DEPARTMENT OF SCIENCE AND TECHNOLOGY

- **Biology Major, Concentration, and Minor**
- **Biochemistry Concentration**
- **Biotechnology Minor**
- **Chemistry Minor**
- **Environmental Science Major, Concentration, and Minor**
- **Forensic Science Concentration**

The Science and Technology Department is committed to academic excellence in science education. Our science programs with dedicated faculty and quality facilities will prepare students for careers in science-related fields and graduate studies. The department emphasizes basic and applied research, technological applications, and international experiences because the objective of challenging educational programs should not be merely accumulating knowledge,but also developing commitment and taking action. A hands-on approach provides students with a meaningful and purposeful education, giving them a competitive edge for career and graduate school opportunities.

Biology Major

Biology, the study of life, is the most all-encompassing of the sciences. Understanding basic life processes requires working in many areas in an integrated way. Students who major in Biology engage in a curriculum that explores the breadth of the biological sciences. They develop hands-on laboratory skills, and have the opportunity to participate in laboratory and field research projects, under the direction of a faculty mentor. The biology program provides a solid foundation in basic scientific knowledge. Every student will take a common set of core classes providing this initial set of core competencies that will be built upon and reinforced as you progress through intermediate level courses. Once the core is complete, students can enter into one of the five advisory tracks to complete the remaining credits required for the major that are designed to assist in course selection based on individual career goals and needs. These tracks are general biology, cellular and molecular biology, pre-health, ecology and conservation and research intensive. With our multiple track program, Biology majors are prepared for a wide array of opportunities including careers in the health sciences, biomedical research, physical therapy, biotechnology, pharmaceutical science, environmental biology, food science, and industrial research.

The Pre-Medical and Pre-Health Professional Advisor provides guidance and resource materials for all students interested in medical school, physician assistant programs, dental school, nursing, veterinary or other biomedical professional programs. Those students will follow the pre-health advisory track and will get assistance with the application process from the pre-health advisor.

Biology majors engage in a challenging and rewarding program that is tailored to fit individual student needs by customizing upper level course selection. Biology majors at Bryant gain a strong foundation in the science of biology and develop the abilities required to engage in thoughtful consideration of complex biological issues from multiple perspectives.

Students in the Biology major will:

- Demonstrate understanding of the processes of science, the scientific method, and the relationship between scientific research and established knowledge.
- Express biological scientific literacy in oral and written communication.
- Demonstrate content knowledge in biology.
- Demonstrate fundamental lab skills.
- Evaluate biological data, draw reasonable conclusions, recognize the ethical implications of these conclusions, and apply these conclusions to personal, community, and scientific problems.

Course Requirements and Advisory Tracks: In order to graduate with a major in Biology a total of 36 credits in science courses are required (39 credits for the Pre-Health track). All biology students take the core which consists of 19 credits. The remaining 17 credits required are taken at the 300 and 400-level (a minimum of one of these courses must be at the 400-level). These advisory tracks at the upper level are meant to package courses and are not strict requirements of the biology degree.

Biology Concentration

Biology is the study of living organisms and life processes. The study of biology is essential for understanding the world around us, for the protection of threatened life forms throughout the ecosphere, and for understanding human health and disease. The study of biology provides a foundation for careers in the biological, biomedical, agricultural and ecological sciences.

Biology Minor

Biology is the study of life forms, including their structure (anatomy), the dynamic processes (physiology), their communities (ecology), their chemical structure (biochemistry and molecular biology), the organization and history of the tree of life (taxonomy and evolution), their reproduction (genetics), and their interactions (behavior). The study of biology is essential for understanding the living world, for the protection of threatened life forms throughout the ecosphere, and for management and control of pathogens and parasites. The study of biology provides a foundation for careers in the biological, biomedical, agricultural and ecological sciences.

Biochemistry Concentration

Biochemistry is the study of the structure, composition, and chemical reactions of substances in living systems. It focuses on the scientific study of the chemistry of living systems, their fundamental chemical substances and reactions, and their chemical pathways and information transfer systems, with particular reference to carbohydrates, proteins, lipids, and nucleic acids. Students interested in the field study such topics as how living things obtain energy from food, the chemical basis of heredity, what fundamental changes occur in disease, and the production of pharmaceutical products.

Biotechnology Minor

Biotechnology is the commercial application of living organisms that involves the deliberate manipulation of DNA. Biotechnology broadly impacts markets in human health, agriculture, and the forensic sciences.

In the required courses for the minor, students will learn basic chemistry, biology, and the technology of manipulating DNA through hands-on lab experiences. In the elective courses they will be exposed to applications of biotechnology and health research, and development of products and services in diverse markets, and begin to appreciate the profound legal,

social, economic, and ethical implications of this technology for our society.

Chemistry Minor

The field of Chemistry is based on understanding the composition and basic properties of matter, the conversions of one form of matter to another form and leads to a greater comprehension of the chemical physics of matter. Knowledge of these fundamentals will allow students to understand such diverse topics as chemical biology, the synthesis of new forms of matter from pharmaceuticals to new materials, the chemical phenomena of the human and the chemical interactions that makes up the biosphere.

Environmental Science Major

The Environmental Science major focuses on the physical, chemical, and biological sciences, and incorporates coursework in social sciences, history, literature, and business administration, resulting in a well-rounded educational experience required by today's employers and graduate schools. We have designed a curriculum that will help students analyze carefully and think critically. Our goal is to develop professional skills in problem solving, quantitative analysis, modeling, field methods, team work, and communication, in addition to fostering a strong environmental ethic.

The curriculum also provides the opportunity for students to pursue specialty areas of interest in environmental science by coordinating courses in two tracks: Environmental Health and Toxicology and Environmental Management and Sustainability. The tracks allow students to better prepare for a wide variety of career opportunities or for graduate programs and will address the growing need for professional graduates trained in these specific areas of environmental science. Students will benefit from dedicated faculty advising, an action-oriented curriculum, and being part of a research team.

Our environmental science program Student Learning Outcome (SLO) areas include, 1) basic scientific knowledge, 2) intellectual curiosity, 3) problem solving, 4) project management, 5) social responsibility, and 6) global awareness.

Students in the Environmental Science major will:

- Understand Environmental Science as a system science, integrating core principles from underlying fields of Biology, Chemistry, and Physics.
- Attain the ability to ask the right questions and think analytically and critically when confronted with an environmental problem.
- Be able to use learned problem solving methods to propose creative solutions, taking into account the complexity and uncertainties of the problem, and different points of view of multiple stakeholders.
- Demonstrate leadership and project management skills by designing and organizing key aspects of research projects.
- Practice as socially responsible citizens by disseminating accurate scientific knowledge, and providing solutions to key environmental problems that have political, economic and/or social impacts on the community.
- Recognize the importance of Environmental Science issues in the context of the global community.

Environmental Science Concentration

Environmental Science is a broad field of study that provides the scientific underpinning to many issues facing society today, including access to and sustainability of resources, preservation of land and wildlife, new and sustainable technologies and global climate change. The Environmental Science concentration allows students to integrate courses in their particular interest areas in environmental science with courses in their major. In the Level I courses for the concentration, students learn the core principles of the discipline. In the elective courses in Level II and Level III, they choose from a diverse collection of in-depth courses according to their unique interests in environmental science and future career goals.

