

# DEPARTMENT OF BIOLOGICAL AND BIOMEDICAL SCIENCES

## Biological and Biomedical Sciences Department

The Biological and Biomedical Sciences 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 three 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, pre-health, and environmental biology. 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.

### 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 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 course 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.

## Exercise and Movement Science Major

Students who earn a B.S. in Exercise and Movement Science will be prepared to sit for the national Certified Strength and Conditioning Specialist exam. Graduates will be prepared to work in a wide array of fitness and athletic settings and will develop a framework to understand and analyze human movement, incorporating an appreciation of the overlapping influences from anatomical, physiological, psychological, and neurological factors. All students will complete an internship to gain experience in a setting that aligns with their future career goals. Two tracks of study are available. The Applied Exercise and Coaching track is designed for students who wish to enter the workforce after graduation, while the Healthcare Provider Prep track is designed for students who wish to build upon their knowledge by pursuing a graduate degree in a healthcare or medical field.

### *Description of the Tracks within the Major:*

#### **Applied Exercise and Coaching Track:**

This track will allow students to broaden their perspective on health and fitness, enhancing their ability to lead individuals and groups in fitness/performance related activities as a coach or exercise specialist. Students can choose any minor from the college of business for this track.

#### **Healthcare Provider Prep**

This track will prepare students for graduate level studies in a variety of different healthcare programs including physical therapy. Students can choose any minor from the college of business for this track.

## Forensic Science Minor

This minor is intended for students interested in exploring 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, DNA analysis, pharmaceutical science, or medical studies. Students will examine the specialized roles of each member of the forensic team, such as law enforcement, medical, and scientific experts.

## Health and Wellness Concentration

The health and wellness industries continue to grow in response to some prominent challenges such as the rising incidence of many chronic diseases, soaring healthcare costs, and the mental health crisis. In this concentration of study, students will develop information literacy skills by locating and analyzing scholarly literature related to health and wellness. Students will develop critical thinking and problem-solving skills as they work collaboratively to consider solutions to some of the biggest problems in today's health arena. Depending which courses are chosen from the approved list for this minor, students may also have the opportunity to: 1) utilize equipment in the analytical science lab and the EMS lab, 2) explore global impacts of health issues, 3) understand preventative health promotion strategies in the area of nutrition, 4) utilize strength and conditioning to promote health and wellness, and/or 5) analyze and understand healthcare from a business/industry standpoint. This concentration of study provides students with a broad-based understanding of the contemporary issues surrounding health and wellness from a healthcare and industry standpoint and aims to provide a practical skill set to support any career involving the industries of health and wellness.

## Health and Wellness Minor

There are many barriers to the maintenance of health and wellness in today's society. Challenges include the rising incidence of many chronic diseases, soaring healthcare costs, and the mental health crisis. In this minor of study, students will gain exposure to information literacy techniques through locating and analyzing scholarly literature related to health and wellness. Students will develop critical thinking and problem-solving skills as they work collaboratively to consider solutions to some of the biggest problems in today's health arena. Depending which courses are chosen from the approved list for this minor, students may also have the opportunity to: 1) utilize equipment in the analytical science lab and the EMS lab, 2) explore global impacts of health issues, 3) understand how to utilize preventative health promotion strategies such as exercise and nutrition, and/or 4) analyze and understand healthcare from a business/industry standpoint.

## Nutrition Minor

Students who complete the minor in nutrition will study the connection between nutrition, health, human performance, and disease. An evidence-based approach will be taken to covering topics such nutrient requirements, weight control, nutritional supplements, popular diets, as well as causes and treatments of eating disorders. Emphasis will be placed on critically analyzing nutritional claims in the marketplace. Through participation in the required laboratory course, students will develop practical skills to assess nutritional status, and to create a nutritional intervention plan to optimize health and human performance.

