Asian Studies

Coordinator: Professor Digre

The Asian Studies minor offers students an interdisciplinary program to study the history, geography, religion, languages, philosophy, economics and societies of this vast, diverse continent. Students can choose from a wide range of courses dealing with the culture and history of China, Buddhism, Hinduism, environmental issues in Southeast Asia, contemporary politics, Asian literature and Chinese geography. They can study Japanese or Chinese, either at Elon or in our study abroad programs in China and Japan. The university also offers a unique series of Winter Term and semester abroad opportunities in China, Japan and other Asian countries.

A minor in Asian Studies requires 20 semester hours selected from the following list. Courses must be chosen from at least two disciplines. Students are strongly encouraged to

ARH 320.  ISSUES IN CONTEMPORARY ART  4 sh
This course considers the arts since 1945, covering the period both broadly and in selective detail to better understand how and why art in our time takes the forms it does. We will consider new approaches to creating and exhibiting art, relevant social and political issues to which artists respond, and the impact of critical theory upon visual art, art history and criticism. No prerequisite. Offered fall and spring.

ARH 340.  HISTORY OF PHOTOGRAPHY  4 sh
This course surveys the history of the photographic arts from the development of the camera obscura to the present use of digital technologies. Issues discussed may include the role of technology in the arts; scopophilia and voyeurism; the use of photography in science, government, propaganda and advertising; perceptions of objective reality and manipulation in the photographic image; reproducibility, time and movement; and personal/amateur photography. No prerequisite.

ARH 341.  AFRICAN ART  4 sh
This course presents a selective survey of the arts of sub-Saharan Africa. It examines artistic production through a variety of media — sculpture, painting, architecture, performance and personal decoration — and a myriad of social contexts — initiation, religious ceremony, political and royal institutions, domestic arenas, cross-cultural exchanges and colonialism. No prerequisite.

ARH 343.  RENAISSANCE ART HISTORY  4 sh
This course provides an introduction to the art of painting, architecture and sculpture of the Italian and Northern Renaissance. The examination of this fundamental time period in the history of art provides the opportunity for investigating the relationship between art and its rich social, political and cultural backdrops. It will also help students understand how currents that emerged in the Renaissance have influenced our perceptions of society and art and the way in which we view art and its makers. No prerequisite.

ARH 491.  INDEPENDENT STUDY IN ART HISTORY  1-4 sh
Open to juniors and seniors with permission of instructor.

ARH 495.  SENIOR SEMINAR IN ART HISTORY  4 sh
A capstone experience for majors, this course offers students experience in researching, writing and presenting a senior thesis project. Prerequisite: ARH 301.

ARH 499.  INDEPENDENT RESEARCH IN ART HISTORY  1-4 sh
Open to juniors and seniors with permission of instructor. In conjunction with a faculty mentor, the student will formulate and execute an original research project. A research proposal form completed by the student and faculty mentor is required for registration.
consider appropriate foreign language study (Japanese or Chinese) and studying abroad in the region. Up to eight semester hours of language study can be counted toward the minor. With the approval of the program coordinator, up to 12 semester hours of study-abroad credit can be counted toward the minor. Students interested in pursuing further study of the region should consider an international studies major with an Asian regional concentration.

Select twenty semester hours from the following: 20 sh

**General Asian Studies courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ENG 337</td>
<td>Asian Literature of Social Change</td>
</tr>
<tr>
<td>ENS 310</td>
<td>Environmental Issues of Southeast Asia</td>
</tr>
<tr>
<td>HST 320</td>
<td>China, Japan and the Pacific Century: Era of War and Revolution</td>
</tr>
<tr>
<td>POL 363</td>
<td>Politics of Asia</td>
</tr>
<tr>
<td>PHL 352</td>
<td>Eastern Philosophy</td>
</tr>
<tr>
<td>REL 353</td>
<td>Buddhism</td>
</tr>
<tr>
<td>REL 356</td>
<td>Hinduism</td>
</tr>
<tr>
<td>APS 361-369</td>
<td>Seminars in Asian Studies (2-4 sh)</td>
</tr>
<tr>
<td>APS 481</td>
<td>Internship in Asian Studies (1-4 sh)</td>
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**Asian Foreign Language Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>CHN 121</td>
<td>Elementary Chinese I</td>
</tr>
<tr>
<td>CHN 122</td>
<td>Elementary Chinese II</td>
</tr>
<tr>
<td>CHN 221</td>
<td>Intermediate Chinese I</td>
</tr>
<tr>
<td>JPN 121</td>
<td>Elementary Japanese I</td>
</tr>
<tr>
<td>JPN 122</td>
<td>Elementary Japanese II</td>
</tr>
<tr>
<td>JPN 221</td>
<td>Intermediate Japanese I</td>
</tr>
</tbody>
</table>

