

232 Renaissance to 20th-Century Art (3) (H)

A survey of the visual arts, and the relationship of the visual arts to social, cultural, and political history from the Renaissance period to the Modern era. The course concentrates on the European tradition of painting, sculpture, and architecture, and pays particular attention to the changing social role of artists and the development of the modern definitions of "fine art." This course is a chronological continuation of ARTH 231, but the latter is not a prerequisite. Offered each spring.

233 Art of Africa, Asia, Americas (3)

Surveys the long-lived art traditions of diverse global cultures, including Africa, India, China, Japan, the Pacific, and Pre-Columbian and Native America.

341 American Art (3) (H)

A history of the visual arts in America from pre-colonial to modern times. Particular attention is paid to the relationship of the visual arts to social and political history, and the issue of "American identity" in the arts.

351 19th-Century Art History (3) (H)

A history of European and American art from the era of the French Revolution to the end of the 19th century. The works of major artists, such as David, Goya, Turner, Manet, Monet, Van Gogh, Munch, etc., are investigated within their historical contexts.

352 20th-Century Art History (3)

A history of artists, works, and movements of 20th-century European and American art, investigated within their historical contexts.

360 Topics in Art History (3)

An in-depth study of some particular period of art history or some disciplinary aspect or problem. May be repeated for credit as topic varies.

BIOLOGY

DR. SORAYA M. BARTOL
 DR. DEIRDRE GONSALVES-JACKSON
 DR. PAUL M. RESSLAR
 DR. PHILIP ROCK
 DR. MAYNARD H. SCHAUS
 DR. VICTOR R. TOWNSEND, JR., Program Coordinator

The Department of Biology is committed to providing a strong foundation in basic life sciences that will give multiple options upon graduation. Both a B.A. and a B.S. degree is offered. In addition to concepts and principles, students learn to see science as a process of discovery and problem solving through scientific methodology. The diverse curriculum in the natural sciences and the program of General Studies prepares competent learners of the

future. Upon successful completion of the program, students may seek careers or graduate work in biology, microbiology, botany, zoology and related areas such as the health professions, environmental studies, marine biology, and education.

Major Requirements

To fit each student's individual program, related courses to fulfill the requirements of the biology major should be planned during the second semester of the sophomore year in close consultation with a science adviser.

To complete the college's requirement for computer literacy, students majoring in biology must show a proficiency in the following areas: 1) the use of word processing, 2) the use of e-mail, 3) the use of the Internet, and 4) the use of multi-media software. This proficiency is demonstrated by completing assignments in several classes required for the major which include BIO 131, 311 and 316.

Bachelor of Arts:

COURSE NUMBER AND TITLE	SEM. HRS.
BIO 131 Principles of Biology I: Evolution and Ecology	4
BIO 132 Principles of Biology II: Cell Biology and Genetics	4
Ecological and Environmental Biology Concentration At least 7 hours from the following: BIO 316, 355, 375, 445	7-8
Evolutionary and Integrative Biology Concentration At least 7 hours from the following: BIO 300, 332, 370, 372, 373, 380, 410	7-8
Molecular, Cellular, and Developmental Biology Concentration BIO 311 Genetics And one of the following: BIO 420 or 482/484	8
BIO 485 Seminar in Biology	1
BIO electives (200 level or higher) BIO 221, 250, 285, 300, 316, 332, 355, 370, 371, 372, 373, 375, 380, 410, 420, 445, 480, 482, 484, 489	3-5
TOTAL W/I DEPT.	36

See continuation of choices next page

Chart continued from previous page

ADDITIONAL REQUIRED COURSES		
CHEM 117 General Chemistry I		4
CHEM 118 General Chemistry II		4
CHEM 311 Organic Chemistry I		3
CHEM 321 Organic Laboratory I		1
CHEM 312 Organic Chemistry II		3
CHEM 322 Organic Laboratory II		2
PHYS 215 General Physics	OR	4
PHYS 221 Physics		
PHYS 216 General Physics	OR	4
PHYS 222 Physics		
TOTAL		61

Bachelor of Science:

COURSE NUMBER AND TITLE	SEM. HRS.
BIO 131 Principles of Biology I: Evolution and Ecology	4
BIO 132 Principles of Biology II: Cell Biology and Genetics	4
Ecological and Environmental Biology Concentration At least 7 hours from the following: BIO 316, 355, 375, 445	7-8
Evolutionary and Integrative Biology Concentration At least 7 hours from the following: BIO 300, 332, 370, 372, 373, 380, 410	7-8