Environmental Science Minor

Students who complement their studies with an Environmental Science minor are prepared for positions in the wide open area of environmentally related fields. For instance, environmental science broadly impacts fields such as toxicology, sustainable development, resource and wildlife management, land use and reclamation, green manufacturing, analytical analysis, and others, where effective communication between scientists and business professionals is essential. The minor is also a good foundation for employment with manufacturers who must comply with changing environmental regulations. In the required courses, students will be exposed to important environmental issues that face today's society by participating in hands-on exercises and experimentation.

Forensic Science Concentration

This concentration is intended for undergraduate students interested in professional careers involving police and medical investigation of crime scenes and criminal acts, laboratory assessment of materials associated with such investigations, and preparation for advanced study in areas such as trauma assessment, forensic photography, ballistics, medical entomology, soil and chemical analysis, biochemistry, geographical information systems (GIS) and mapping, bio-imaging, DNA analysis, pharmaceutical science, or medical studies. Students who matriculate in this program will develop the ability to conduct basic or applied laboratory research and to gain skill sets and technical expertise that will enable graduates to move forward in a forensic science career. This concentration could be combined with either a Business concentration (serving to meet the requirement for an A&S minor), or with an Arts & Science major such as Communication, Economics or Applied Psychology.

Most of the work of forensic scientists is done in a laboratory, utilizing highly accurate instrumentation and working collaboratively with other highly trained specialists. Basic training in the sciences enables students to prepare for developing more advanced skill sets. The Forensic Science concentration will enable Bryant students to explore the scope of professional careers, to examine the collage of narrow specialties that make up collaborative forensic teams, and to identify their own personal passion that will sustain them as they navigate through more advanced studies. It is also important to analyze common misconceptions about this challenging field of science, and to clarify the roles of various law enforcement, medical, and scientific experts.

Forensic techniques can also be used to track industrial responsibility for toxic releases, to assess engineering failures such as bridge or building collapse, and to assist countries following natural disasters, disease outbreaks, or wars.

Students in the Forensic Science Concentration will:

- Develop the ability to analyze complex problems and issues in the forensic sciences.
- Learn and practice laboratory research skills to conduct basic and applied scientific investigations.
- Gain skill sets and technical expertise that will qualify graduates to move forward in advanced training for careers in forensics.
- Explore the scope of professional forensic careers, including the narrow specialties that make up collaborative forensic teams.
- Analyze common misconceptions about forensics and clarify the roles of various law enforcement, medical and scientific experts.

Faculty

Department Chair
Dr. Kirsten Hokeness

Professor
Brian Blais

Professor
Kirsten Hokeness

Professor
Gaytha Langlois

Professor
Qin Leng

Professor
Christopher Reid

Professor
Hong Yang

Associate Professor
Dan McNally

Assistant Professor
Steven Weicksel

Lecturer
Jennifer Hurrell

Lecturer
Stephanie Mott

Lecturer
Angelyn Phillips

Lecturer
Dania E. Whitaker

Majors

- Bachelor of Science with a Biology Major
- Bachelor of Science with Environmental Science Major

Concentrations

- Biochemistry Concentration
- Biology Concentration
- Environmental Science Concentration
- Forensic Science Concentration

Minors

- Biology Minor
- Biotechnology Minor
- Chemistry Minor
- Environmental Science Minor

Courses

SCI 251. Biology I Principles of Biology. 3 Credit Hours.
This course serves as an introduction to the fundamental principles of biology. Emphasis will be placed on topics including scientific/biological methodology, biological classification and nomenclature, cell structure and function, cellular biochemistry, principles of energy and metabolism, genetics, aspects of ecology, and the core theory of modern biology - evolution. Students will gain a deeper understanding of life processes at the cellular and molecular level. This course may be taken with a laboratory to fulfill the laboratory requirement for graduation.
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI 253. Biology II Organismal Biology. 3 Credit Hours.
This course is intended as a higher level biology course focusing on organismal biology, the study of structure, function, ecology and evolution at the level of the organism. It will use evolutionary theory as an organizing theme to explore biodiversity, physiology of various organism groups (plants, animals, etc.), and ecology, with human physiology especially highlighted. This course will be essential for students intending to pursue advanced graduate or professional training in biological and biomedical fields.
Prerequisites: SCI 251
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 262. Physical Geology. 3 Credit Hours.
This course explores the cyclicality of geologic processes that shape the earth. Volcanic activity and earthquakes contribute to the building of mountains. Rivers and oceans help to destroy mountains. This simplistic idea is expanded to give the student a very good idea of "how the earth works." This course may be taken with a laboratory to fulfill the laboratory requirement.
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI 263. Astronomy. 3 Credit Hours.
This general introductory course explores the fundamentals of astronomy. All branches of modern astronomy are covered. Major topics include the historical development of astronomy, the solar system, and the universe beyond. This course may be taken with a laboratory to fulfill the laboratory requirement.
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI 264. Physics I Introductory Physics. 3 Credit Hours.
This course deals with some areas of physics, such as mechanics, heat, waves, sound, light, electricity, and modern atomic physics, primarily from a conceptual point of view. This course will be especially useful to students who plan to enter an industry in which an understanding of the physical laws of nature is desirable. This course may be taken with a laboratory to fulfill the laboratory requirement.
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 265. Chemistry I Introductory Chemistry. 3 Credit Hours.
This course will provide a general knowledge of chemistry as foundational background for careers in the environmental and biological sciences, chemical, agricultural and pharmaceutical industries, energy and materials management, and community service sectors. This course provides an introductory study of the fundamental concepts of chemistry: atomic and electronic structure, chemical bonding, simple reactions in organic and organic chemistry, and chemical equilibria. This course may be taken with a laboratory to fulfill the laboratory requirement.
Session Cycle: Fall
Yearly Cycle: Annual.

SCI 266. Oceanography. 3 Credit Hours.
The study of oceanography will provide students with an appreciation and a general familiarity with the ocean and with both coastal and open marine environments. This course will have an interdisciplinary focus in that it will emphasize the interactions that occur among the biological, chemical, geological, and physical phenomena of various marine environments from the beach to the open ocean.
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI 267. Introductory Chemistry II Chemical Systems. 3 Credit Hours.
This course completes a two semester introductory chemistry sequence and will enhance a student's preparation for further study in the environmental and life sciences at Bryant. Recommended for students who are majors in Biology or Environmental Science and who plan to enter an industry or field of study where a general knowledge of chemistry is essential such as the health professions (medical, pharmaceutical, dental) and graduate school in the biological sciences. This course will characterize and explain chemical systems at equilibrium, as well as exploring spontaneous processes, rates of chemical reactions, electrochemistry, thermodynamics, and acid/base chemistry.
Prerequisites: SCI 265
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 268. Introduction to Environmental Science and Sustainability. 3 Credit Hours.
This course provides students with a broad overview of the scientific principles, concepts, and methodologies required to understand the interrelationships implicit in environmental studies, including the concept of sustainability, and to identify and analyze environmental problems both natural and human-made. Integrated laboratory and/or field exercises will demonstrate the principles, processes, techniques, and technologies of environmental problems and solutions.
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 274. Physics II Biological Physics. 3 Credit Hours.
This course explores concepts in physics specifically related to the biological and health sciences, including properties of fluids and solids, thermodynamics, optics, electrostatics and DC circuits, and radiation and health. Examples will be drawn primarily from the biological world with a special emphasis on human and animal health. This course is required for students pursuing a pre-med track within the Biology major.
Prerequisites: SCI 264
Session Cycle: Fall
Yearly Cycle: Annual.

