

**Descriptions — Natural Resources
of
Courses**

450. Natural Resource Administration
Fall, Spring. 4(4-0) Interdepartmental with Fisheries and Wildlife, Forestry, Park and Recreation Resources and Resource Development Departments. Administered by the Forestry Department.

Concepts and methods of administering wild-land 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.

471. Environmental Topics in Nonmetropolitan Regions

Fall. 4(4-0) Nomination of students by own department and approved by participating faculty. Interdepartmental with the College of Natural Science and Agriculture.

Environmental topics in nonmetropolitan regions including issues on: production agriculture, service industries, nonagricultural uses, rural urban balance, discussion topics and case studies.

475. International Studies in Agriculture and Natural Resources

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, Summer. 3(3-0) Juniors. Interdepartmental with the Forestry and the Resource Development Departments and administered by Forestry Department.

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

To satisfy the University General Education requirement, a student must take one course in each of the following groups. Additional courses may be taken for elective credit.

1. 111, 117, 121, 131, 151, 171H, 181, 322.
2. 112, 118, 122, 132, 152, 162, 172H, 182, 323.
3. 113, 116, 120, 133, 150, 160, 173H, 183, 321.

111. The Nature of Science I

(192A.) Fall, Winter, Spring, Summer. 4(2-3)

The development and validation 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 process of scientific investigation.

112. The Nature of Science II

(193A.) Fall, Winter, Spring, Summer. 4(2-3) 111 preferred; or 121, 131, 141, 151, 171H, 181, or 322.

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.

113. The Nature of Science III

(191A.) Fall, Winter, Spring, Summer. 4(2-3) 112 preferred; or 122, 132, 142, 152, 162, 172H, or 182.

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

120. Science, Beliefs and Values I

(191B.) Fall, Winter, Spring, Summer. 4(2-3)

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.

121. Science, Beliefs and Values II

(192B.) Fall, Winter, Spring, Summer. 4(2-3) 120 preferred; or 140, 150, 160, or 321.

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. Science, Beliefs and Values III

(193B.) Fall, Winter, Spring, Summer. 4(2-3) 121 preferred; or 111, 131, 141, 151, 171H, 181, or 322.

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

127. The Bioecology of Health

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

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

131. Science, Man and Society I

(192C.) Fall, Winter, Spring, Summer. 4(2-3)

The role science plays in our lives is explored through consideration of aspects of reproduction and heredity. Emphasis on the origin of scientific explanations and their significance to the individual.

132. Science, Man and Society II

(193C.) Fall, Winter, Spring, Summer. 4(2-3) 131 preferred; or 111, 121, 141, 151, 171H, 181, or 322.

The origin and evolution of earth and man are studied as vital and related problems. Emphasis on problem-solving in science and the impact of evolutionary concepts on human societies.

133. Science, Man and Society III

(191C.) Fall, Winter, Spring, Summer. 4(2-3) 132 preferred; or 112, 122, 142, 152, 162, 172H, or 182.

Origin, growth and nature of theories in modern science. Includes aspects of astronomy and radioactivity. Emphasis on the application of scientific methodology and its products to problems of society.

140. Life, Its Origin

(116., 191D.) Fall, Winter, Spring, Summer. 4(2-3)

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.

141. Life, Its Continuity

(117., 192D.) Fall, Winter, Spring, Summer. 4(2-3)

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.

142. Life, Its Environment

(118., 193D.) Fall, Winter, Spring, Summer. 4(2-3)

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.

150. The Dynamics of Scientific Ideas I

(191E.) Fall, Winter, Spring, Summer. 4(2-3)

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.

151. The Dynamics of Scientific Ideas II

(192E.) Fall, Winter, Spring. 4(2-3) 150 preferred; or 120, 140, 160, or 321.

The influence of scientific ideas about the living world on the western intellectual tradition. Emphasis on the successes and failures of scientific ideas in offering a unified picture of reality.

152. The Dynamics of Scientific Ideas III

(193E.) Fall, Winter, Spring. 4(2-3) 151 preferred; or 111, 121, 131, 141, 171H, 181, or 322.

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

160. Evolution of Scientific Ideas I

(191B.) Fall, Winter, Spring, Summer. 4(2-3)

The nature of science, its power, its limitations and the interaction of science and culture. The idea of motion and/or matter from early concepts to relativity.

161. Evolution of Scientific Ideas II

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

The nature of science, its power, its limitations and the interaction of science and culture. The evolution of the gene concept from Mendel to modern times. Genetic theory—its application to man.

