

## Descriptions — Music

### of Courses

955. **Current Tendencies in Music Education**  
*Winter of even-numbered years. 3(3-0)*  
*Approval of department.*  
Current trends and practices in public school music education.
956. **Advanced Research Techniques in Music**  
*Winter. 3(3-0)* *Approval of department.*  
Selected research techniques in music education with emphasis on experimental design and computerized data analysis.
960. **Analytical Studies**  
*Fall. 3(3-0)* *Approval of department.*  
Analysis of melody, harmony, rhythm, color, texture, counterpoint, and form in part-music from the thirteenth century through the late sixteenth/early seventeenth century.
961. **Analytical Studies**  
*Winter. 3(3-0)* *Approval of department.*  
Analysis of melody, harmony, rhythm, color, texture, counterpoint, and form in music from the late seventeenth/early eighteenth century through the nineteenth century.
962. **Analytical Studies**  
*Spring. 3(3-0)* *Approval of department.*  
Analysis of melody, harmony, rhythm, color, texture, counterpoint, and form in music of the twentieth century.
963. **Schenker Analysis**  
*Winter. 2(2-0)* *Approval of school.*  
Analytical techniques and concepts of Heinrich Schenker. Examination of his sketches and writings, reading about him, and analysis of music using his techniques.
964. **Set-Theory Analysis of Atonal Music**  
*Fall. 2(2-0)* *Approval of school.*  
Set-Theory principles and their application to the analysis of atonal music.
970. **Contrapuntal Techniques**  
*Fall of odd-numbered years, Summer. 3(3-0)* *Approval of school.*  
Advanced contrapuntal practice from the sixteenth century to the present.
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. **Doctoral Dissertation Research**  
*Fall, Winter, Spring, Summer. Variable credit. Approval of department.*

## NATURAL SCIENCE N S

### College of Natural Science

115. **The Nature and Continuity of Life (N)**  
*Fall, Winter, Spring, Summer. 4(3-2)*  
*Not open to students with credit in N S 1814.*  
A—The development and testing of scientific concepts as examples of our attempts to understand the world. 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. **Human Biosocial Evolution (N)**  
*Fall, Winter, Spring. 4(3-2)*  
Current understanding of human beings and their beliefs as products of biological and cultural evolution. Implications for the future of humanity.
125. **Time and Change in Nature (N)**  
*Fall, Winter, Spring, Summer. 4(3-2)*  
*Not open to students with credit in N S 1824.*  
A—Our 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 societies.
129. **Biotechnology and Human Values (N)**  
*Winter, Spring. 4(4-0)*  
Consideration of social and ethical issues which arise from our increasing control of the human body through biotechnology.
135. **Changing Concepts of the Universe (N)**  
*Fall, Winter, Spring, Summer. 4(3-2)*  
*Students may not receive credit in more than one of the following: AST 119, AST 217, AST 229, N S 135, N S 155 or N S 1834.*  
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 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.

142. **Life, Its Environment (N)**  
*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.

152. **Science and Culture in the 20th Century (N)**  
*Fall, Winter, Spring. 4(4-0)*

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

155. **Cosmology, Humanity's Place in the Universe (N)**  
*Fall, Winter, Spring, Summer. 4(3-2)*  
*Students may not receive credit in more than one of the following: AST 119, AST 217, AST 229, N S 135, N S 155, N S 1834.*

Our attempts to understand the universe and our place within it. The interaction between scientific concepts and the beliefs and values of the culture in which they are proposed.

162. **Race, The Evolution of an Idea (N)**  
*Fall, Winter, Spring. 4(3-2)* *N S 115 or approval of department.*

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

- 171H. **Our Biological Nature (N)**  
*Fall. 4(4-0)* *Honors College students or approval of department.*

Various issues confronting us in our attempt to understand our biological selves. Emphasis on the role that science can play in helping to resolve these issues.

- 172H. **Our Place in Nature (N)**  
*Winter. 4(4-0)* *Honors College students or approval of department.*

Various issues confronting us in our attempt to understand our 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 (N)**  
*Spring. 4(4-0)* *Honors College students or approval of department.*

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.

1814. **Natural Science (N)**  
*Fall. 4(3-2)* *Not open to students with credit in N S 115. Enrollment in Remedial-Developmental Writing Program 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.

1824. **Natural Science (N)**  
*Winter. 4(3-2)* *Not open to students with credit in N S 125. N S 1814 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.

**1834. Natural Science (N)**

Spring, 4(3-2) Students may not receive credit in more than one of the following: AST 119, AST 217, AST 229, N S 135, N S 155, N S 1834, N S 1824 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, Society and Public Policy**

Winter, 3(3-0) Twelve credits from natural science or engineering, Interdepartmental with and administered by Engineering.