SCI 287. Weather and Natural Disasters. 3 Credit Hours.
Natural disasters, both local and global, are an important factor of all human societies and the weather comprises many of these disasters. This course investigates our knowledge of the weather processes that affect human environments in catastrophic ways, from tornadoes and hurricanes to climate change coverage. It includes the prediction of these phenomena as well as quantifying their impact, possible mitigation, and the politics that surround them. These concepts are presented in a way which applies to real-life and encourages critical thinking. Methods of scientific inquiry are also covered. This course may be taken with a laboratory to fulfill the laboratory requirement.
Session Cycle: Fall
Yearly Cycle: Alternate Years.

SCI 350. Biological Imaging. 3 Credit Hours.
This course is designed for both majors and non-majors who are interested in learning how biological characters and concepts are illustrated through various kinds of imaging technologies. By introducing the theoretical dimensions and the operation guidelines of biological imaging techniques, students will practice on using these techniques to detect and illustrate biological structure and function. Students will be guided to generate publishable images, to use proper imaging processing skills, and to incorporate the images into a scientific paper.
Prerequisites: 200-level science course
Session Cycle: Spring
Yearly Cycle: Alternate Years.

SCI 351. Ecology. 3 Credit Hours.
This course provides a review of ecological principles and selected research studies underlying these concepts, identifies techniques used by ecologists, and presents an overview of local and global environmental issues, including strategies for sustainability. In addition, the course emphasizes critical analysis of environmental problems and examines individual, group and societal roles important to improving environmental quality. This course may be taken with a laboratory to fulfill the laboratory requirement.
Prerequisites: SCI 251, SCI 262, or SCI 266 or permission of the instructor
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI 354. Nutrition. 3 Credit Hours.
Nutrition concerns the study of processes by which organisms ingest, digest, absorb, utilize food and excrete wastes. Students will learn human diet and nutritional needs and develop the ability to think critically about nutrition claims and counterclaims in the marketplace. Recent advances in nutrition research, such as those relating to weight loss, performance enhancement, and mood control, will also be covered.
Prerequisites: SCI 251
Session Cycle: Fall
Yearly Cycle: Annual.

SCI 355. Energy Management Strategies. 3 Credit Hours.
In this course students review the principles of energy transformation, explore alternative energy resources and their feasibility, and assess current and future energy policy formation. In addition, students examine the economic and ecological impacts of various policy options and provide assistance in structuring institutional management plans for efficient energy use. This course may be taken with a laboratory to fulfill the laboratory requirement.
Prerequisites: 200-level science course
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI 356. Introduction to Biotechnology. 3 Credit Hours.
Biotechnology is the commercial application of living organisms involving the deliberate manipulation of their DNA. As such, biotechnology broadly impacts commercial markets in human and animal health care, agriculture and horticulture, and the forensic sciences. Students will learn, through lectures and "hands on" laboratory experiences, about the biotechnology products and "new life forms" which have been or are about to be commercialized. This course involves significant "hands on" experiences, and focuses on the development process of bioengineered products from Idea inception to market entry. This course may be taken with a laboratory to fulfill the laboratory requirement.
Prerequisites: SCI 251 or SCI 265
Session Cycle: Fall
Yearly Cycle: Varies.

SCI 358. Human Sexuality. 3 Credit Hours.
This course will instruct students in the cultural and social legacy of sexuality in American society. Students will also learn the details of human reproduction, development, and sexual maturation and consider the impacts of new technologies on reproductive health care. Sexually transmitted diseases, their biology and social implications, will also be covered.
Prerequisites: SCI 251 and junior standing
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 360. Anatomy and Physiology I. 3 Credit Hours.
The essential principles of human anatomy and physiology are explored in this course, using a systems approach. The first portion of the course will review fundamental biological and chemical principles central to life at a cellular level, and explore the structure and function of tissues. The second portion of the course will involve a detailed analysis of the structure and function of the integumentary, skeletal, muscular, nervous and endocrine systems, as well as an examination of the senses. The coordination of these organ systems and their role in the maintenance of homeostasis in the human body will also be explored. The course can be taken with a laboratory to fulfill the laboratory requirement, or to prepare for application to medical or professional programs in the health sciences.
Prerequisites: SCI 251 and SCI L251 and SCI 253 or instructor permission
Session Cycle: Fall
Yearly Cycle: Annual.

SCI 362. Nobel Prize in Biological Sciences. 3 Credit Hours.
This course provides an understanding of the development of modern biological sciences and covers basic biological scientific principles in major sub-disciplines such as evolution, molecular biology, physiology, and medicine. By presenting major Nobel Prize winning research in biology, the course provides insight into the unique mindsets of Nobel laureates, noting the creativity and logical reasoning behind their Nobel Prize winning research. Both social and business impacts of their scientific contributions will be discussed, with emphasis on how scientific knowledge affects politics, history, religions, and daily life.
Prerequisites: SCI 251 or SCI 265 or permission of the instructor
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI 363. Genetics. 3 Credit Hours.
This course will introduce students to the fundamental concepts of genetics. The first half of the course will detail classical inheritance patterns, chromosomal rearrangement, mutations and DNA repair. The second half of the course will deal with modern discoveries and applications in today's world with respect to uses in biotechnology, genomics as well as the role of genetics in the development of disease states such as cancer. Experimental data will be incorporated into each segment of the course to enhance understanding of the scientific method and reinforce lecture topics. This course may be taken with a laboratory to fulfill the laboratory requirement.
Prerequisites: SCI 251, sophomore standing or permission of instructor
Session Cycle: Fall
Yearly Cycle: Alternate Years.

SCI 364. Plant Biology. 3 Credit Hours.
This course explores the biology of major plant groups -- their structure, function, physiology and ecology systematics and phylogeny. While the emphasis will be placed on flowering plants (angiosperms), the dominant plant group in the modern world, the course examines all aspects of plant life, including the impact of human activities on vegetation. The course will include direct observation of plant material and preparation of herbarium specimens. Current issues related to plant diversity, protection of endangered species, horticulture, food production, etc. will also be discussed.
Prerequisites: SCI 251 or SCI 265 or instructor permission
Session Cycle: Fall
Yearly Cycle: Alternate Years.

SCI 365. Organic Chemistry I. 3 Credit Hours.
This course will provide an introduction to the chemistry of organic compounds and the importance of organic chemistry in our everyday life. Organic chemistry is involved in many industrial production processes such as plastics and pharmaceuticals, as well as being essential to the reactions and processes that occur in living organisms. This course will cover the structure and chemistry of the major classes of organic compounds, and is recommended for students who plan careers in environmental toxicology, the chemical and pharmaceutical industries, waste management, biological sciences and geochemistry. This course may be taken with a laboratory to fulfill the laboratory requirement.
Prerequisites: SCI 265
Session Cycle: Fall
Yearly Cycle: Alternate Years.