**TOTAL** 20 sh

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**Biology**

Chair, Department of Biology: Associate Professor Niedziela  
Associate Chair, Department of Biology: Associate Professor Vick  
Professors: H. House, S. House  
Associate Professors: M. Clark, Haenel, N. Harris, Kingston, MacFall, Touchette  
Assistant Professors: Coker, Gallucci, Gammon, Izzo, Miyamoto, Vandermast  
Adjuncts: DeVries, Mackin, Train

Biology is the study of life in all its diverse forms. As a species, we have always been deeply fascinated by other living creatures. Early human’s dependence on other animals and plants for food, medicine and shelter fostered an appreciation for life’s interconnectedness. Modern society has rediscovered these relationships in the face of such challenges as global warming, rain forest destruction, antibiotic resistance, emerging diseases, pollution and rising cancer rates.

Our approach to biology at Elon University stresses hands-on experiences in the classroom, laboratory and field. The course of study includes off-campus experiential opportunities and research seminars that encourage creative approaches to biological problems. The focus is on science as a process, not merely a collection of established facts.
The faculty strives to provide students with a high quality program that enables them to (1) develop critical thinking and problem-solving skills to better understand and meet present and future biological challenges; (2) develop competency in information retrieval, use and analysis; (3) develop an understanding of the latest technologies utilized in biological investigation; (4) acquire broad-based knowledge of biological concepts from molecules to ecosystems; and (5) acquire an experiential learning opportunity through either research, internship or laboratory assistantship.

The Bachelor of Science in Medical Technology (MT) consists of three years of preprofessional training at Elon followed by application to the 12-month clinical program at our affiliated hospital. Admission to the affiliated program is competitive and based on overall GPA, evaluation by faculty and personal interviews. Students may also apply to a variety of Medical Technology programs once a bachelor's degree is completed with the appropriate prerequisites.

In all of Elon's biology offerings, students receive a strong foundation in biology that prepares them for graduate studies, medical and other allied health-related professional schools, teaching and industry.

The Department of Biology and Allied Health offers programs leading to the Bachelor of Arts or Bachelor of Science degree with a major in Biology, the Bachelor of Science degree with a major in Medical Technology and a minor concentration in biology for students majoring in another discipline.

The Department of Biology has divided its laboratory course offerings that serve as electives into three functional categories to assist students in the development of a broad-based major with the necessary fundamental biological concepts while at the same time providing the student with the flexibility to build a program that meets their individual interests and needs.

<table>
<thead>
<tr>
<th>Molecular/Cellular Biology</th>
<th>Organismal Biology</th>
<th>Supraorganismal Biology</th>
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</thead>
<tbody>
<tr>
<td>BIO 322</td>
<td>BIO 316</td>
<td>BIO 335</td>
</tr>
<tr>
<td>BIO 345</td>
<td>BIO 318</td>
<td>BIO 344</td>
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<td>BIO 348</td>
<td>BIO 321</td>
<td>BIO 442</td>
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<tr>
<td>BIO 351/352</td>
<td>BIO 325</td>
<td>BIO 452</td>
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<tr>
<td>BIO 353/354</td>
<td>BIO 342</td>
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<td></td>
<td>BIO 343</td>
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</table>

Both the Bachelor of Arts and the Bachelor of Science degrees in Biology require the following Core Courses:

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BIO 111</td>
<td>Introductory Cell Biology</td>
<td>3 sh</td>
</tr>
<tr>
<td>BIO 112</td>
<td>Introductory Population Biology</td>
<td>3 sh</td>
</tr>
<tr>
<td>BIO 113</td>
<td>Cell Biology Lab</td>
<td>1 sh</td>
</tr>
<tr>
<td>BIO 114</td>
<td>Population Biology Lab</td>
<td>1 sh</td>
</tr>
<tr>
<td>BIO 221</td>
<td>General Zoology</td>
<td>4 sh</td>
</tr>
<tr>
<td>BIO 222</td>
<td>General Botany</td>
<td>4 sh</td>
</tr>
<tr>
<td>BIO 261</td>
<td>Introductory Seminar</td>
<td>2 sh</td>
</tr>
<tr>
<td>BIO 322</td>
<td>Molecular and Cellular Biology</td>
<td>4 sh</td>
</tr>
<tr>
<td>BIO 316</td>
<td>Developmental Biology</td>
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</tbody>
</table>