Molecular, Cellular, and Developmental Biology Concentration BIO 311 Genetics And one of the following: BIO 420 or 482/484	8
BIO 485 Seminar in Biology	1
BIO 489 Research in Natural Sciences	3
BIO electives (200 level or higher) BIO 221, 250, 285, 300, 316, 332, 355, 370, 371, 372, 373, 375, 380, 410, 420, 445, 480, 482, 484, 489	0-2
TOTAL W/I DEPT.	36
ADDITIONAL REQUIRED COURSES	
CHEM 117 General Chemistry I	4
CHEM 118 General Chemistry II	4
CHEM 311 Organic Chemistry I	3
CHEM 321 Organic Laboratory I	1
CHEM 312 Organic Chemistry II	3
CHEM 322 Organic Laboratory II	2
MATH 171 Calculus I	3
MATH 172 Calculus II	3
PHYS 221 Physics	4
PHYS 222 Physics	4
TOTAL	67

See continuation of choices next page

Minor Requirements

COURSE NUMBER AND TITLE (See p. 32 for general minor requirements)	SEM. HRS.
BIO 131 Principles of Biology I: Evolution and Ecology	4
BIO 132 Principles of Biology II: Cell Biology and Genetics	4
Ecological and Environmental Biology Concentration One course from the following: BIO 316, 355, 375, 445	3-4
Evolutionary and Integrative Biology Concentration One course from the following: BIO 300, 332, 370, 372, 373, 380, 410	3-4
Molecular, Cellular, and Developmental Biology Concentration BIO 311 or 420	4
BIO 485 Seminar in Biology	1
TOTAL	19-21

In addition to the above requirements, students seeking certification for secondary education to teach biology must complete either EES 130 Physical Geology or EES 132 Environmental Geology and should consult a member of the Department of Education regarding procedures and requirements for certification.

BIOLOGY COURSES (BIO)**100 The World of Biology (3)**

An introduction to biology. The course presents an overview of the study of life. Emphasis is placed on how biology affects our daily lives, including such topics as biodiversity, genetic engineering, and problems associated with the expansion of the human population. Designed for non-science majors. Offered each semester.

101 The World of Biology Laboratory (1)

Compliments BIO 100. Students observe living systems and perform basic experiments that demonstrate fundamental biological principles using the scientific method as one way to acquire knowledge about our world. Designed for non-science majors. Laboratory session meets three hours each week. Prerequisite/co-requisite: BIO 100. \$50 lab fee. Offered each semester.

**131 Principles of Biology I:
Evolution and Ecology (4)**

An introduction to the biological sciences. Lecture topics include Darwinian evolution, the origin and diversity of life, functional morphology, and ecology. This course is designed specifically for students intending to pursue a major in biology or EES. \$50 lab fee. Offered each fall.

**132 Principles of Biology II:
Cell Biology and Genetics (4)**

Completes the introduction to the biological sciences for biology and other natural science majors. Lecture topics include biochemistry, cell structure and processes, cell respiration, fermentation, photosynthesis, cell division, Mendelian genetics, gene expression, cancer biology, and animal physiology. \$50 lab fee. Offered each spring.

115 Human Genetics (3) (E)

An introduction to the science of genetics. Emphasis is placed on human genetics and the genetics of organisms that are important to mankind. A course for everyone concerned about how our genetic makeup affects what we are, what we do, and what we transmit to future generations. Areas such as evolution, reproduction, different types of inheritance and population genetics are explored. Designed for the non-science major. Offered each spring.

120 Microbes and Man (3)

An introductory biology course using microbiology as the unifying concept to explore many of the facets of the study of life. Topics include: the evolution and classification of life, cell structure and metabolism, the major roles microbes play in ecosystems, molecular genetics, control of microbial growth, biotechnology, the human immune system, and major viral and bacterial diseases of humans. Designed for non-biology majors. Corequisite: BIO 121. Offered each fall.

121 Microbes and Man Laboratory (1)

An introductory biological science lab course designed to accompany BIO 120. Students have the opportunity to learn a number of basic scientific techniques including: the correct use of microscopes, basic aseptic techniques, how to handle microbial cultures, basic bacterial identification, cell structure and function, and how to design simple experiments using microorganisms. Designed for non-biology majors. Corequisite: BIO 120. \$50 lab fee. Offered each fall.

