formance 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.

**ART 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 relation between art and its rich social, political and cultural backdrops, as well as understanding 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.

**ART 363. DIGITAL ART II** 4 sh

In this course students continue to build on the skills and ideas introduced in ART 263 with the addition of digital photography, alternative materials, interactivity, animation and Web design. Students further investigate the creative potential of the computer through projects that integrate advanced software tools with strategies for creating complex imagery and are introduced to new software in the production of Web-related artwork. Students continue their critical inquiry into the medium through required readings and research. Prerequisite: ART 263. Material fee: $100.

**ART 400. ADVANCED PROJECTS IN CERAMICS** 4 sh

A continuation of ART 300, emphasis in this course is on increased individual exploration of a single form-making process, glaze calculation and kiln firing. Prerequisite: ART 300. Material fee: $75. May be repeated a maximum of three times for credit.

**ART 402. ADVANCED PROJECTS IN DRAWING AND PAINTING** 4 sh

This continuation of ART 302 emphasizes increased individual exploration of the medium and the development of a focused body of work. Prerequisite: ART 302. Material fee: $100. Offered fall. May be repeated a maximum of three times for credit.

**ART 405. PHOTOGRAPHY III** 4 sh

This course continues ART 305 with a semester-long project proposed and developed by each student, concluding in a portfolio. Course emphasis is on individual particip-ation; applying to graduate school and preparing for other postgraduate opportunities. Senior standing art majors or instructor permission required. Offered fall.

**ART 461. SENIOR SEMINAR** 2 sh

Senior Seminar is intended to broaden the senior art major’s perspective on art-making through an investigation of significant topical issues. Reading, discussions and writing about these alternative views will help us understand that creativity is something that not only emanates from within ourselves, but is also a phenomenon that is heavily influenced by external forces. Spring semester only.

**ART 463. DIGITAL ART III** 4 sh

This course continues ART 363 with the introduction of advanced tools in Web site design, animation, virtual reality and multimedia authoring. Students continue their critical inquiry into the medium through required readings and discussions and will learn how to explore and critique interactive multimedia artworks. Prerequisite: ART 363. Material fee: $100.

**ART 481. INTERNSHIP IN ART** 1-4 sh

This course for art majors and minors may only be taken with the permission of the department head and supervising instructor.

**ART 483. DIGITAL ART IV** 4 sh

This course continues ART 463 with a portfolio project which emphasizes intense individual exploration of digital media resulting in a unified body of work that includes supporting materials such as an artist statement and electronic presentation of work. Materials fee: $100.

**ART 485. PHOTOGRAPHY IV** 4 sh

Photography IV is a self-directed involvement in a long-range photographic project proposed, researched and executed in consultation with the instructor/mentor. The project should reflect the student’s knowledge and experience in the medium and culminate in a coherent portfolio for exhibition or publication. Materials fee: $100.

**ART 491. INDEPENDENT STUDY STUDIO** 1-8 sh

Art majors and minors may pursue a program of advanced study and individual explo-ration in a selected medium. Proposals for independent studio should be prepared and submitted in the semester prior to enrollment. The instructor may require class attend-ance; maximum 8 semester hours of credit, by permission of art faculty only.

**ART 499. RESEARCH IN ART** 1-8 sh

Students engage in an undergraduate research project under the guidance of an Art Department mentor. A special research proposal form must be prepared and submitted in consultation with the mentor. Maximum of 8 semester hours of credit.

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**Asian/Pacific Studies**

Coordinator: Professor Digre

The vast area of the Pacific Rim is of major importance in political, economic and cultural terms. This program aids students to shift from an Atlantic to a Pacific perspective, to focus on some particular Asian/Pacific cultures, and to take first steps not only in seeing Asia with Western eyes but also in seeing the West through Asian eyes.

Asian/Pacific Studies takes an interdisciplinary approach to study the peoples and cultures of Asia and the Pacific Rim. The program allows students to select from a current group of courses approved by an advisory group.