SCI 366. Coastal Environments. 3 Credit Hours.
This course will teach the student how different types of coastlines are molded from waves, tides and sediment supply. It will also show the different tools, methodologies, and applications that are available to the coastal geomorphology assessment and surveying service industries. Group projects involve the preparation of technical/cost proposals to solve coastal geo-technical problems and design of coastal management plans.
Prerequisites: SCI 251 or SCI 262 or SCI 266 or SCI 287 or permission of the instructor
Session Cycle: Fall
Yearly Cycle: Annual.

SCI 367. Biochemistry. 3 Credit Hours.
This course involves the study of chemical processes that are continually occurring within a living organism. The structures and functions of critical chemical components of all cells will be covered as well. In addition, critical processes such as metabolism, generation of energy and the biosynthesis of major biomolecules (proteins, DNA, lipids, carbohydrates) and photosynthesis will be analyzed in-depth. The final portion of the course will examine biochemical basis of disease, and how biological systems deal with toxins.
Prerequisites: SCI 251 and SCI 265; or permission of the instructor
Session Cycle: Spring
Yearly Cycle: Alternate Years.

SCI 368. Elements of Forensic Science. 3 Credit Hours.
This course will provide an overview of forensic science, including strategies for identifying and solving complex problems, exposure to the analytical tools used by forensic scientists, and the professional standards and ethical considerations guiding practitioners. Special topics will include the scope and history of forensic science, the use of scientific methodology, the concepts of evidence and proof, and the methodologies used for establishing unique connections based on physical, chemical and biological evidence. Students will also become acquainted with the role of histology, serology and DNA typing in forensic analyses, the importance of accurately reconstructing dynamic processes; the recognition, collection and preservation of evidence; the use of statistical techniques, and the demands for quality assurance. An introduction to the technologies used by forensic scientists will be included, along with an examination of the scope of professional careers in forensic science, especially the collage of specialties that comprise collaborative forensic teams.
Prerequisites: SCI 251 or SCI 265 or permission of the instructor
Session Cycle: Fall
Yearly Cycle: Annual.

SCI 369. Histology. 3 Credit Hours.
This course will focus on the microscopic study of tissues and organs in relation to their function using light and scanning electron microscopy allowing anatomy and physiology analyses to be visualized at the cellular level. Topics will include tissue structure, organization and histochemistry, pathological variations associated with different disease states, molecular biomarkers, fluorescence technology, and immuno/cyto/ histochemical techniques. Students will use various techniques of preparing plant and animal tissue for microscopic study in the laboratory, and will gain experience in digitizing microscopic images. Additionally, methodologies including tissue processing, embedding, sectioning and staining techniques, along with analytic tools used by scientists in medical forensic, biological, and toxicological fields will be examined.
Prerequisites: SCI 251 or SCI 265; or permission of instructor
Session Cycle: Spring
Yearly Cycle: Alternate Years.

SCI 371. Human Impact on Land and Life. 3 Credit Hours.
Having doubled in the last 40 years, the human population is requiring an increasing amount of natural resources while generating a substantial amount of waste and pollution that the environment can no longer absorb. It has been reported that human activities, such as land development and agriculture, have modified over 50% of the Earth's land surface. We are also causing an extinction rate 1,000 – 10,000 times greater than the background extinction rate. This course covers environmental issues on land use, wildlife protection, and human health. Topics include toxicology, agriculture, forestry, urbanization, biodiversity decline, and sustainable solutions. Tools and techniques for problem solving and analysis will be emphasized. This course may be taken with a laboratory to fulfill the laboratory requirement.
Prerequisites: 200-level science course
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 372. Sustaining Air and Water. 3 Credit Hours.
An increase in technological advancements has degraded our air and water. For instance, acid rain has caused half the trees in Germany's Black Forest to die; the life expectancy for urban residents in India has been reduced by 3.2 years because of air pollution; and at least 320M people in China do not have access to clean drinking water. This course covers our environmental impact on air and water, transport and fate of toxic chemicals, and current prevention efforts. Topics include global warming and climate change, urban smog, surface water and groundwater contamination, and ocean dead zones. Developing problem solving and risk assessment skills will be emphasized. This course may be taken with a laboratory to fulfill the laboratory requirement.
Prerequisites: 200-level science course
Session Cycle: Fall
Yearly Cycle: Annual.

SCI 373. Artificial Intelligence and Robotics. 3 Credit Hours.
Can machines think? What does this really mean? This course provides an introduction to the topic of artificial intelligence and robotics. The lab part of the course provides hands-on experience in the making of thinking machines. The lecture part of the course will focus on the theory of artificial intelligence and robotics, but will also include some hands-on projects and competitions. The course (both the lab and lecture) will serve as an introduction to programming in Python, and the use of the robotic hardware. The course will present methods for solving difficult decision-making problems. The lecture and lab (SCI L373) must be taken concurrently. Some programming experience is helpful but is not required.
Prerequisites: 200 level science course
Session Cycle: Fall
Yearly Cycle: Alternate Years.