150 Introduction to Marine Biology (3)

An introduction to the organisms and communities of marine and estuarine areas. Students examine the basic physical and ecological processes that are pertinent to marine habitats and will focus on the diversity of marine organisms and ecosystems. Designed for non-science majors. Offered each fall.

151 Introduction to Marine Biology Laboratory (1)

An introductory laboratory study of the organisms and communities of marine and estuarine areas. The lab includes field and laboratory identification of local organisms and investigations in a variety of local field habitats. Designed for non-science majors. Corequisite: BIO 150. \$50 lab fee. Offered each fall.

207 Environmental Biology (4) (E)

A study of specific environmental issues, especially those that influence biodiversity and the abundance of organisms. Emphasis is placed on basic ecological principles, overpopulation, air and water resources, environmental monitoring, and biodiversity. Designed for majors in the sciences or students minoring in EES. Lecture three hours, laboratory three hours each week. \$50 lab fee. Offered each spring.

221 Anatomy and Physiology (4)

An integrated lecture/laboratory experience which examines the anatomy and physiology of humans. A survey of the major organs and organ systems of the body from both the histological and gross anatomical perspective is featured. Lecture three hours, laboratory three hours each week. \$50 lab fee. Offered each fall.

250 Field Experiences in Biology (3) (E)
(Winter Session)

Provides students with an intensive field experience in particular habitats. Studies are conducted to examine the interrelationship between organisms and their environment within specific habitats. May be repeated for credit as topics change. Does not fulfill the Natural Science requirement for Latin Honors. Lab fee. Prerequisite: consent. Offered in selected Winter Sessions or summers on demand.

280 General Horticulture (3)

A course designed to acquaint students with factors necessary to grow and maintain plants. Ideal for those interested in learning applied skills in botany. Students will apply knowledge gained in lecture to projects in the greenhouse. Offered on demand.

285 Plants and Man (3)

Introduces students to how mankind uses plants and how plants have influenced human cultures. This course is appropriate for both the non-major and major in science. Offered fall of odd-numbered years.

300 Plant Morphology (4)

A morphological and evolutionary study of plants from bacteria to flowering plants. Designed to give the student a view of the structure and modes of reproduction of plants. Prerequisites: a grade of C or better in BIO 132 or consent. Lecture three hours, laboratory three hours each week. Offered spring of odd-numbered years.

311 Genetics (4)

Principles of heredity as applied to both plants and animals. Prerequisites: CHEM 105 or 117 and a grade of C or better in both BIO 131 and 132 or one year of general biology. Lecture three hours, laboratory three hours each week. Offered each spring.

316 General Ecology (4) W

A study of plant and animal communities in relation to habitat with emphasis on the effect of the environment on community structure and distribution. Prerequisites: BIO 131 and 132 or one year of general biology or 207. MATH 106 is recommended. Lecture three hours, laboratory/field three hours each week. Offered each fall.

332 Taxonomy of Vascular Plants (4)

Emphasis is on the classification and identification of the plants of southern Virginia. The characteristics of the major families of plants of North America are discussed. Prerequisites: a grade of C or better in BIO 132 or consent. Lecture three hours, laboratory three hours each week. Offered spring of even-numbered years.

355 Marine Biology (4)

A study of organismal adaptation and community organization in marine and estuarine habitats. A variety of marine habitats, with the laboratory primarily focusing on local species and habitat types is examined. Prerequisite: one year of general biology or BIO 207. Offered each fall.

370 Vertebrate Zoology (4)

A comparative study of the morphology, life histories, and evolutionary relationships of the major vertebrate lineages. This course includes laboratory examinations and field observations of representative vertebrate animals. Prerequisite: BIO 131. Lecture three hours, laboratory three hours each week. Offered on demand.

371 Histology (4)

Features a detailed study of the cells, tissues, and organs that comprise the mammalian body. It is especially intended for students seeking careers in biology, medicine, or veterinary sciences. Prerequisite: grade of C or better in BIO 131 or consent. Lecture three hours, laboratory three hours each week. Offered spring of even-numbered years.

