

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.

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 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.

General Asian 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
POL	363	Politics of Asia	4 sh
PHL	352	Eastern Philosophy	4 sh
REL	353	Buddhism	4 sh
REL	356	Hinduism	4 sh
APS	361-369	Seminars in Asian Studies	2-4 sh
APS	481	Internship in Asian Studies	1-4 sh

Asian Foreign Language Courses

CHN	121	Elementary Chinese I	4 sh
CHN	122	Elementary Chinese II	4 sh
CHN	221	Intermediate Chinese I	4 sh
JPN	121	Elementary Japanese I	4 sh
JPN	122	Elementary Japanese II	4 sh
JPN	221	Intermediate Japanese I	4 sh

TOTAL **20 sh**

Athletic Training

Chair, Department of Health and Human Performance: Associate Professor J. Davis

Professors: Beedle, Calhoun

Associate Professors: Hall, Miller

Assistant Professors: Baker, Bixby

Instructors: Bender, Calone

The Athletic Training Education Program (ATEP) major located within the Health and Human Performance (HHP) Department includes clinical education and internship experiences within a CAAHEP approved curriculum. Admission into the ATEP requires a separate application process that is outlined in the ATEP application packet which can be obtained through the HHP Department.

Students with disabilities or for more information about the technical standards of Elon's ATEP, please visit the program's Web site at: www.elon.edu/athletictraining. Students wishing to transfer into the program from another institution should also access the program's Web site.

Upon completion of the curriculum, students are eligible to sit for the BOC certification exam. Graduates of this program may pursue careers in athletic training or graduate degrees in other allied health professions after satisfying the appropriate prerequisites.

A major in Athletic Training Education requires the following courses:

ATP	112*	Athletic Training I	4 sh
ATP	212	Athletic Training II	4 sh
ATP	301	Clinical Education I	2 sh
ATP	302	Clinical Education II	2 sh
PEH	305	Legal Aspects	2 sh
ATP	311	Introduction to Pharmacology	2 sh
ESS	315	Advanced Strength Training Conditioning	4 sh
ATP	329	Assessment of Athletic Injuries	4 sh
ATP	330	Therapeutic Exercise/Rehabilitation	4 sh
ATP	401	Clinical Education III	2 sh
ATP	402	Clinical Education IV	2 sh
ESS	422	Physiology of Exercise	4 sh
ATP	430	Therapeutic Modalities	4 sh
ATP	481	Internship in Athletic Training	2 sh
ATP	495	Senior Seminar	2 sh
PEH	321	Biomechanics	4 sh
PEH	410	Administration and Management	4 sh
HED	220	First Aid and CPR for the Professional Rescuer	1 sh
PEH	324	Nutrition	4 sh
PEH	421	Chronic and Acute Diseases	4 sh
BIO	161*	Human Anatomy	4 sh
BIO	162	Human Physiology	4 sh
PSY	111	General Psychology	4 sh
TOTAL			73 sh

*Courses required for ATEP application.

- ATP 112. 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.
- ATP 212. 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.
- ATP 301. 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 certified athletic trainers. Rotations with medical doctors and other allied medical professionals 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 certified athletic trainers. Prerequisite: ATP 301. Offered fall.
- ATP 311. INTRODUCTION TO PHARMACOLOGY** 2 sh
 This course is designed as an introduction to pharmacology. Pharmacodynamics, pharmacokinetics, and drug regulation and testing will be discussed. Extra attention will be given to drugs commonly used in sports medicine. Topics will cover drugs used to treat infections, inflammation, pain, muscle spasm, colds, allergies, asthma, gastrointestinal disorders, hypertension, heart disease and performance enhancement. 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, including 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 athletic 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 contribution 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 training student continues to practice and improve clinical decision-making skills by building 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 assessments 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 supervision 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 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 athletic training. It is directed toward students who plan on pursuing careers in athletic training and/or physical therapy. The main topics discussed in this class will be the theory 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, with the assistance of a supervising faculty member, are responsible for making arrangements the semester prior to taking the internship. Prerequisites: ATP 329, 330; junior/senior majors only; permission of department; 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 curriculum. Students will be prepared to sit for the BOC certification exam. Students will discuss moral and ethical responsibility, state licensure, continuing education, 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: Associate Professor Kingston

Professors: H. House, S. House

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

Assistant Professors: Coker, Gallucci, Gammon, Miyamoto, Niedziela, Touchette, Vandermast

Adjuncts: DeVries, 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 interconnect-edness. 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 class-room, laboratory and field. The course of study includes off-campus experiential oppor-tunities 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.

Molecular/Cellular Biology

BIO 322

BIO 345

BIO 348

BIO 351

BIO 352

Organismal Biology

BIO 316 BIO 343

BIO 318

BIO 321

BIO 325

BIO 342

Supraorganismal Biology

BIO 335

BIO 344

BIO 442

BIO 452

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	
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	General 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
PHY	111	General Physics I	4 sh
PHY	112	General Physics II	4 sh
or			
PHY	113	General Physics I with Calculus	4 sh
PHY	114	General Physics II with Calculus	4 sh
MTH	112	General Statistics	4 sh

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.

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	321	Microbiology	4 sh
BIO	345	Genetics	4 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
PHY	111	General Physics I	4 sh
PHY	112	General Physics II	4 sh

MTH 112	General Statistics (or higher)	4 sh
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:

BIO 111	Introductory Cell Biology	3 sh
BIO 113	Cell Biology Lab	1 sh

Sixteen semester hours chosen from the following: 16 sh

BIO 112	Introductory Population Biology
BIO 114	Population Biology Lab

Biology courses at the 200-400 level

TOTAL **20 sh**

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 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 114. 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 112. 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. 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 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. Junior 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 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. 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. 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. 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

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: Burbidge, Honeycutt, Noer

Associate Professors: Baxter, Burpitt, Garber, Manring, Nienhaus, O'Mara, Paul, Powell,

Schuette, Strempek, Valle

Assistant Professors: Buechler, Gunby, Hodge, Yap

Lecturer: Rich, Riney

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