Description and analysis of certain current technologies and their consequences; exploration of avenues for assessing such consequences as an aid to formulation of public policy.

**209. Humans and Disease (N)**

Fall, Winter, Spring, 4(4-0)  
Disease as a natural biological phenomenon and how it has influenced the human race from a worldwide perspective. Environmental and cultural factors and how these influence and interrelate with disease.

**242. Wilderness Environmental Field Studies (N)**

Winter, Summer, 4(4-0) Approval of instructor. Students may not receive credit in more than one of the following: N S 142, N S 242.

Study of ecosystem balance between physical, biological and human elements while hiking in selected wilderness areas. Requires out-of-state travel.

**292. Selected Topics**

Fall, Winter, Spring, 3 to 5 credits. May reenroll for a maximum of 8 credits if different topic is taken.

Interdisciplinary study of topics in the natural sciences or the natural sciences as related to the humanities and social sciences.

**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. Variable elective credit will be determined when the student secures instructor, adviser, and department approval.

**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 and 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. Engineering and Public Policy**

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

Sociotechnical assessment of impact of technology on society, with analysis of the role of engineering and natural science in contributing to public policy formulation.

**456. Foundations of Developmental Biology**

Winter of even-numbered years, 3(3-0) ZOL 317; ZOL 417 recommended. Interdepartmental with and administered by the Department of Zoology.

Reading and discussion of original research which posed significant problems of modern developmental biology.

**NATURAL SCIENCE NSC  
(COLLEGE OF)**

**201. Science Problem Solving Seminar I**

Fall, 2(2-0) MTH 108 concurrently, approval of instructor.

Problem solving principles and application of strategies to the disciplines of science and mathematics. Activities reflecting the types of problems encountered in these disciplines emphasized.

**202. Science Problem Solving Seminar II**

Winter, 2(2-0) NSC 201, approval of instructor.

Continuation of NSC 201. Emphasis upon problem solving in science disciplines and principles of research design.

**203. Science Problem Solving Seminar III**

Spring, 2(1-3) May reenroll for a maximum of 4 credits. NSC 202, approval of instructor.

Applied experience in research. Design and implementation of simple research problems. Relationship of science and society.

**305. Women in Science**

Spring, 3(3-0) Introductory course in chemistry or physics or biological science or approval of instructor.

The development of women scientists of the past, present, and future will be examined. Emphasis will be on representatives from physics, biology, medicine, mathematics, and engineering.

**394H. Current Topics in Science (MTC)**

Fall, Winter, Spring, 3(3-0) May reenroll for a maximum of 9 credits if different topics are taken. Approval of Honors College or course coordinator.

Scientists from several disciplines lecture on a common topic of current scientific interest, indicating the key concepts, the analytic approaches, the processes and the constraints of their respective disciplines.

**410. Environmental Toxicology**

Winter, 4(4-0) B S 212, BCH 401. Interdepartmental with Agriculture and Natural Resources.

Fate and effects of toxic chemicals in soil, plants, wildlife, and aquatic systems. Interactions between chemicals and the environment which influence their fate and ecological importance. Approved through Fall 1989.

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

Fall, 5(3-4) CEM 143, ENT 425, HRT 402 or CSS 402, BOT 405 or concurrently or approval of instructor. Interdepartmental with Agriculture and Natural Resources.

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

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

Fall, 3(3-0) ENT 425, HRT 402 or CSS 402, BOT 405 or concurrently or approval of instructor. Interdepartmental with Agriculture and Natural Resources.

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

**447. Pest Management: Systems Management for Plant Protection**

Winter, 4(3-2) NSC 445, NSC 446 or approval of instructor. 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.

**492. Integrative Studies**

Fall, Winter, Spring, Summer, 3 to 6 credits. Juniors.

In-depth study of topics which require an integration within or among the natural sciences or between the natural sciences and other major areas of human knowledge.

**801. Special Problems in Electron Microscopy**

Fall, Winter, Spring, Summer, 1 to 15 credits. Approval of instructor.

**802. Essentials of Electron Microscopy**

Fall, Winter, 2(2-0) Approval of instructor.

Principles of electron microscopy including optical theory, instrument design and construction and selected specimen preparative procedures. Emphasis on current literature.

**810. Methods in Transmission Electron Microscopy**

Fall, Winter, Spring, 3(1-5) Approval of instructor; NSC 802.

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

**820. Methods in Scanning Electron Microscopy**

Fall, Winter, Spring, 3(1-5) Approval of instructor; NSC 802 or concurrently.

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

**830. Analytical Electron Microscopy**

Fall, Spring, 2(1-3) Approval of instructor; NSC 802 or concurrently.

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