372 Comparative Anatomy (4)

A study of the evolution, morphology, and physiology of vertebrates. An intensive laboratory directed examination of the major organ systems of vertebrates as exemplified by the lamprey, dogfish, salamander, and cat is featured. It is intended for students seeking careers in biology, medicine, or veterinary sciences. Prerequisite: BIO 131 with a grade of C or better or consent. Lecture three hours, laboratory three hours each week. Offered spring of odd-numbered years or on demand.

373 Invertebrate Zoology (4)

A survey of the invertebrate phyla, with a focus on the classification, evolution, ecology, morphology, and life histories of these organisms. This course includes laboratory examinations of representative groups and field sampling of local invertebrate fauna. Prerequisite: BIO 131. Lecture three hours, laboratory three hours each week. Offered fall of odd-numbered years.

375 Topics in Tropical Biology (3)

Features an intensive field experience in neotropical ecosystems (e.g., sea caves, mangrove swamps, coral reefs and rainforests). Descriptive field studies of representative plants and animals is required. Field activities require strenuous exercise and considerable hiking. Destinations may include Trinidad, Belize, Costa Rica, U.S. Virgin Islands, or the Galapagos Islands. Prerequisite: a grade of C or better in BIO 131 and BIO 132 or BIO 207, and consent. Lab fee. Offered summer on demand.

380 Comparative Animal Physiology (4)

A study of the basic mechanisms by which different animals function. Emphasis is placed on how organisms, both invertebrates and vertebrates, make changes in these basic mechanisms to deal with differing environmental conditions. Prerequisites: a grade of C or better in BIO 131 or consent. Lecture three hours, laboratory three hours each week. Offered spring of even-numbered years.

385 Animal Behavior (4)

A study of the mechanisms and evolution of animal behavior. Topics include genetics and development of behavior, neural and physiological mechanisms of behavior, communication, social behavior, habitat selection, reproductive behavior, and parental investment. Laboratory exercises provide hands-on experience for many of these concepts. Prerequisites: BIO 131 or consent. Lecture three hours, laboratory three hours each week. Offered spring odd-numbered years.

410 Evolution (3)

A study of the theories of evolution and their proponents in both vegetable and animal kingdoms. Prerequisite: junior/senior status. Offered each fall.

420 Cell and Molecular Biology (4)

A study of the structure and function of prokaryotes and eukaryotes at the cellular and molecular level. Emphasis is placed on the molecular nature of cellular structure, metabolism and physiology. Prerequisite: a grade of C or better in CHEM 311, 312, 321 and 322. Offered each fall with sufficient demand.

445 Limnology (3)

Introduces the study of fresh waters, including lake, pond, river, and stream ecosystems. Emphasis is placed on physical processes, primary and secondary

productivity, biogeochemical cycling, and food web interactions across all trophic levels. Prerequisite: BIO 131 and 132 or equivalent or BIO 207, with a grade of C or better. Offered spring of odd-numbered years.

460 Zymurgy: the Science of Fermentation (3) (I)
(Winter Session)

Introduces the science and art of fermentation and a consideration of the use of alcohol by human societies. Prerequisite: senior status or consent. Offered in selected Winter Sessions.

470 Internship in the Natural Sciences (3)

An intensive study of a particular field of science through on-site field experience. Internships involve hands-on opportunities in the sciences that are relevant to that particular site. Students are expected to devote a minimum of at least 120 hours for three semester hours, but some placements may require more time. Students must coordinate their internship placement with the supervising faculty member at least two months prior to placement. Pass/fail grading. Prerequisites: junior/senior status and consent. Offered each semester.

475 Natural & Social History of the Chesapeake Bay (3) (I)

Gives students a comprehensive view of one of the largest and most diverse estuaries in the world, the Chesapeake Bay. Students examine the relationships among the natural history (flora and fauna), human history, including social and political aspects, use of the bay by different societies, their impact on and preservation of the bay. Saturday field trips required. Prerequisite: junior/senior status. Offered each spring.

480 Readings in Biology (1)

An advanced seminar that discusses readings from the primary literature on various announced topics in biology. May be repeated for credit as topics change. Prerequisite: senior/junior status and consent. Offered on demand.

482 Microbiology (3)

Teaches basic microbiological concepts and the role of microorganisms in various applied areas. Topics include: microbial physiology, cell structure, microbial genetics, pathogenic microorganisms and human diseases, and environmental and applied microbiology. Corequisite: BIO 484. Prerequisites: BIO 311. Offered each spring.