The minor consists of a minimum of 20 credit hours. The Asian/Pacific Studies pro-garm may be expanded into an international studies major with Asian/Pacific Studies as a regional concentration. See note.

Foreign language study (e.g., Japanese or Chinese) is strongly recommended as is a study abroad experience in the region.

A minor in Asian/Pacific Studies requires 20 semester hours selected from the following list. Courses must be chosen from at least two disciplines.

**General Asian/Pacific Studies courses**

- **ENG 337** Asian Literature of Social Change 4 sh
- **ENS 310** Environmental Issues of Southeast Asia 4 sh
- **HST 320** China, Japan and the Pacific Century: Era of War and Revolution 4 sh

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**Asian/Pacific Studies courses**

- **HST 320** China, Japan and the Pacific Century: Era of War and Revolution 4 sh
- **ENS 310** Environmental Issues of Southeast Asia 4 sh
- **ENG 337** Asian Literature of Social Change 4 sh
- **ASIAN/PACIFIC STUDIES**
A major in Athletic Training Education requires the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATP 112*</td>
<td>4 sh</td>
</tr>
<tr>
<td>ATP 212</td>
<td>4 sh</td>
</tr>
<tr>
<td>ATP 301</td>
<td>2 sh</td>
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<tr>
<td>ATP 302</td>
<td>2 sh</td>
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<tr>
<td>PED 305</td>
<td>2 sh</td>
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<tr>
<td>ATP 311</td>
<td>2 sh</td>
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<tr>
<td>ESS 315</td>
<td>4 sh</td>
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<tr>
<td>ATP 329</td>
<td>4 sh</td>
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<td>ATP 330</td>
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<td>ATP 401</td>
<td>2 sh</td>
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<tr>
<td>ATP 402</td>
<td>2 sh</td>
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<tr>
<td>ESS 422</td>
<td>4 sh</td>
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<tr>
<td>ATP 430</td>
<td>4 sh</td>
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<tr>
<td>ATP 481</td>
<td>2 sh</td>
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<tr>
<td>ATP 495</td>
<td>2 sh</td>
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<tr>
<td>PED 321</td>
<td>4 sh</td>
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<tr>
<td>PED 410</td>
<td>4 sh</td>
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<tr>
<td>HED 220</td>
<td>1 sh</td>
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<tr>
<td>HED 324</td>
<td>4 sh</td>
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<tr>
<td>HED 421</td>
<td>4 sh</td>
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<tr>
<td>BIO 161*</td>
<td>4 sh</td>
</tr>
<tr>
<td>BIO 162</td>
<td>4 sh</td>
</tr>
<tr>
<td>PSY 111</td>
<td>4 sh</td>
</tr>
</tbody>
</table>

TOTAL 73 sh

*Courses required for ATEP application.

ATHLETIC TRAINING I 4 sh

This course introduces the student to the profession and principles of athletic training, including topics such as sports medicine organizations, emergency care of specific injuries, emergency procedures, tissue repair and healing, transportation and transfer of catastrophic injuries, methods of bandaging and dressing wounds and adhesive taping. Offered fall and spring.

ATHLETIC TRAINING II 4 sh

Students will gain practical knowledge and hands-on experience of advanced skills and techniques of athletic training. Topics include but are not limited to: protective sports devices and equipment; drugs and sports; skin disorders; specific sports conditions and injuries, and advanced taping skills. Prerequisites: ATP 112, BIO 161, admission to the athletic training education program or permission of instructor. Offered fall.

CLINICAL EDUCATION I 2 sh

This course is the first in a progressive series of four clinical education courses and is intended to apply theories learned in ATP 212 assessment and previous athletic training classes in a clinical setting. Outcome-based assessments of clinical skills will be performed to determine duties and responsibilities in each setting. Athletic training students are exposed to the practice of athletic training and are supervised by practicing athletic trainers.
certified athletic trainers. Rotations with medical doctors and other allied medical profes-

sions will also be completed as a learning opportunity and to obtain a sense of

where certified athletic trainers fit into the sports medicine team. Prerequisite: ATP

212. Offered spring.

**ATP 302. CLINICAL EDUCATION II**  2 sh

This course is the second in a series of four clinical education courses. The athletic

training student continues to practice and improve clinical decision-making skills by

building upon Clinical Education I. Outcome-based assessments of clinical skills will be

performed to determine duties and responsibilities in each setting. These students are

further exposed to the practice of athletic training and are supervised by practicing cer-

tified athletic trainers. Prerequisite: ATP 301. Offered fall.

