic environmental factors of the ecosystem and plant response, including structure, function and evaluation of species.

**275. Exploring International Agriculture**  
Spring. 3(3-0) Interdepartmental with and administered by Agriculture.

Exploration of overseas assignments with international agencies; potential world food actualities and potentialities; special problems of the tropics compared with those in temperate regions.

**350. Leadership Development for Agriculture and Natural Resources**

Winter, Spring. 3(3-0) May reenroll for a maximum of 6 credits. Approval of department. Interdepartmental with and administered by Agriculture.

Leadership development. Preparation for community leadership. Firsthand look at social, economic, and political problems. Series of seminars, interviews, field trips. Emphasis on awareness, action, and involvement. Field trips required.

**399. Agriculture Internship**  
Fall, Winter, Spring, Summer. Zero to 10 credits. (10 credits. See page A-2 item 3.) Juniors and approval of department. Interdepartmental with and administered by Agriculture.

Professionalized experiences in a student's major. Supervision and evaluation conducted by faculty and cooperating agencies.

**425. Agriculture and Natural Resources Seminar**  
Spring. 2(2-0) Interdepartmental with and administered by Agriculture.

Current agricultural, natural resources, and environmental problems and solutions as presented by discussion leaders from various disciplines, arranged by undergraduate students.

**444. Pest Management I: Systems Management for Plant Protection**  
(437.) Fall. 4(3-2) FSM 200 or EC 201.

Interdepartmental with Agriculture and the College of Natural Science and administered by the College of Natural Science.

Designed to integrate knowledge and improve ability in arriving at pest management decisions of varying complexity involving the fields of agronomy, wildlife, horticulture, entomology, and plant pathology.

**445. Pest Management II: Pesticide Chemistry and Application Systems for Plant Protection**

(435.) Winter. 5(3-4) CEM 132. Interdepartmental with Agriculture and the College of Natural Science and administered by the College of Natural Science.

A broad overview of pesticide chemistry, efficient usage, environmental fate, legislation and application techniques.

**446. Pest Management III: Biological Systems for Plant Protection**

(436.) Spring. 3(3-0) ENT 430, BOT 405, HRT 402 or CSS 402. Interdepartmental with Agriculture and the College of Natural Science and administered by the College of Natural Science.

Management of plant pests utilizing host resistance, cultural practices, legislation, and biological systems.

**450. Natural Resource Administration**

Fall, Spring. 4(4-0) Seniors. Interdepartmental with the departments of Fisheries and Wildlife, Forestry, Park and Recreation Resources and Resource Development. Administered by the Department of Forestry.

Concepts and methods of administering wildland properties. The legal, economic and social environment. Benefit-cost analysis of management changes. Unit organization, personnel management and accounting. Presents a systems view of administration.

**455. Natural Resource Economics**

Winter. 4(4-0) FOR 450 or approval of department. Interdepartmental with the departments of Fisheries and Wildlife, Forestry, Park and Recreation Resources and Resource Development. Administered by the Department of Forestry.

Basic economic and political principles and techniques that govern the production and consumption of forest land products, including basic forest valuation procedures.

**475. International Studies in Agriculture and Natural Resources**

Spring, Summer. 3 to 9 credits. Approval of the college. Interdepartmental with and administered by Agriculture.

Study-travel experience emphasizing contemporary problems affecting agriculture in the world, national, and local communities. Field trips, case studies, interviews with leading experts, government officials, community leaders. Supervised individual study.

**491. Natural Resources and Modern Society**

Spring. 3(3-0) Juniors. Interdepartmental with the departments of Forestry and Resource Development and administered by the Department of Forestry.

A survey of the social and economic significance of natural resources in modern industrial and urban society. Current problems of natural resources management and use are examined in terms of the society in which they exist.

**NATURAL SCIENCE N S**

**University College**

Students who have not taken any of the required natural science courses, may take any three course from the following list.

N S 115, 122, 125, 135, 142, 152, 162, 171H, 172H, 173H

OR

If you are enrolled in ATL 101, you may take N S 181, 182, 183.

Students who have already taken one or two natural science courses should refer to the chart below to complete the University requirements of 12 credits in Natural Science.