SCI 374. Organic Chemistry II. 3 Credit Hours.
This course is the second semester offering of the full year of organic chemistry. This course will expand your basic knowledge of organic chemistry by developing a deeper understanding of the reactivity of functional groups such as aromatic rings, dienes, alcohols, amines, aldehydes, ketones, carboxylic acids and their derivatives. In addition, it will further your understanding of "electron pushing", so that you are able to propose reasonable reaction mechanisms. Students will be able to use the fundamentals of functional group reactivity to develop multi-step syntheses of organic molecules. Finally, students will be able to use NMR spectroscopy, along with IR spectroscopy and mass spectrometry, to deduce unknown organic structures.
Prerequisites: SCI 365
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 376. GIS for Environmental Decision Making. 3 Credit Hours.
This course will provide an overview of Geographic Information Systems (GIS), widely used by geologists, hydrologists, oceanographers, community planners and environmental engineers, utilizing diverse computer hardware and software applications. Applications for GIS tools will be examined, including transportation design, land use planning, facility citing, and resource management. This course will focus on how GIS applications are structured, what types of mapping data can be processed, and what customized products can be generated. Case studies will illustrate the utilization of GIS analysis to improve decision making, and field visits to public and private sector data centers will illustrate the breadth of applications. Hands-on exposure to CARIS for Windows and ArcGIS will enhance the student's understanding of GIS tools and provide a means for individualized projects to be completed. This course may be taken with a laboratory to fulfill the laboratory requirement.
Prerequisites: 200-level science course
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI 377. Microbiology. 3 Credit Hours.
This course examines life at the microscopic level and is designed to provide an understanding of microbiology and its connectedness to the environment, medicine, agriculture, and industry. Topics will include exploration of the world of bacteria, viruses, protista, and fungi, use of microbes in genetic engineering, food preservation and safety, the role of microbes in biotechnology, industry, and agriculture, antibiotic resistance, viral and bacterial diseases of humans, and the use of microbes or microbial products in bioterrorism. Demonstration exercises will be integrated throughout the course to reinforce lecture topics. This course may be taken with a laboratory to fulfill the laboratory requirement.
Prerequisites: SCI 265 with lab or SCI 251 with lab or permission of instructor
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 378. Computer Programming for the Sciences. 3 Credit Hours.
This course provides an introduction to programming in Python specifically designed for use in the sciences. Students will obtain hands-on experience in data analysis, simulation, and visualization in a project-based course. Fundamentals of programming in Python will be covered, and applied to problems in biology, environmental science, physics, and chemistry.
Prerequisites: Sophomore standing
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 379. Emergency Medical Technician (EMT) Basic. 6 Credit Hours.
This course prepares individuals to function in the pre-hospital environment. This course provides instruction in basic life support care of sick and injured persons, including airway assessment, shock management, communications, documentation general pharmacology for the basic provider, hemorrhage control, ambulance operations, and splinting of adult, pediatric and infant patients, as well as special care of patients exposed to heat, cold, radiation, hazardous materials, poisons or contagious disease. This course consists of didactic and laboratory class time as well as clinical training in the hospital setting and training aboard an ambulance. Completion of this course qualifies the student to be eligible to sit for the National Registry of Emergency Medical Technician's exam. This course may include one or two Saturday sessions.
Prerequisites: SCI 251
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 380. Anatomy and Physiology II. 3 Credit Hours.
This course is the second semester of a 2-course sequence that covers the study of the structure and function of the human body. Topics include a further exploration of essential principles in human anatomy and physiology, and are built upon the knowledge acquired in Anatomy and Physiology I. The course will proved a detailed analysis of the structure and function of the cardiovascular, lymphatic, digestive, respiratory, urinary and reproductive systems, as well as to examine human growth and development. The coordination of organ systems and their role in the maintenance of homeostasis in the human body will be examined. The course is matched with a laboratory component (Anatomy and Physiology Lab II), and is considered to be a requirement for pre-med and many pre-professional health programs.
Prerequisites: SCI 360, Sophomore standing, or permission of the instructor
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 381. Human Kinesiology. 3 Credit Hours.
Kinesiology is by definition, the study of the art and science of human movement. This course will provide a broad introduction to human anatomy and biomechanics. Topics will include osteokinematic and arthrokinematic descriptions of normal and abnormal movement patterns. Students will be equipped with the necessary knowledge and skills to analyze movement in order to prepare the student for work in a medical or fitness field, supporting future study in such health programs as physical therapy, occupational therapy, physician assistant and chiropractic work.
Prerequisites: SCI 251
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 382. Cell Biology and Molecular Genetics. 3 Credit Hours.
This course is designed for upper-level students as a continuation of General Biology. SCI 382 focuses on the fine structure of cells, intra- and intercellular communication, and the molecular organization and transfer of genetic information. Experimental design, methodology, and current biotechnological applications will also be discussed. For many of the lecture topics, primary research and review articles will be assigned for reading pertaining to the lecture. The overall goal of the course is for students to synthesize knowledge of how cells function with experimental design and experimental methodology. Upon the completion of this course students should be able to successfully convey this knowledge through scientific writing, and add to their knowledge through reading and understanding of scientific literature.
Prerequisites: SCI 251
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 383. Human Health and Disease. 3 Credit Hours.
Human Health and Disease is a non-majors course that is designed to inform students of basic human biology, health, and how disease can develop when the normal efficient and intricate processes of the human body go wrong. Diseases of multiple body systems will be discussed including many different types of cancer. The course will also highlight modern biomedical advancements that have helped to better diagnose and treat disease. Lastly, students will be exposed to the broader context of healthcare as a system that will enable them to make rational decisions on personal, ethical, and political issues in their health. This course does not apply to Science majors.
Prerequisites: SCI 251 or SCI 267
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI 390. Research Methods in Science. 3 Credit Hours.
This course is intended to provide an introduction to scientific methodology and analytical science. Topics will include data analysis, statistical analysis, principles of spectrophotometry, chromatography and microscopy, field sampling techniques, technical writing, and oral presentation skills. This course will serve as the foundation for the SCI 490 research project and those students interested in analytical science.
Prerequisites: Junior standing and science major or permission of the instructor
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 391. Science Internship. 3 Credit Hours.
The science internship provides the student with the opportunity to gain on-the-job experience and to apply scientific principles and procedures learned in the classroom in a work environment. The student is required to meet regularly with a faculty advisor, keep a daily log of activities, complete a paper or specific research project, and prepare an evaluation of the experience at the end of the internship.
Prerequisites: Approval of a supervising faculty member and department chair.

SCI 397. Directed Study in Science. 3 Credit Hours.
This course is tailored to fit the unique interests of a student interested in science. Faculty and student will design a program for the study of complex issues in science and/or technology, including technical applications of scientific methodology and basic applied research into existing scientific problems, including regular meetings throughout the semester. The end product of this study would be a paper describing the results of the investigation, including methodology and data that have been generated, or the equivalent.
Prerequisites: approval of supervising faculty member and department chair.

SCI 452. Innovation and Global Energy Challenges. 3 Credit Hours.
This course will explore the challenges of providing a sustainable energy supply to support increasing world population and growing economies, and will focus on global energy systems, renewable energy sources, distributed power networks, diversification of energy supply, and increased energy efficiency. By examining the energy issues that preoccupy world decision makers, such as dwindling fuel resources, deteriorating electrical grids, externalization of costs, subsidies for existing energy corporations, extreme pollution and environmental degradation associated with mining, drilling, transport, operations, and waste disposal, students will develop and international perspective and multidisciplinary frame with which to approach needed changes in direction. Innovative approaches are needed throughout the entire energy distribution system, including changes in fuel procurement, processing, usage, and cost analyses that account for the entire fuel cycle and minimization of external costs. Breakthroughs in control systems, materials management, green building technology, carbon sequestration techniques, and algal biofuel production are just a few examples of promising new avenues for energy developments that will be assessed. For qualified students, this course may be taken as a 500 level graduate content course. Permission of the instructor is required.
Prerequisites: SCI 251 or SCI 262 or SCI 265; or permission of the instructor
Session Cycle: Fall
Yearly Cycle: Varies.

SCI 453. GIS Tools Coastal Planning and Climate Change. 3 Credit Hours.
This course provides background and training in the utilization of Geographic Information System (GIS) tools for tracking climate change effects on coastal ecosystems, with a particular emphasis on how coastal planners can predict the extent and likelihood of significant alterations of coastline geomorphology or ecosystem dynamics. Advance planning can reduce the impact of these changes on residents and natural inhabitants. Case studies of coastal regions around the world will be explored. For qualified students, this course may be taken as a 500 level graduate content course. Permission of the instructor is required.
Prerequisites: SCI 251 or SCI 262 or SCI 265 or SCI 287, or permission of instructor
Session Cycle: Spring
Yearly Cycle: Varies.