One course selected from the Organismal Biology category: 4 sh
BIO 318 Comparative Vertebrate Structure & Function
BIO 321 Microbiology
BIO 325 Human Histology
BIO 342 Plant Physiology
BIO 343 Clinical Anatomy

One course selected from the Supraorganismal Biology category: 4 sh
BIO 335 Field Biology
BIO 344 Evolution
BIO 442 Aquatic Biology
BIO 452 General Ecology

Eight semester hours of electives selected from the following: 8 sh
- Organismal Biology category
- Supraorganismal Biology category
- Molecular/Cellular Biology category
  This may include a maximum of two 2-semester hour special topics seminars.

BIO 462 Senior Seminar 2 sh

TOTAL 40 sh

A Bachelor of Arts degree in Biology requires the following courses:

Core Courses in Biology 40 sh
CHM 111 General Chemistry I 3 sh
CHM 113 General Chemistry I Lab 1 sh
CHM 112 General Chemistry II 3 sh
CHM 114 General Chemistry II Lab 1 sh
or (in lieu of CHM 111, 113, 112, 114)
CHM 115 Advanced General Chemistry (3 sh)
CHM 116 Advanced General Chemistry Lab (1 sh)
MTH 112 Advanced Statistics 4 sh

In addition, a required experiential component selected from the following:
(a) internship
(b) research
(c) a specialized approved laboratory assistantship

TOTAL 48-52 sh

A Bachelor of Science degree in Biology requires the following courses:

Core Courses in Biology 40 sh
CHM 111 General Chemistry I 3 sh
CHM 113 General Chemistry I Lab 1 sh
CHM 112 General Chemistry II 3 sh
CHM 114 General Chemistry II Lab 1 sh
or (in lieu of CHM 111, 113, 112, 114)
CHM 115 Advanced General Chemistry (3 sh)
CHM 116 Advanced General Chemistry Lab (1 sh)
CHM 211 Organic Chemistry I 3 sh
CHM 212 Organic Chemistry II 3 sh
CHM 213 Organic Chemistry I Lab 1 sh
CHM 214 Organic Chemistry II Lab 1 sh
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHY 111</td>
<td>General Physics I</td>
<td>4 sh</td>
</tr>
<tr>
<td>PHY 112</td>
<td>General Physics II</td>
<td>4 sh</td>
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<tr>
<td>or</td>
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<tr>
<td>PHY 113</td>
<td>General Physics I with Calculus</td>
<td>4 sh</td>
</tr>
<tr>
<td>PHY 114</td>
<td>General Physics II with Calculus</td>
<td>4 sh</td>
</tr>
<tr>
<td>MTH 112</td>
<td>General Statistics</td>
<td>4 sh</td>
</tr>
</tbody>
</table>

In addition, a required experiential component selected from:

(a) internship
(b) research
(c) a specialized approved laboratory assistantship.

**TOTAL** 64-68 sh

**A Bachelor of Science degree in Medical Technology** requires 40-47 semester hours of coursework at Elon University and completion of the clinical curriculum.