484 Microbiology Laboratory (1)

Techniques of culturing and identifying microorganisms are taught. Procedures include: culturing, staining, determination of microbial numbers, effect of environmental influences, identification of enzymatic reaction, and isolation and identification of bacterial cultures. Corequisite: BIO 482. Prerequisites: BIO 311. Offered each spring.

W

485 Seminar in Biology (1)

An advanced seminar on various topics in biology. Each student will conduct in-depth library research on a topic of interest and present a seminar to the department. Prerequisite: senior/junior status and a major or minor in the natural sciences. Offered each spring.

489 Research in the Natural Sciences (3)

Provides students with the opportunity to conduct original scientific research in an area of interest. Students work closely with one or more members of the natural science faculty to develop and conduct a research project. Students present their findings orally during the semester's undergraduate research symposium and as a formal research paper. Students are encouraged to present their findings at a conference. Prerequisite: junior/senior status and a major in the natural sciences, prior approval by the project adviser, and consent of the instructor. May be repeated once for a total of 6 semester hours. Identical to CHEM 489 and EES 489. Offered each semester.

BUSINESS

(See Management, Business and Economics)

CENTER FOR THE STUDY OF RELIGIOUS FREEDOM

(Also see page 45)

DR. PAUL B. RASOR, Director

CSRF courses are interdisciplinary and incorporate diverse perspectives and methods of analysis. Center-affiliated courses are listed within particular academic disciplines.

The following courses have also been identified as focusing on issues, analyses, or processes related to religious freedom: INST 202; HIST 248, 317, 322, 400, 426, 451; PHIL 102, 110, 215; POLS 239, 335, 372, 435; RELST 116/316, 140, 319, 320, 336; SOC 110, 222, 230, 336.

CSRF COURSES (CSRF)**100 Religious Freedom Symposium (1)**

(Previously INST 100) A non-traditional course, sponsored by the Center for the Study of Religious Freedom, offers students an opportunity to continue discussions arising out of symposium series offered by the Center. Past topics have included "Religious Freedom in a Global Context," "Persecution and Toleration," and "Religious/Freedom, Southern Style," for example. Students attend the symposium series of programs, read background materials for each program topic, and participate in discussions that will be done mainly via Web conference. Examining a myriad of issues involved in the complex matter of religious freedom will involve the use of

a variety of disciplines—e.g., history, philosophy, political science, religious studies. Pass/fail grading. Offered intermittently.

275 Religious Freedom in America (3)

(Previously INST 275) An examination of the historical development and present state of religious freedom in the United States. Topics include the emergence of the idea of religious toleration in the West, the influence of Jefferson's Virginia Statute for Religious Freedom, the concepts of establishment and free exercise of religion in the U.S. Constitution, and the role of religion in American public and political life. Students acquire a conceptual framework and vocabulary for discussing current issues. The course is interdisciplinary in nature, drawing on historical, legal philosophical and political sources. Offered spring of even-numbered years.

355 Law and Religion in America (4)

(Previously RELST 355) Explores the various ways in which law and religion interact with and impact upon each other in American life. The approach is contextual and case-driven, meaning that we get at the larger, philosophical issues through the medium of specific legal cases and public debates from our past and present. Through these case studies, we reach the broader concerns: the legitimacy of law ("Where the law comes from"), the experience of free exercise of religion in American history, the legal enforcement of morality, and the establishment clause limits on the power of the majority. Prerequisites: at least six, preferably nine, semester hours in one or more of the following: religious studies, history, philosophy, political science.

CHEMISTRY

DR. JOYCE B. EASTER

DR. DEBORAH E. OTIS, Program Coordinator

The Department of Chemistry curriculum is designed to provide opportunities for curious and interested students to immerse themselves in a concentrated study of the various principles of classical and contemporary chemical knowledge. From introductory to upper level courses, applications are made of the basic theories and methods of chemical investigation, with an emphasis on problem-solving. The chemistry program accommodates chemistry majors, other science majors, pre-med/pre-vet students, and students planning to enter the health and allied health professions, as well as students wishing to teach chemistry at the secondary school level. Chemistry majors are prepared for careers in industry, business, government, and academia.

Major Requirements

Those courses designed for non-science majors, including CHEM 105, cannot be counted toward the major in chemistry (64-65 semester hours), but may be counted toward the degree (120 semester hours). The