SCI 454. Conservation in the U.S. and China. 3 Credit Hours.
As one of the major environmental issues, conservation captures the attention of both scientists and the general public. National parks in the U.S. and China preserve spectacular examples of the best biological and geological resources on our planet. This course provides basic scientific information behind these natural wonders and presents and analyzes conservation issues using an interdisciplinary approach. Through reading, discussion, and lectures, students will gain insights into the critical role that national parks play in the preservation of natural resources, as well as protecting cultural and historic values. Using selected national parks as case examples, students will learn how to assess scientific data that underlies environmental debates about conservation issues, and will examine how these issues are connected to society and business. For qualified students, this course may be taken as a 500 level graduate content course. Permission of the instructor is required.
Prerequisites: SCI 251 or SCI 262 or SCI 266 or SCI 351 or SCI 366 or SCI 371 or SCI 376; or permission of the instructor
Session Cycle: Spring
Yearly Cycle: Varies.

SCI 455. Environmental Policy: Decision Making and Problem Solving. 3 Credit Hours.
This course will present an overview of environmental policy alternatives, emphasizing the interrelationship of science, business and government in policy formation and implementation. Global issues will be included, with special attention directed toward international efforts to achieve consensus on sustainable growth policies that encompass economic realities, technological innovation and a sensible legal and regulatory framework. For qualified students, this course may be taken as a 500 level graduate content course. Permission of the instructor is required.
Prerequisites: SCI 251 or SCI 262 or SCI 265 or SCI 266 or SCI 351 or SCI 371 or SCI 372 or SCI 376 and junior standing; or permission of instructor
Session Cycle: Spring
Yearly Cycle: Annual.

SCI 457. Environmental Toxicology and Risk Assessment. 3 Credit Hours.
The generation of hazardous wastes and our potential exposure to them is increasing. This course will provide the student with the fundamentals of hazardous substances and wastes in relation to chemistry, environmental chemical processes, and toxicology. It is designed for students who are interested in various aspects of hazardous substances and wastes, including regulation, treatment, remediation, biological effects, chemical phenomena, transport, source reduction, and research. Experimental exercises will be integrated throughout the course to reinforce lecture topics. For qualified students, this course may be taken as a 500 level graduate content course. Permission of the instructor is required.).
Prerequisites: 200-level science course
Session Cycle: Fall
Yearly Cycle: Alternate Years.

SCI 458. Global Change and Geochemical Impact. 3 Credit Hours.
This course provides an in-depth understanding of global changes of atmosphere, biosphere and hydrosphere in the past and present. using the state of art isotope technology and its applications in environmental sciences, the course covers both theoretical and experimental aspects of issues in global scale. The course integrates hands-on laboratory exercises to reinforce lecture topics. For qualified students, this course may be taken as a 500 level graduate content course. Permission of the instructor is required.
Prerequisites: SCI 251 with lab or SCI 265 with lab or permission of instructor
Session Cycle: Fall
Yearly Cycle: Varies.

SCI 461. Issues in Biological Science. 3 Credit Hours.
This seminar course will focus on current issues in biological science, and will vary from year to year based upon compelling new trends in the biosciences. Public understanding of science often plays a large role in the advancement of the field as a whole, and therefore current societal issues and biomedical research will be addressed. Additional topics may include addressing new technology or research methodologies, the role of government and culture in scientific achievement, the integration of the environment and science and climate change and species extinction. This course will be a faculty and student-run seminar course in which students will be required to present topics of interest to them. Outside speakers will be included.
Prerequisites: SCI 251 and Lab or SCI 265 and Lab; or permission of instructor
Session Cycle: Spring
Yearly Cycle: Varies.

SCI 462. Plant Diversity in Ancient and Modern Environments. 3 Credit Hours.
This course provides an in-depth understanding of major plant groups--their naming, classification, structure, function, and evolution. By examining all aspects of plant life through temporal and spatial changes, and the role of plants in shaping, adapting, and recording ancient and modern environments, the evolutionary history of plants and the global environmental change history will be integrated. For qualified students, this course may be taken as a 500 level graduate content course. Permission of the instructor is required.
Prerequisites: SCI 251 or SCI 262 or SCI 364; junior standing or permission of the instructor
Session Cycle: Fall
Yearly Cycle: Varies.

SCI 463. Issues in Environmental Science. 3 Credit Hours.
This course provides an understanding of current environmental problems and a familiarity with innovative developments to solve them. Current issues from the following subject areas will be discussed: climate change, energy, land degradation, air and water quality, population growth, resource depletion, and wildlife management. Guest speakers will describe their work and provide insight on specific environmental issues and the future of the environmental science field. Students will research proposed solutions to various current environmental problems and evaluate their potential effectiveness. For qualified students, this course may be taken as a 500 level graduate content course. Permission of the instructor is required.
Prerequisites: 200-level science course
Session Cycle: Spring
Yearly Cycle: Alternate Years.

SCI 464. Biomarkers and isotope Signals. 3 Credit Hours.
This course provides an in-depth understanding of state-of-the-art isotope technologies and their applications in the environmental sciences. Both theoretical and experimental aspects will be examined, with emphasis on current issues surrounding compound-specific isotope geochemistry, and how these isotope techniques are used in different scientific disciplines and their impact on a student's future environmental career will also be emphasized. Additionally, the course will explore how technical skills and knowledge about isotope chemistry can be utilized in different environmental assessments. For qualified students, this course may be taken as a 500 level graduate content course. Permission of the instructor is required.
Prerequisites: Two of the following: SCI 251 and lab; SCI 264 and lab; SCI 265 and lab; and Junior standing or permission of instructor
Session Cycle: Varies
Yearly Cycle: Varies.

SCI 465. Green Technology for Sustainability. 3 Credit Hours.
Chemical processes provide valuable products and materials in various industries ranging from health care to transportation and food processing, yet they generate substantial quantities of wastes and emissions, which cost tens of millions of dollars annually to safely manage. This course investigates cost-effective utilization of chemical processes in ways that minimize pollution at the source and reduce impact on health and the environment, by creating sustainable systems in manufacturing, transportation, building, and energy production. Environmental risk-based costs and benefits are also explored, including the rationale, benefits, and implementation problems of green technology innovations. Experimental exercises will be integrated into the course to reinforce lecture topics. For qualified students, this course may be taken as a 500 level graduate content course. Permission of the instructor is required.
Prerequisites: 200 level science course
Session Cycle: Fall
Yearly Cycle: Alternate Years.

SCI 466. Global Health Challenges. 3 Credit Hours.
This course will explore the unique global health challenges we are facing today. As the world becomes increasingly globalized, the status of health worldwide has begun to decline. This course will present some of the complexities facing the global health community from a variety of perspectives. A brief history of global health will be given, with particular attention to environmental degradation, especially the correlation between these changes and adverse effects of health and disease transmission. Social issues including literacy and cultural values will also be discussed in relation to effects on health. Selected communicable diseases and zoonotic and emerging diseases will be highlighted, along with current efforts to stop the spread of these diseases within the global community. Selected epidemiological studies will be emphasized to ensure that students are able to comprehend and appraise research in this field. For qualified students, this course may be taken as a 500 level graduate content course. Permission of the instructor is required.
Prerequisites: One of the following courses: SCI 251, SCI 351, SCI 356, SCI 362 or SCI 377, and junior standing or permission of the instructor
Session Cycle: Fall
Yearly Cycle: Varies.