<table>
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<td>BIO 114</td>
<td>Population Biology Lab</td>
<td>1 sh</td>
</tr>
<tr>
<td>BIO 321</td>
<td>Microbiology</td>
<td>4 sh</td>
</tr>
<tr>
<td>BIO 345</td>
<td>Genetics</td>
<td>4 sh</td>
</tr>
<tr>
<td>CHM 111</td>
<td>General Chemistry I</td>
<td>3 sh</td>
</tr>
<tr>
<td>CHM 113</td>
<td>General Chemistry I Lab</td>
<td>1 sh</td>
</tr>
<tr>
<td>CHM 112</td>
<td>General Chemistry II</td>
<td>3 sh</td>
</tr>
<tr>
<td>CHM 114</td>
<td>General Chemistry II Lab</td>
<td>1 sh</td>
</tr>
<tr>
<td>CHM 115</td>
<td>Advanced General Chemistry (3 sh)</td>
<td></td>
</tr>
<tr>
<td>CHM 116</td>
<td>Advanced General Chemistry Lab (1 sh)</td>
<td></td>
</tr>
<tr>
<td>CHM 211</td>
<td>Organic Chemistry I</td>
<td>3 sh</td>
</tr>
<tr>
<td>CHM 212</td>
<td>Organic Chemistry II</td>
<td>3 sh</td>
</tr>
<tr>
<td>CHM 213</td>
<td>Organic Chemistry I Lab</td>
<td>1 sh</td>
</tr>
<tr>
<td>CHM 214</td>
<td>Organic Chemistry II Lab</td>
<td>1 sh</td>
</tr>
<tr>
<td>PHY 111</td>
<td>General Physics I</td>
<td>4 sh</td>
</tr>
<tr>
<td>PHY 112</td>
<td>General Physics II</td>
<td>4 sh</td>
</tr>
<tr>
<td>MTH 112</td>
<td>General Statistics (or higher)</td>
<td>4 sh</td>
</tr>
</tbody>
</table>

A course in immunology: Immunology as a separate course or as part of a microbiology course 0-3 sh

Recommended additional courses:

- CHM 311  Quantitative Analysis
- CIS 112  Problem Solving with Spreadsheet Applications
- CIS 114  Introduction to Web Site Development
- BIO 162  Human Physiology
- BUS 303  Introduction to Managing

A mathematics course higher than MTH 112

Completion of the clinical curriculum

**TOTAL** 40-47 sh
A minor in Biology requires the following courses:

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Sixteen semester hours chosen from the following: 16 sh

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</table>

Biology courses at the 200-400 level

TOTAL 20 sh

**BIO 101. TOPICS IN GENERAL BIOLOGY**

This topical approach to the foundational concepts of biology examines theories and issues in biology as they relate to varying special topics selected by the instructor. To satisfy the General Studies laboratory science requirement, BIO 102 should be taken concurrently. No credit to students with prior credit for BIO 111. No credit toward biology major or minor. Offered fall and spring.

**BIO 102. GENERAL BIOLOGY LABORATORY**

This two-hour laboratory provides experiences to complement selected foundational concepts from BIO 101. To satisfy the General Studies laboratory science requirement, BIO 101 and 102 should be taken concurrently. No credit to students with prior credit for BIO 113. No credit toward biology major or minor. Offered fall and spring.

**BIO 105. CURRENT ISSUES IN BIOLOGY**

Designed for nonscience majors, this course focuses on reading, interpreting and evaluating facts behind biological issues and exploring the implications for science and human society. Students conduct library research, present oral reports, discuss and write papers on these issues. No credit toward biology major or minor. Satisfies General Studies nonlaboratory science requirement. Offered winter.

**BIO 111. INTRODUCTORY CELL BIOLOGY**

In this introduction to organization and function at the cellular level, topics of study include basic cell chemistry and structure, transport, energetics and reproduction. Required for biology majors/minors. Corequisite: BIO 113. Offered fall and spring.

**BIO 112. INTRODUCTORY POPULATION BIOLOGY**

Topics of study in this introduction to organization and function at the population level include reproduction and transmission genetics, patterns and mechanics of evolutionary change and basic concepts of ecology. Required for biology majors/minors. Corequisite: BIO 114. Offered fall and spring.

**BIO 113. CELL BIOLOGY LABORATORY**

Students have three hours of laboratory experience per week with topics complementing concurrent study in BIO 111. Required for biology majors/minors. Corequisite: BIO 111. Offered fall and spring.

**BIO 114. POPULATION BIOLOGY LABORATORY**

Students have three hours of laboratory experience per week with topics complementing concurrent study in BIO 112. Required for biology majors/minors. Corequisite: BIO 112. Offered fall and spring.

**BIO 161. HUMAN ANATOMY**

This course builds a basic foundation in regional human anatomy. Lectures emphasize macroscopic and some microscopic studies of the human body. Special emphasis will be placed on musculoskeletal and neuromuscular anatomy. Laboratory involves progressive anatomical dissections of human cadavers, use of human anatomy instructional software.
and examination of osteological models. Three class hours, one laboratory per week. No credit toward biology major/minor. Offered fall and spring.