162. Evolution of Scientific Ideas III

(193F., 134.) Fall, Winter, Spring, Summer. 4(2-3) Any group, one course.

The nature of science, its powers, its limitations and the interaction of science and culture. Human races and mankind evolving. The biological concepts of races based on the theories of the gene, evolution, and natural selection.

171H. Honors Natural Science
(192H.) Fall. 4(2-3)

Exploration of various topics of interest and value to students eligible for Honors, especially the nature and significance of science in western culture and its interrelationship with other creative activities.

172H. Honors Natural Science
(193H.) Winter. 4(2-3) 171H.

A continuation of 171H.

173H. Honors Natural Science
(191H.) Spring. 4(2-3) 172H.

Continuation of 172H.

181. Natural Science
Fall. 4(2-3) Approval of department.

The role of methods in science emphasizing the development and modification of systems of explanation. The nature of the cell and sexual reproduction as background for Mendelian gene theory and its modern modifications. Social implications are emphasized.

182. Natural Science
Winter. 4(2-3) 181 or approval of department.

Methods in science continued with emphasis on evolutionary ideas regarding the origin of earth features and existing life forms. The origin and development of man is considered along with a number of modern problems.

183. Natural Science
Spring. 4(2-3) 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 the nature of matter are also introduced.

200. Technology and Society
Winter. 3(3-0) One term of American Thought and Language. Interdepartmental with and administered by the Engineering Department.

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 re-enroll 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.

321. Studies in Natural Science I
Fall. 4(2-3) Juniors.

An interdisciplinary analysis of the nature of science and its role in the human experience, with emphasis on science as a way of knowing. Subject matter used includes material from the physical sciences.

322. Studies in Natural Science II
Winter. 4(2-3) Juniors.

An interdisciplinary study of the nature of science and its role in the human experience, with emphasis on the way science affects society and is, in turn, affected by society. Subject matter used includes material from the biological sciences.

323. Studies in Natural Science III
Spring. 4(2-3) Juniors.

An interdisciplinary approach to the nature of science and its role in the human experience, with emphasis on man and his understanding of the world around him. Subject matter used includes material from the historical sciences.

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

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)**

230. The Role of the Natural Sciences in Future Environments
Fall. 4(4-0) Approval of college. Interdepartmental with the departments of Entomology, Geology, Physics, and Zoology.

Physical and biological science concepts relevant to understanding of environmental issues. Options for action in areas of population size, energy and life support system. Illustrated by case studies.

IDC. Human Adjustment to Environment
For course description see Interdisciplinary Courses.

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.

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 microscopy in representative biological and physical sciences.

435. Pest Management I: Pesticide Chemistry and Application Systems for Plant Protection
Fall. 5(3-4) CEM 132. Interdepartmental with Agriculture and Natural Resources.

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

436. Pest Management II: Biological Systems for Plant Protection
Winter. 3(3-0) ENT 430, BOT 405, HRT 402 or CSC 402. Interdepartmental with Agriculture and Natural Resources.

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

437. Pest Management III: Systems Management for Plant Protection
Spring. 4(3-2) 435 and 436, FSM 200 or EC 201. Interdepartmental with Agriculture and Natural Resources.

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.

471. Environmental Topics in Nonmetropolitan Regions
Fall. 4(4-0) Nomination of students by own department and approved by participating faculty. Interdepartmental with Natural Resources and Agriculture and administered by Natural Resources.

Environmental topics in nonmetropolitan regions including issues on: production agriculture, service industries, nonagricultural uses, rural urban balance, discussion topics and case studies.

801. Special Problems in Electron Microscopy
Fall, Winter, Spring, Summer. 1 to 15 credits. Approval of instructor.

810. Methods in Transmission Electron Microscopy
Fall, Winter, Spring. 3(1-5) 400 or approval of instructor.

Use of the transmission electron microscopes and preparative instruments. Preparative technique for biological and nonbiological materials. Photographic principles including interpretation of micrographs.

820. Methods of Scanning Electron Microscopy
Fall, Winter, Spring. 3(1-5) 400 or approval of instructor.

Use of the scanning electron microscope and preparative equipment. Preparative technique for biological and nonbiological materials. Interpretation of micrographs.

830. Analytical Electron Microscopy
Fall. 2(1-3) 810 or 820 or approval of instructor.

Use of X-ray analysis on electron microscopes and electron microprobes with biological and physical materials. Methods of preparation and analysis of product data.

NURSING N E

College of Natural Science

205. Foundations of Nursing
Fall. 3(2-3) Approval of school.

Introduction to principles basic in identifying nursing problems and their use in sound planning of patient care.