You may take	if you have not had credit in
N S 115	111, 116, 121, 131, 140, 151, 161, 181, 192, 322
122	193
125	112, 117, 132, 141, 182, 193, 323
135	113, 120, 133, 150, 160, 183, 191, 321
142	118, 193
152	193
162	193
171H	192
172H	193
173H	191
181	115, (111, 116, 121, 131, 140, 151, 161, 192)
182	125 (112, 117, 132, 141, 193)
183	135 (113, 120, 133, 150, 160, 191)

**115. The Nature and Continuity of Life**

Fall, Winter, Spring, Summer. 4(3-2)

A—The development and testing of scientific concepts as examples of man's attempt to understand the world in which he lives. Selected topics from the life sciences illustrate the nature of scientific investigation.

B—Theories of the origin, development and structure of life and the universe of which it is a part. Examination of contemporary problems associated with defining life and death.

C—Consideration of social and ethical issues relating to our increasing control of reproduction and heredity. Reproduction and heredity from molecular, cellular and organismic perspectives, including human structure and function.

D—The nature of living things, contrasting various scientific and non-scientific views. The implications of the modern scientists understanding of life for our beliefs and values.

**122. Biosocial Evolution of Man**

(193B.) Fall, Winter, Spring. 4(3-2)

Man's current understanding of himself and his beliefs as products of biological and cultural evolution. Implications for man's future.

**Descriptions – Natural Science  
of  
Courses**

**125. Time and Change in Nature**

Fall, Winter, Spring, Summer. 4(3-2)

A—Man's attempts to explain the present in terms of past events are explored through selected topics from the life sciences and earth sciences. Stresses the role of controversy in science and the nature of scientific evidence.

B—Heredity, evolution and diversity of life are examined from the viewpoint of the biological and cultural development of the human species. Evolutionary relationships between humans and their environment.

C—The origin and evolution of earth and living things are studied as vital and related problems. Emphasis on problem-solving in science and impact of evolutionary concepts on human species.

**127. The Bioecology of Health**

Fall, Winter, Spring. 4(3-2)

Man's health examined from evolutionary and ecological viewpoints. Emphasis on the impact of increasingly man-made environment has had on the health of Western man.

**129. The Biotechnology of Health**

Winter, Spring. 4(4-0)

Survey of the biotechnology currently and potentially available to manage health problems. Social issues associated with this biotechnology.

**135. Changing Concepts of the Universe**

Fall, Winter, Spring, Summer. 4(3-2)

A—The origin and development of scientific explanations of the physical world. The origins of modern science and scientific revolutions.

B—The role of science in the development of western man's ideas about reality. The origin and development of mechanistic concepts of the physical world and their part in intellectual dialogue.

C—Growth of theories of celestial motion and of matter. Their interrelationship. Impact of scientific knowledge on society. The contribution of science to clarification and solution of social problems.

D—Man's attempts to understand the universe and his place within it. The interaction between scientific concepts and the beliefs and values of the culture in which they are proposed.

**142. Life, Its Environment**

(118.) Fall, Winter, Spring. 4(3-2)

Natural ecological systems and the impact of human biological and cultural development on them. Examination of specific ecological problems and the role of science in seeking solutions.

**142A. Life, Its Environment**

Summer. 4(3-2) Approval of instructor.

May not receive credit in both N S 142 and N S 142A.

Academic goals and objectives are parallel to those for Natural Science 142; however, examination of geological and ecological features will be done through direct experience in wilderness areas off campus. Offered only in an off campus wilderness setting. Approved through Spring term 1980.

**152. Science and Culture in the 20th Century**

(193E.) Fall, Winter, Spring. 4(3-2)

Controversies concerning interpretation of modern scientific concepts such as evolution, uncertainty and relativity are discussed in terms of developing a personal philosophy.

**162. Race, The Evolution of an Idea**

Fall, Winter, Spring. 4(3-2)

Human races and mankind evolving. The biological concept of race based on the theories of the gene, evolution, and natural selection.

**171H. Man's Nature**

(192H.) Fall. 4(3-2)

Various issues confronting modern man in his attempt to understand his biological self. Emphasis on the role that science can play in helping to resolve these issues.