**BIO 162. HUMAN PHYSIOLOGY 4 sh**
This study of human physiology emphasizes skeletal, muscular, nervous, endocrine, heart, blood, respiratory, digestive and urinary aspects. Three class hours, one laboratory per week. No credit toward biology major or minor. Offered fall and spring.

**BIO 181. BIOLOGY LABORATORY TECHNIQUES 2 sh**
Skills taught in this training course for prospective laboratory assistants include laboratory procedures, materials preparation and grading procedures. Offered spring.

**BIO 215. DIVERSITY OF LIFE 4 sh**
This course examines the basic concepts of biological form and function, based on evolutionary relationships and diversity. Students investigate the natural history of local species and their role in community dynamics. Laboratory experiences emphasize field investigations, including sampling techniques, species identification and data analysis. Satisfies the General Studies lab science requirement. This course can be used for the major in Environmental Studies and the Elementary Education concentration in Society and Environment, as well as a minor in Biology. No credit toward the Biology major. Prerequisites: ENS 111/113 or BIO 112/114. (BIO 215 is cross-listed with ENS 215). Offered spring.

**BIO 221. GENERAL ZOOLOGY 4 sh**
Students survey the animal kingdom (emphasizing selected vertebrates and invertebrates) investigating basic concepts of morphology, anatomy, physiology and taxonomy as they affect the ecology of the animal. Three class hours, one laboratory per week. Prerequisites: BIO 111, 112, 113, 114. Offered fall and spring.

**BIO 222. GENERAL BOTANY 4 sh**
This survey of the plant kingdom (emphasizing vascular plants) includes general morphology, anatomy, physiology of metabolism and growth, economic importance and identification. Three class hours, one laboratory per week. Prerequisites: BIO 111, 112, 113, 114. Offered fall.

**BIO 261. INTRODUCTORY SEMINAR 2 sh**
Students learn to use primary information sources and gain practice in manual and computer information retrieval, read and interpret research and review papers, write abstracts and present scientific information orally. Recommended for sophomore year. Offered fall and spring.

**BIO 271. SPECIAL TOPICS SEMINAR 2-4 sh**
Study focuses on one biological topic per seminar in this nonlaboratory discussion course for biology majors. Topics are determined by student and faculty interest. Must have instructor’s consent. Offered winter.

**BIO 316. DEVELOPMENTAL BIOLOGY 4 sh**
This course examines the changes that occur at the cellular and subcellular level as a single-cell zygote develops into a multi-cellular organism. Topics include fertilization, blastula formation, gastrulation and organogenesis. Three class hours, one laboratory per week. Prerequisites: BIO 221; CHM 111, 112, 113, 114 or CHM 115/116. Offered spring of even-numbered years.

**BIO 318. COMPARATIVE VERTEBRATE STRUCTURE AND FUNCTION 4 sh**
This course is an evolutionary approach to the form and function of vertebrates. Students will investigate a diversity of traits and follow the evolutionary changes of these traits from the earliest vertebrates to mammals. The primary focus is on the move from aquatic to terrestrial habitats, the evolution of flight and the evolution of endothermy. Students will compare changes in form and function of the major organ systems through laboratory
dissection of the jawless fish, shark, amphibian and mammal. Prerequisites: BIO 112, 114, 221. Offered fall of even-numbered years.

**BIO 321. MICROBIOLOGY** 4 sh
In a general survey of microorganisms, study emphasizes bacteria, their cytophysiological characteristics and classification, viruses, microbial diseases and immunity, and the role of microorganisms in human affairs. Three class hours, one laboratory per week. Prerequisites: BIO 111, 113; CHM 111, 112, 113, 114 or CHM 115/116. Junior standing or consent of instructor. Offered spring of even-numbered years.

**BIO 322. MOLECULAR AND CELLULAR BIOLOGY** 4 sh
This course is a study of the structure and function of prokaryotic and eukaryotic cells at the molecular level. It examines in depth specific biochemical pathways and processes essential to life. Topics include considerable coverage of the principles, techniques and applications of molecular genetics. Three class hours, one laboratory per week. Junior standing or consent of instructor. Prerequisites: BIO 111, 112, 113, 114 or CHM 115/116. Offered fall and spring.