**ATP 311. INTRODUCTION TO PHARMACOLOGY**  2 sh

This course is designed as an introduction to pharmacology. Pharmacodynamics, phar-

macokinetics, and drug interactions and reactions will be discussed. Extra attention will

be given to drugs commonly used in sports medicine including but not limited to:
PNS- and CNS-acting, anti-inflammatory, antibiotics, gastrointestinal-acting, respirato-

ry-acting and ergogenic aids. An understanding of the practical implication of using

these drugs will be emphasized. Prerequisite: BIO 162 or permission of instructor.

Offered fall of odd years.

**ATP 329. ASSESSMENT OF ATHLETIC INJURIES**  4 sh

This course familiarizes students with the principles of assessing sport injuries, includ-

ing injury history, inspection, palpation, range of motion tests, muscle function tests,

joint stability, neurological tests and specific anatomical features. This course is designed

with a lecture and laboratory component. Prerequisites: ATP 212, admission to the ath-

letic training education program or permission of instructor. Offered fall.

**ATP 330. THERAPEUTIC EXERCISE AND REHABILITATION**  4 sh

Students study the process and components of therapeutic rehabilitation. Emphasis is

placed on deconditioning and reconditioning following injury, as well as the contribu-

tion of various forms of exercise and therapeutic techniques on recovery. Prerequisites:

ATP 329, admission to the athletic training education program or permission of

instructor. Offered spring.

**ATP 401. CLINICAL EDUCATION III**  2 sh

This course is the third in a series of four clinical education courses. The athletic train-

ing student continues to practice and improve clinical decision-making skills by build-

ing upon ATP 302 and ATP 329. Students are given more responsibility and required to

problem solve and improve their decision-making abilities in a practical setting while

under the supervision of a practicing certified athletic trainer. Outcome-based assess-

ments are performed to determine duties and responsibilities in each setting.

Prerequisite: ATP 302. Offered spring.

**ATP 402. CLINICAL EDUCATION IV**  2 sh

This course is the fourth in a series of clinical education courses. It is intended to be a

capstone course to bring together all of the theories and skills learned in the classroom

and clinical education courses and apply them in a practical setting under the supervi-

sion of a working professional. This course is intended to provide the student the

opportunity to show mastery of the skills needed to function as a successful certified

athletic trainer through outcome-based assessments. Successful completion of this

course is required to sit for the NATA-BOC certification exam. Prerequisite: ATP 401.

Offered fall.

**ATP 430. THERAPEUTIC MODALITIES**  4 sh

This course is designed to cover topics in therapeutic modalities as they relate to athlet-

ic training. It is directed towards students who plan on pursuing careers in athletic

training and/or physical therapy. The main topics discussed in this class will be the the-

ory workings, application and use of therapeutic modalities in the rehabilitation of

sports injuries, and the effect of therapeutic modalities on both the stages of healing

and pain process. Prerequisites: ATP 330, admission to the athletic training education

program or permission of instructor. Offered fall.

**ATP 481. INTERNSHIP IN ATHLETIC TRAINING**  2-4 sh

In this course, upper level majors have opportunities to apply classroom knowledge and

skills to real world problems under the supervision of a faculty member and a certified

athletic trainer. Settings may include a sports medicine clinic, professional sports team,

corporate setting, etc. Students must keep a daily journal of their experiences, which

are discussed in conferences with the faculty supervisor. The student must also complete a

project benefiting the internship facility, but which would not have been possible

without the student. Student evaluations are based on these assignments. Students

should make arrangements with their professors the semester prior to taking the

internship. Prerequisites: ATP 329, 330; junior/senior majors only; permission of depart-

ment; 2.0 GPA overall, 2.0 GPA in major. Offered fall, winter, spring and summer.