SCI 470. Immunity and Disease. 3 Credit Hours.
This course will provide a broad introduction to the rapidly advancing study of immunity and disease. Starting with a survey of basic immunological principles, the course will explore the importance of the molecular and cellular factors involved in immune responses. Key methodologies used by immunologists and the practical applications of this research for the medical community will be discussed, causes of autoimmune disorders.
Prerequisites: SCI 251 or SCI 366 or SCI 377 or permission of instructor
Session Cycle: Fall
Yearly Cycle: Varies.

SCI 475. On-Site Environmental Study in China. 3 Credit Hours.
This course provides basic scientific information behind environmental issues in the larger context of cross-cultural differences between the U.S. and other countries. Using China as an example, this course offers an in-depth look into the environmental challenges that the country is facing with an emphasis on current environmental issues. Students will learn how to assess scientific data behind environmental debates and will examine how environmental issues are connected to society and business.
Prerequisites: At least one science course and one China- related course or permission of the instructor and junior standing
Session Cycle: Summer
Yearly Cycle: Varies.

SCI 490. Research Directed Study in Science. 3 Credit Hours.
This course is designed to refine the research interests of departmental majors, and to gain additional hands-on research skills, including experimental design, methodology, and exposure to technology and instrumentation appropriate for a more extensive research project. Direct interaction of faculty and students will be required, and students will be matched with a faculty member most closely aligned with his/her research interests. The end product of this study will be a scientific paper describing a literature search, precise methodology, data analysis, and discussion of the research. An oral presentation of the research results will be expected, and the paper will be evaluated for publication in an appropriate journal.
Prerequisites: SCI 390 and senior standing or permission of the department chair.

SCI 497. Directed Study in Science. 3 Credit Hours.
This course is tailored to fit the unique interests of a student interested in science. Faculty and student will design a program for the study of complex issues of science and/or technology, including technical applications of scientific methodology and basic applied research into existing scientific problems, including regular meetings throughout the semester. The end product of this study would be a paper describing the results of the investigation, including methodology and data that have been generated, or the equivalent.
Prerequisites: approval of supervising faculty member and department chair.

SCI HS300. Honors Special Topics in Science Application of Brain Science. 3 Credit Hours.
The human brain is very good at recognizing patterns. We are able to learn new faces and languages, and are able to work in complex environments easily. Brain models have been able to capture some of these features, and are continually giving us a better understanding of the workings of the brain. In this course we look at applications of these models on non-biological problems. For example, Google uses brain modeling techniques in some of its data analysis, and neural networks are used in automobiles and factories. Netflix has an ongoing contest to improve their ratings system, the winners of previous contests have used models inspired from the brain. This course will explore these, and other, applications of these models in data analysis problems in finance, marketing, science, economics, and other fields.
Prerequisites: Honors Program and 200-level science course.

SCI L251. Biology I Laboratory. 1 Credit Hour.
This laboratory course is intended to complement the General Biology lecture course. Familiarity with a variety of organisms, techniques, and concepts is obtained through a direct, hands-on approach.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course and will also fulfill the laboratory requirement
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI L253. Biology II Laboratory. 1 Credit Hour.
This course is intended as a higher level biology laboratory course, and will be essential for students intending to pursue advanced graduate or professional training in biomedical fields. Building on the foundations of biological science covered in General Biology – SCI 251 and Biology II – SCI 253, this laboratory course will use evolutionary theory as an organizing theme to explore biodiversity, animal and plant biology, human anatomy and physiology, immunology, hormone regulation, and vaccine development .
Pre/Corequisites: this course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course; fulfills the laboratory requirement
Prerequisites: SCI 251 and SCI L251
Session Cycle: Spring
Yearly Cycle: Annual.

SCI L262. Physical Geology Laboratory. 1 Credit Hour.
This laboratory course complements Physical Geology. Familiarity with minerals, igneous, sedimentary, and metamorphic rocks will be gained through hands-on activities. Other exercises include plotting of earthquake epicenters and map reading.
Pre/Corequisites: this course many only be taken concurrently with the lecture course or in a subsequent semester to the lecture course and fulfills the laboratory requirement
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI L263. Astronomy Laboratory. 1 Credit Hour.
This laboratory course consists of a series of exercises and term projects designed to give the student an appreciation of the heavens and modern developments in astronomical science. The exercises will duplicate as closely as possible the research conducted by contemporary astronomers, using real data and similar types of analyses. A trip to an observatory is included in the course.
Pre/Corequisites: this course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course; fulfills the laboratory requirement
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI L264. Physics I Laboratory. 1 Credit Hour.
This laboratory course is designed to provide a better understanding of the physical principles studies in the lecture course. The work done here provides an opportunity to become familiar with the scientific methods of making experimental measurements and evaluating the results of these measurements.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course; fulfills the laboratory requirement
Session Cycle: Spring
Yearly Cycle: Annual.

SCI L265. Chemistry I Laboratory. 1 Credit Hour.
Laboratory experimentation is the foundation of the science of chemistry. The "hands-on" experiments performed in this course will illustrate the principles, theories, and laws discussed in the lecture portion of the course.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course; fulfills the laboratory requirement
Session Cycle: Fall
Yearly Cycle: Annual.

SCI L267. Chemistry II Laboratory. 1 Credit Hour.
This course completes a two (2) semester introductory chemistry sequence (lecture plus lab), and will enhance a student's preparation for further study in the environmental and life sciences at Bryant. Recommended for Science and Technology majors/concentrators, and who plan to enter an industry or field of study where a general knowledge of chemistry is essential, such as the health professions (medical, pharmaceutical, dental) and graduate school in the biological sciences. This laboratory course will present practical applications of inorganic chemistry, thermodynamics, kinetics, and spectroscopy, and will coincide with the Chemistry II lecture.
Pre/Corequisites: This course may be only taken concurrently with the lecture course or in a subsequent semester to the lecture course; fulfills the laboratory requirement
Session Cycle: Spring
Yearly Cycle: Annual.

SCI L274. Physics II Laboratory. 1 Credit Hour.
This laboratory course consists of a series of exercises and term projects designed to give the student a quantitative understanding of experimental biological physics. The course follows Socratic methodology wherever possible to allow the students to gain a strong intuition even for concepts that are challenging. Data analysis techniques will be covered, as well as the use of technology in the gathering and interpretation of issues related to biological physics.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course; and fulfills the laboratory requirement
Session Cycle: Fall
Yearly Cycle: Alternate Years.

SCI L287. Weather and Natural Disasters Laboratory. 1 Credit Hour.
In this lab course students will gain a hands-on understanding of the methods used in the prediction, modeling, and impact of weather-related natural disasters. Data analysis techniques will be covered, as well as the use of technology in the gathering and interpretation of issues related to natural disasters. The lab will focus on data measurement and uncertainty, and will also include a covering of climate models, their uses and limitations.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course. This course fulfills the laboratory science requirement
Session Cycle: Fall
Yearly Cycle: Alternate Years.