**BIO 325. HUMAN HISTOLOGY** 4 sh
Students survey human body tissues (especially of the cardiovascular, alimentary, respiratory, urinary and reproductive systems), stressing tissue identification and the relationship of microanatomy to physiology of the human body. Three class hours, one laboratory per week. Prerequisites: BIO 111, 113. Offered fall of odd-numbered years.

**BIO 335. FIELD BIOLOGY** 4 sh
In this field-oriented course, restricted to selected natural taxa, environments or biological phenomena, in-depth field study may include identification, classification, life histories and relationships among organisms. Prerequisite: consent of instructor. Offered winter and/or summer.

**BIO 342. PLANT PHYSIOLOGY** 4 sh
Topics in this study of the life processes of plants include photosynthesis, mineral nutrients, movement of materials, plant growth substances and senescence. Three class hours, one laboratory per week. Prerequisites: BIO 222; CHM 111, 112, 113, 114 or CHM 115/116. Offered spring of odd-numbered years.

**BIO 343. CLINICAL ANATOMY** 4 sh
This course uses the regional approach to build a strong foundation in human anatomy. Lectures emphasize structure, basic clinical concepts and some functional and mechanical relationships at the gross anatomical level. Laboratory includes dissection of human cadavers, use of human anatomy instructional software, examination of osteological models and applications of basic radiology. Three class hours, one laboratory per week. Prerequisites: BIO 221; CHM 111, 112, 113, 114 or CHM 115/116. Offered fall of even-numbered years.

**BIO 344. EVOLUTION** 4 sh
In this course, students investigate the causes, rates and implications of evolutionary change in biological systems. Evolution by natural selection is the unifying theory of biology linking phenomena that occur at many different levels of biological organization. Thus, natural selection is studied in depth. Other topics include speciation, rates of molecular change, causes of mass extinctions and sexual selection. Three lecture hours, one laboratory per week. Prerequisites: BIO 112 and BIO 114. Offered spring of odd-numbered years.

**BIO 345. GENETICS** 4 sh
Students are introduced to Mendelian and molecular principles of genetics and the applications of these principles to the modern world. Three class hours, one laboratory per week. Prerequisites: BIO 111, 112, 113, 114; CHM 111, 112, 113, 114 or CHM 115/116. Offered fall of odd-numbered years.
BIO 348. BIOENGINEERING 4 sh
Students explore how biological systems are utilized in scientific research. In collaboration with their peers, students will apply the techniques of molecular biology (restriction digestion, transformation, DNA hybridization, PCR, etc.) to investigate a research question. Emphasis will be placed on protocol design, solution preparation and critical analysis of research data. Additionally, the social context of biotechnology will be investigated as students explore the risks and rewards in this expanding field. Two laboratory periods, one class hour per week. Prerequisite: BIO 345 or 322. Offered spring of odd-numbered years.

BIO 351. BIOCHEMISTRY 3 sh
In this survey of biochemistry as it relates to the physiology of organisms, study includes biochemical methodology, buffers, proteins (structure, function and synthesis), enzymes, bioenergetics, anabolism and catabolism of carbohydrates and lipids, and metabolic regulation. Three class hours, one laboratory per week. Prerequisites: CHM 211, 212, 213, 214. (BIO 351 is cross-listed with CHM 351.) Offered fall of odd-numbered years.

BIO 352. BIOCHEMISTRY LABORATORY 1 sh
Experiments in this study of laboratory techniques and principles of biochemistry as it relates to the physiology of organisms include biochemical methodology, buffers, proteins (structure, function and synthesis), enzymes, bioenergetics, anabolism and catabolism of carbohydrates and lipids, and metabolic regulation. Corequisite: BIO 351. (BIO 352 is cross-listed with CHM 352.) Offered fall of odd-numbered years.

BIO 353. ADVANCED BIOCHEMISTRY 3 sh
Topics chosen to complement BIO 351 include a detailed study of primary and intermediary metabolism: syntheses and degradation of lipids, amino acids and nucleotides; metabolic coordination; signal transduction; molecular motors; and the role of cytochrome c. The use of selected case studies from medical schools will be integrated into the study of metabolism. The course will also include a student-led discussion of selected articles from the primary literature in biochemistry. Prerequisites: BIO 351-2. (BIO 353 is cross-listed with CHM 353.) Offered spring of even years.