## Strength and Conditioning Concentration

Students who complement their studies with a Strength and Conditioning Concentration will develop knowledge and hands-on skills related to human structure, physical and physiologic function, as well as training techniques to enhance human fitness and performance. Students also have the option to customize their path of study to include additional learning about health and human disease, nutrition, sports psychology,

and/or management principles in fitness and athletics. This practical skill set in the field of exercise can be useful to meet personal and/or career-related goals.

## Strength and Conditioning Minor

Students who enroll in the Strength and Conditioning minor will develop practical knowledge and hands-on skills related to exercise, which can be useful to meet personal and/or career-related goals. Students will have exposure to content such as the structure and movement of the human body, the body's physiologic response to physical activity, measures of human fitness, as well as training techniques to enhance human fitness and performance.

## Sustainability and Climate Action Concentration

The Sustainability and Climate Action concentration empowers students to examine critical sustainability issues across business, healthcare, and environmental sectors. This program provides a robust framework for understanding how climate action intersects with organizational practices and consumer expectations, including emissions disclosures, greenhouse gas accounting, waste circularity, ESG, greenwashing, and nature-based solutions.

Students will delve into the strategic environmental frameworks that are increasingly essential in today's marketplace, where businesses are held accountable for their sustainability efforts. This concentration not only enhances students' technical expertise in their primary fields—such as marketing, finance, or healthcare—but also equips them with the skills to integrate sustainability into business operations effectively.

Through hands-on projects and real-world applications, students will practice applying their knowledge to enhance business practices, leading to improved outcomes for consumers, increased profitability, and a positive impact on the environment. By fostering innovative solutions and responsible decision-making, this concentration prepares students to become leaders who drive meaningful change in their organizations and communities.

Ultimately, the concentration in Sustainability and Climate Action inspires students to align their career aspirations with a commitment to sustainability, contributing to a future that balances economic success with environmental stewardship.

## Sustainability and Climate Action Minor

The Sustainability and Climate Action minor offers students a foundational understanding of sustainability issues as they relate to business, healthcare, and the environment. This program emphasizes the importance of integrating sustainability into various organizational practices, preparing students to meet the growing demand for environmentally responsible decision-making.

Students will explore key concepts in sustainability and climate action, such as emissions disclosures, greenhouse gas accounting, waste circularity, and nature-based solutions, while gaining practical skills to enhance business operations in ways that benefit consumers, increase profitability, and support environmental stewardship. Through hands-on projects and case studies, the minor equips students to contribute to sustainable practices within their primary fields of study.

This minor inspires students to align their career goals with a commitment to sustainability, fostering responsible leadership for a better future.

### Faculty

#### Department Chair

Jennifer Hurrell

#### Clinical Associate Professor

Jennifer Hurrell

#### Professor

Brian Blais

#### Professor

Kirsten Hokeness

#### Professor

Qin Leng

#### Professor

Christopher Reid

#### Professor

Hong Yang

#### Assistant Professor

Steven Weicksel

#### Lecturer

Stephanie Mott

#### Lecturer

Robert Patalano

#### Lecturer

Dania E. Whitaker

## Majors

- Bachelor of Science with a Biology Major
- Bachelor of Science with an Exercise and Movement Major

## Concentrations

- Biology Concentration
- Environmental Science Concentration
- Health and Wellness Concentration
- Strength and Conditioning Concentration
- Sustainability and Climate Action Concentration

## Minors

- Biology Minor
- Biotechnology Minor
- Chemistry Minor
- Environmental Science Minor
- Forensic Science Minor
- Health and Wellness Minor
- Nutrition Minor
- Strength and Conditioning Minor
- Sustainability and Climate Action 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 252. Medical Terminology. 1 Credit Hour.

This one-credit course introduces medical terminology for students entering health professions as well as other fields such as law, insurance, technology development, billing, and sales. It starts with an introduction to word parts building medical terms, instruction in organization of the body, directional terms, and abbreviations. A general overview of functions, pathology, and medical management will be provided for the major organ systems in the body.

Session Cycle: Fall.