**ATP 491. INDEPENDENT STUDY**  1-4 sh

**ATP 495. SENIOR SEMINAR IN ATHLETIC TRAINING**  2 sh

This course is designated to be the capstone class for the athletic training major. The

course will review acquired knowledge and experiences of the athletic training cur-

riculum. Students will be prepared to sit for the NATA-BOC certification exam.

Students will discuss moral and ethical responsibility, state licensure, continuing educa-

tion, decision-making accountability and conflict management. The NATA professional

code of practice and standards of practice will be reviewed. Resume and interview skills

will be discussed. Prerequisite: senior majors only. Offered spring.

**ATP 499. RESEARCH IN ATHLETIC TRAINING**  1-4 sh

Independent research project supervised by faculty mentor.

**Biology**

Chair, Department of Biology and Allied Health: Associate Professor Kingston

Professors: H. House, S. House

Associate Professors: Carloye, M. Clark, Haenel, N. Harris, MacFall, Seidel, Vick

Assistant Professors: Colker, Gallucci, Niedziela, Stemke, Touchette

Adjuncts: DeVries, Holand, Vandermast

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, AIDS, rising cancer rates and industrial pollution.

Our approach to biology at Elon University stresses hands-on experiences in the class-

room, laboratory and field. The course of study includes off-campus experiential opportuni-

ties 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 biologi-

cal 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>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 322</td>
<td>BIO 316 BIO 343</td>
<td>BIO 335</td>
</tr>
<tr>
<td>BIO 345</td>
<td>BIO 318 BIO 344</td>
<td>BIO 442</td>
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<tr>
<td>BIO 348</td>
<td>BIO 321 BIO 422</td>
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<tr>
<td>BIO 351</td>
<td>BIO 325 BIO 452</td>
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<tr>
<td>BIO 352</td>
<td>BIO 342</td>
<td></td>
</tr>
</tbody>
</table>

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

| BIO 111 | Introductory Cell Biology | 3 sh |
| BIO 112 | Introductory Population Biology | 3 sh |
| BIO 113 | Cell Biology Lab | 1 sh |
| BIO 114 | Population Biology Lab | 1 sh |
| BIO 221 | General Zoology | 4 sh |
| BIO 222 | General Botany | 4 sh |
| BIO 261 | Introductory Seminar | 2 sh |
| BIO 322 | Molecular and Cellular Biology | 4 sh |

One course selected from the Organismal Biology category: 4 sh

| BIO 316 | Developmental Biology |
| 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 |

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:

<table>
<thead>
<tr>
<th>Core Courses in Biology</th>
<th>40 sh</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHM 111</td>
<td>General Chemistry I</td>
</tr>
<tr>
<td>CHM 113</td>
<td>General Chemistry I Lab</td>
</tr>
<tr>
<td>CHM 112</td>
<td>General Chemistry II</td>
</tr>
<tr>
<td>CHM 114</td>
<td>General Chemistry II Lab</td>
</tr>
<tr>
<td>or (in lieu of CHM 111, 113, 112, 114)</td>
<td></td>
</tr>
<tr>
<td>CHM 115</td>
<td>Advanced General Chemistry (3 sh)</td>
</tr>
<tr>
<td>CHM 116</td>
<td>Advanced General Chemistry Lab (1 sh)</td>
</tr>
<tr>
<td>MTH 112</td>
<td>General Statistics</td>
</tr>
</tbody>
</table>

In addition, a required experiential component selected from:

- (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:

<table>
<thead>
<tr>
<th>Core Courses in Biology</th>
<th>40 sh</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHM 111</td>
<td>General Chemistry I</td>
</tr>
<tr>
<td>CHM 113</td>
<td>General Chemistry I Lab</td>
</tr>
<tr>
<td>CHM 112</td>
<td>General Chemistry II</td>
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<td>CHM 114</td>
<td>General Chemistry II Lab</td>
</tr>
<tr>
<td>or (in lieu of CHM 111, 113, 112, 114)</td>
<td></td>
</tr>
<tr>
<td>CHM 115</td>
<td>Advanced General Chemistry (3 sh)</td>
</tr>
<tr>
<td>CHM 116</td>
<td>Advanced General Chemistry Lab (1 sh)</td>
</tr>
<tr>
<td>CHM 211</td>
<td>Organic Chemistry I</td>
</tr>
<tr>
<td>CHM 212</td>
<td>Organic Chemistry II</td>
</tr>
<tr>
<td>CHM 213</td>
<td>Organic Chemistry I Lab</td>
</tr>
<tr>
<td>CHM 214</td>
<td>Organic Chemistry II Lab</td>
</tr>
<tr>
<td>PH1 111</td>
<td>General Physics I</td>
</tr>
<tr>
<td>PH1 112</td>
<td>General Physics II</td>
</tr>
<tr>
<td>or</td>
<td></td>
</tr>
<tr>
<td>PH1 113</td>
<td>General Physics I with Calculus</td>
</tr>
<tr>
<td>PH1 114</td>
<td>General Physics II with Calculus</td>
</tr>
<tr>
<td>MTH 112</td>
<td>General Statistics</td>
</tr>
</tbody>
</table>

In addition, a required experiential component selected from:
BIO 101. TOPICS IN GENERAL BIOLOGY 3 sh
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 101 and 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 1 sh
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 4 sh
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 3 sh
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 3 sh
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 112. Offered fall and spring.

BIO 113. CELL BIOLOGY LABORATORY 1 sh
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 1 sh
Students have three hours of laboratory experience per week with topics complementing concurrent study in BIO 112. Required for biology majors/minors. Corequisite: BIO 114. Offered fall and spring.

BIO 161. HUMAN ANATOMY 4 sh
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, 1 laboratory per week. No credit toward BIO 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. ORGANISMAL BIOLOGY AND FIELD TECHNIQUES 4 sh
This course examines the basic concepts of biological form and function and the fundamentals of organismal systematics with a focus on herbaceous and woody plants, invertebrates and microbial ecology. Students investigate the natural history of local species and their role in community dynamics. Laboratory experiences emphasize keying and identification, field methodologies of specimen collection and preservation, sampling techniques and population estimation procedures for terrestrial and aquatic ecosystems. Satisfies the General Studies lab science requirement. No credit toward the 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 and spring.

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.

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. Senior standing or consent of instructor. Prerequisites: BIO 111, 112, 113, 114; CHM 111, 112, 113, 114 or CHM 115/116. Offered fall and spring.

BIO 325. HUMAN HISTOLOGY 4 sh
Students study 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 fall of even-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. BIOTECHNOLOGY 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 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; 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 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. INTERNSHIP 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 from all levels 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

The 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 Valle
Professors: Burbridge, Honeycutt, Noer
Associate Professors: Baxter, Burpitt, Manring, Nienhaus, O’Mara, Paul, Powell, Schuette, Stevens, Strempke
Assistant Professors: Buechler, Cort, Hodge,Yap

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 five areas of concentration: 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.

The Bachelor of Science in Business Administration (BSBA) program at Elon University emphasizes academic challenge, mature intellectual development and a lifetime of learning. Our graduates go on to leadership positions in business and industry in for-profit and not-for-profit organizations. Our graduates are prepared for a variety of assignments because they possess an extensive array of knowledge, skills and abilities.

A major in Business Administration requires the following:

At least 50% of the business credit hours required for the degree (B.S. in Business Administration) must be earned at Elon University.

- MTH 116 Applied Mathematics with Calculus 4 sh
- MTH 121 Calculus and Analytic Geometry I 4 sh
- ECO 201 Principles of Economics 4 sh
- ECO 203 Statistics for Decision-Making 4 sh
- ECO 301 Business Economics 4 sh
- ACC 201 Principles of Financial Accounting 4 sh
- ACC 212 Principles of Managerial Accounting 4 sh
- CIS 211 Management Information Systems 4 sh
- BUS 202 Business Communications 4 sh