SCI L351. Ecology Laboratory. 1 Credit Hour.
This laboratory complements the Ecology: Theory and Applications lecture course. Ecosystem dynamics, including assessment of biotic and abiotic components, population growth patterns, species diversity and perturbation responses will be emphasized. Techniques and equipment commonly employed by professional ecologists will be stressed, using field studies, laboratory investigations, computer simulation, lab demonstrations, and site visits.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course; fulfills the laboratory requirement
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI L355. Energy Management Strategies Lab. 1 Credit Hour.
This laboratory course complements Energy Management Strategies. Familiarity with a variety of non-renewable and renewable resources will be gained through hands-on activities. Exercises include evaluation of fossil fuel efficiency, computer simulations of resource allocation, and the design of a solar house.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course; fulfills the laboratory requirement
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI L356. Biotechnology Laboratory. 1 Credit Hour.
This laboratory course will provide a hands-on approach to examine topics such as genes and genomes, genetic manipulation, microbial biotechnology, plant and animal biotechnology, forensics, medical and environmental biotechnology to accompany the material covered in the Introduction to Biotechnology course. Students will gain a greater knowledge of the techniques currently used researchers in the biotech field.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course: fulfills the laboratory requirement
Session Cycle: Fall, Spring
Yearly Cycle: Varies.

SCI L360. Anatomy and Physiology Laboratory I. 1 Credit Hour.
This laboratory component of Anatomy and Physiology I course will enable students to become familiar with anatomical structures at their own pace, using a hands-on approach. The laboratory exercises will include studies of 3-dimensional models and prepared slides, dissections of isolated organ systems, and observation of a virtual cadaver dissection, which will enable students to examine detailed structural features of key organs and systems, and better appreciate how the various body systems integrate. This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course: fulfills the laboratory requirement.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course. This course fulfills the laboratory science requirement
Session Cycle: Fall
Yearly Cycle: Annual.

SCI L363. Genetics Laboratory. 1 Credit Hour.
This laboratory course accompanies the Genetics lecture course which is intended to provide the fundamental basics of inheritance as well as to integrate modern uses of genetics in biotechnology and genomics. Topics will include basic inheritance patterns, reproduction, chromosomal replication, and the role of genetics in the development of various diseases. Students will be able to track inheritance patterns to determine risk of the occurrence of disease using hands-on techniques such as genetic karyotyping, generation of Punnett squares and DNA fingerprinting analyses.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course: fulfills the laboratory requirement
Session Cycle: Fall
Yearly Cycle: Alternate Years.

SCI L365. Organic Chemistry I Laboratory. 1 Credit Hour.
This laboratory course will accompany the Organic Chemistry lecture course. Laboratory activities are based primarily on the study of carbon-containing compounds. Students will be given the opportunity to carry out reactions covered in the lecture course. In addition, the basic techniques required for performing organic chemistry research will also be learned, utilizing state of the art equipment, and the importance of organic chemistry to biology and environmental science will be emphasized.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course: fulfills the laboratory requirement
Session Cycle: Fall
Yearly Cycle: Alternate Years.

SCI L371. Human Impact on Land and Life Laboratory. 1 Credit Hour.
This advanced laboratory course investigates a number of environmental topics pertaining to land and life. Interactive activities and experiments convey basic concepts of data collection, experimental design, analytical instrumentation, data analysis and interpretation, and risk assessment. These laboratory exercises also provide the necessary laboratory skills and techniques to conduct scientific research.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course; fulfills the laboratory requirement
Session Cycle: Spring
Yearly Cycle: Annual.

SCI L372. Sustaining Air and Water Laboratory. 1 Credit Hour.
This advanced laboratory course investigates a number of environmental topics pertaining to air and water. Interactive activities and experiments convey basic concepts of data collection, experimental design, analytical instrumentation, data analysis and interpretation, and risk assessment. These laboratory exercises also provide the necessary laboratory skills and techniques to conduct scientific research.
Pre/Corequisites: The course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course; fulfills the laboratory requirement
Session Cycle: Fall
Yearly Cycle: Annual.

SCI L373. Artificial Intelligence and Robotics Laboratory. 1 Credit Hour.
SCI L373 is the laboratory portion of artificial intelligence and robotics. This lab must be taken concurrently with the lecture portion.
Session Cycle: Fall
Yearly Cycle: Alternate Years.

SCI L374. Organic Chemistry II Laboratory. 1 Credit Hour.
This laboratory course is the second in a two-semester organic chemistry progression. This course will use a self-directed curriculum to teach and reinforce topics and concepts in organic chemistry and build critical thinking skills. This course will employ microwave assisted organic synthesis, collaborative experimental design, analysis and debriefing of results. This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course; fulfills the laboratory requirement.
Prerequisites: SCI L365
Session Cycle: Spring
Yearly Cycle: Annual.

SCI L376. GIS for Environmental Decision Making Laboratory. 1 Credit Hour.
This laboratory will accompany the GIS for Environmental Decision Making course, which is designed to provide an overview of Geographic Information Systems (GIS), widely used by geologists, hydrologists, oceanographers, community planners and environmental engineers, utilizing diverse computer hardware and software applications. The lab will utilize GIS hardware and software to examine problems and challenges confronted by environmental decision makers, including land use planning, facility citing, resource management, conservation strategies, public health issues, and transportation planning. This course will consider how GIS applications are structured, what types of mapping data can be processed, and what customized products can be generated.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course; fulfills the laboratory requirement
Session Cycle: Fall, Spring
Yearly Cycle: Annual.

SCI L377. Microbiology Laboratory. 1 Credit Hour.
This laboratory course accompanies the Microbiology lecture course, which examines life at the microscopic level and is designed to provide an understanding of microbiology and its connectedness to the environment, medicine, agriculture, and industry. Topics will include exploration of the world of bacteria, viruses, protista, and fungi, preservation and safety; the role of microbes in biotechnology, industry, and agriculture, antibiotic resistance, viral and bacterial diseases of humans, and the use of microbes or microbial products in bioterrorism.
Pre/Corequisites: this course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course; fulfills the laboratory requirement
Session Cycle: Spring
Yearly Cycle: Annual.

SCI L380. Anatomy and Physiology Lab II. 1 Credit Hour.
This laboratory component of Anatomy and Physiology II course will serve as a continuance of Anatomy and Physiology I Lab, which will enable students to study in more depth the various human body systems. The laboratory exercises will include studies of 3-dimensional models and prepared slides, dissections of isolated organ systems, and observation of a virtual cadaver dissection, which will enable students to examine detailed structural features of key organs and systems, and better appreciate how the various body systems integrate.
Pre/Corequisites: This course may only be taken concurrently with the lecture course or in a subsequent semester to the lecture course: fulfills the laboratory requirement. Sophomore standing required
Session Cycle: Spring
Yearly Cycle: Annual.

SCI ST400. Special Topics in Science Environmental Investigation and Remediation. 3 Credit Hours.
We continue to pollute air and water, degrade soil and threaten wildlife. This course describes the thought process and necessary analytical steps to remediate outdoor environmental problems, such as contaminated air and water, wetland degradation, endangered species, and indoor environmental challenges resulting from asbestos, lead paint, and toxic molds. Field trips to superfund sites, wildlife sanctuaries, government laboratories, and environmental advocacy organizations, along with guest speakers from government, corporate, NGOs, and the environmental consulting industry will prepare students for completing a semester-long “environmental consulting” project that will demonstrate the progression of investigation and remediation activities through field sampling, laboratory analysis using advanced scientific instrumentation, data interpretation, and mitigation recommendations.
Prerequisites: 200-level science course
Session Cycle: Spring
Yearly Cycle: Varies.