**172H. Man's Place in Nature**

(193H.) Winter. 4(3-2)

Various issues confronting modern man in his attempt to understand his place in and relation to the environment. Emphasis on the role of science in helping to resolve these issues.

**173H. Science-Technology and Human Values**

Spring. 4(3-2)

The nature and significance of science and technology in Western culture, with emphasis on their relationship to other creative activities, particularly those within the arts.

**181. Natural Science**

Fall. 4(3-2) Not open to students with credit in N S 115. Enrollment in ATL 101 or approval of department.

Scientific methods emphasizing development and modification of explanation systems. The nature of cells and sexual reproduction as background for Mendelian gene theory and its modern modifications. Social implications are emphasized.

**182. Natural Science**

Winter. 4(3-2) Not open to students with credit in N S 125. N S 181 or approval of department.

Scientific methods with emphasis on evolutionary ideas regarding origin of earth features as related to modern problems. Human origins and development are considered, with a number of modern problems.

**183. Natural Science**

Spring. 4(3-2) Not open to students with credit in N S 135. N S 182 or approval of department.

Nature of science as exemplified by ideas from physical science. The Copernican Revolution is used as an example of the science-society interaction. Modern concepts of cosmology are also introduced.

**200. Technology and Society**

Winter. 3(3-0) Twelve credits of Natural Science. Interdepartmental with and administered by the Department of Engineering.

An attempt to describe and analyze portions of current technology and its desired and undesired consequences; and exploration of avenues for assessing such consequences for future technologies.

**300. Supervised Individual Study**

Fall, Winter, Spring, Summer. 2 to 4 credits. May reenroll for a maximum of 12 credits. Approval of department.

Selected students requesting individual study of interdisciplinary problems will work under supervision of University College professors. Variable elective credit will be determined when the student secures instructor, adviser, and department approval.

**310. Science and Pseudoscience**

Spring. 3(3-0) Juniors.

Techniques of reasoned, critical analysis applied to science-related ideas such as astrology, gods from outer space, and the secret life of plants. Specific topics selected from recent writings.

**325. Biological and Social Aspects of Human Reproduction**

Fall, Winter, Spring. 4(4-0) Juniors or approval of department.

Anatomy and physiology of human reproduction will be integrated with consideration of such current social concerns as contraception, abortion, venereal disease and drugs.

**380. Issues in Science and Religion**

Winter. 4(4-0) Juniors or approval of department. Interdepartmental with the Department of Religious Studies and Justin Morrill College. Administered by the Department of Religious Studies.

History of relationships between science and religion. Methods of science and religion. Attempts at resolution of conflicts and formation of new syntheses.

**401. Technology Assessment**

Spring. 3(3-0) Seniors, or approval of department. Interdepartmental with and administered by the Department of Engineering.

Sociotechnical evaluation of impact of proposed technologies on economic, political, and cultural aspects of society. Identification of technical strategies and social goals. Techniques of assessment.

**NATURAL SCIENCE NSC  
(COLLEGE OF)**

**390H. The Human Organism**

Winter. 3(3-0) Juniors; approval of the Honors College.

The importance of new discoveries in biology for our understanding of the human organism with emphasis from the fields of genetics, molecular biology, behavior, developmental biology, physiology and ecology.

**391H. Man's Universe**

Fall. 3(3-0) Juniors; approval of the Honors College.

A creative review by senior faculty from astronomy, biochemistry, biophysics, geology, physics, and philosophy of the impact of recent space probes in developing modern concepts of the universe, the origin of the earth and life upon it.

**392H. The Uniqueness of Man**

Spring. 3(3-0) Approval of the Honors College, or course coordinator.

Physiological processes; behavioral mechanisms; genetic information; life support systems; physical disorders and adjustment to hostile environments.

**400. Nature and Uses of Electron Microscopes**

Fall. 3(2-1) MTH 111, Juniors, 1 year college physics.

Principles of electron optics including history, construction, and design of electron optical equipment. Lectures and demonstrations will be given on uses of various types of electron microscopes in representative biological and physical sciences.