BIO 354. ADVANCED BIOCHEMISTRY LABORATORY 1 sh
This laboratory investigates the analysis of selected proteins and other biomolecules by NMR as well as the methods used in BIO 352. Experiments involving the study of dynamic processes inside living cells (metabolism) will be included. Prerequisites: BIO 351-2. Corequisite: BIO 354. (BIO 354 is cross-listed with CHM 354.) Offered spring of even years.

BIO 371. SPECIAL TOPICS SEMINAR 2-4 sh
Each seminar — a nonlaboratory discussion course for biology majors — focuses on one biological topic determined by faculty interest. Offered winter.

BIO 442. AQUATIC BIOLOGY: THE STUDY OF INLAND WATERS 4 sh
Aquatic Biology considers the chemical, physical and biological properties of freshwater ecosystems including streams, rivers, ponds and lakes. Topics include the geomorphology of inland waters, thermal stratification, nutrient cycles, community metabolism, plankton community dynamics, seasonal succession and eutrophication resulting from human activities. Weekly laboratory meetings provide hands-on experience with the field techniques of freshwater scientists. Prerequisites for biology major: BIO 221, 222; CHM 111, 112, 113, 114 or CHM 115/116. Prerequisites for environmental studies major: BIO 112, 114, 215; CHM 111,112, 113, 114 or CHM 115/116. Junior standing or consent of instructor. Offered spring of even-numbered years.

BIO 452. GENERAL ECOLOGY 4 sh
Students explore ecological principles at population, community and ecosystem levels in this study of the interrelationships of organisms with their biotic and abiotic environments. Three lecture hours, one laboratory per week. Prerequisites for biology major: BIO 221,
222. Prerequisites for environmental studies major: BIO 112, 114, 215. Junior standing or consent of instructor. Offered fall.

BIO 462. **SENIOR SEMINAR** 2 sh
This course provides students with the opportunity to conduct both individual and group literature research projects of their own choosing based on recently published scientific papers. Students participate in group discussions of the current literature, research and write a scientific review paper, and develop a formal oral presentation. Recommended for senior year. Offered fall.

BIO 471. **SPECIAL TOPICS SEMINAR** 2-4 sh
Each seminar — a nonlaboratory discussion course for biology majors — focuses on one biological topic determined by student and faculty interest. Must have instructor’s consent.

BIO 481. **INTERNERSHIP IN BIOLOGY** 1-4 sh
Advanced-level work experience in a biological field is offered on an individual basis when suitable opportunities can be arranged. Prerequisite: permission of department.

BIO 499. **RESEARCH** 1-4 sh
Students conduct laboratory and/or field research under the direction of the biology faculty. Maximum eight semester hours total credit. Prerequisite: permission of the biology faculty.

**Business Administration**

Martha and Spencer Love School of Business mission statement:
To provide instruction and experiences for our students so they graduate with the knowledge, skills and character essential for responsible business leadership in the 21st century.

Chair, Department of Business Administration: Associate Professor Stevens
Professors: Gowan, Honeycutt, Noer, O’Mara
Associate Professors: Burpitt, Garber, Manring, Nienhaus, Powell, Schuette, Strempek, Valle, Yap
Assistant Professors: Buechler, Gunby, Hodge
Lecturer: Rich, Riney
Executive-in-Residence: MacMahon

The study of Business Administration at Elon University begins with a solid grounding in the traditional liberal arts and sciences. This preparation is an integral part of becoming an informed, responsible and capable business leader. An Elon education emphasizes the development of the whole person — mind, body and spirit. Business Administration courses at Elon University advance that commitment by emphasizing business knowledge acquisition, skill development through hands-on learning and experiential activities and the development of discipline, integrity and an ethic of service.

Students majoring in Business Administration at Elon University take courses in a common core representing the functional business disciplines (e.g., accounting, finance, management, marketing, MIS, etc.). They also have the opportunity to develop specialized knowledge in one of six areas of concentration: Entrepreneurship, Finance, International Business, Management, Management Information Systems and Marketing.

Our coursework emphasizes active learning and appreciative inquiry. Rather than dictate a set of principles to be memorized, our programs emphasize the integration of business knowledge and the application of that knowledge to organizational problems. We emphasize hands-on learning through internships, co-op experiences, service learning and classroom instruction which engages students in the study and practice of business. Students also develop skills in written and oral communications, team-building and problem solving, and decision-making in our increasingly global business environment.