### 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 cyclicity 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: Fall

Yearly Cycle: Annual.

### SCI 265. Introductory Chemistry I. 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. 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 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 269. Climate Change. 3 Credit Hours.

This lecture course will both satisfy the science requirement in Bryant's General Education (Gen Ed) Curriculum and serve as an introduction to the most pressing issue and the most challenging crisis that humans now face—climate change. It will provide students with the fundamental scientific knowledge to help them understand the causes of climate change, the factual information on the immediate and lasting impacts on land and life, and the possibilities and innovations to mitigate and remediate climate-related disasters.

Session Cycle: Fall and Spring.



**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: Spring

Yearly Cycle: Annual.

**SCI 275. Introduction to Healthcare: Clinical and Business Perspectives. 3 Credit Hours.**

This course provides a broad-based introduction to the delivery of healthcare, as well as the growing and ever-changing healthcare industry. Students will become familiar with a variety of health professions and the importance of an interdisciplinary healthcare team. Topics such as documentation, DEI in healthcare, as well as social determinants of care will be discussed. The healthcare sector will be examined from a business standpoint, with an emphasis on insurance carriers, reimbursement, marketing, regulatory affairs, as well as other political and economic factors. The topic of biomedical ethics will be a theme that carries through the entire course.

**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, SCI 266, or SCI 268, or permission of the instructor

Session Cycle: Fall, Spring

Yearly Cycle: Annual.

**SCI 352. Exercise Physiology. 3 Credit Hours.**

This course examines exercise from a scientific standpoint by analyzing the acute responses and chronic adaptations of the human body during aerobic and anaerobic exercise challenges, related to endurance and strength training. Emphasis is placed on bioenergetics as well as the mechanism for exercise related responses and adaptations in the musculoskeletal, pulmonary, cardiovascular, and endocrine systems. Students are encouraged to register for the optional SCI L352 Exercise Physiology Lab course during the same semester as the lecture course.

Pre/Corequisites: SCI 352

Prerequisites: SCI 251- Biology I Principles of Biology

Session Cycle: Spring

Yearly Cycle: Annual.

**SCI 353. Human Muscles and Movement. 3 Credit Hours.**

This course leads students through an examination of the skeletal system, the joints, and the major muscles within the human body. Muscle actions will be determined through an analysis of their attachment points, line of pull, and orientation to the joint(s) they cross. Students will learn what joint positions place muscles on stretch, and what joint motions occur during various muscle contractions. Functional activities and common exercises will be analyzed to identify what muscles are contracting and what other forces may be influencing movement.

NOTE: This course is designed for students outside the Exercise and Movement Science major, and students may not receive credit for SCI 353: Human Muscles and Motion if they have or will receive credit for SCI 387: Functional Musculoskeletal Anatomy and/or SCI 381: Kinesiology. Prerequisites: SCI 251.

**SCI 354. Fundamentals of 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 Strategies for a Sustainable World. 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 359. Artificial Intelligence (AI) in Healthcare. 3 Credit Hours.**

This course introduces artificial intelligence (AI) from the perspective of its application to healthcare. The course focuses on applied techniques in AI, drawing from a collection of case-studies chosen to be both approachable and current. A working proficiency in Python is helpful, but the course will review and workshop the necessary programming skills for those with little or no programming background. The course will also include support programming libraries to make the technical aspects more approachable. By exploring case-studies, and applied techniques to real data sets, students will gain both the practical skills of implementing the methods of AI in healthcare and the necessary understanding of how the methods work. In this way, students will be able to approach new methods of AI as they are developed in this fast-paced field with the confidence that they can understand both the strengths and weaknesses of AI.

Session Cycle: Every Spring.

**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 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 371. Human Impact on the Global Environment. 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 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 Health, Business, and the Environment. 3 Credit Hours.**

This course will demonstrate how Geographic Information Systems (GIS) can be used to help build efficiency and solve real-world problems in the health, environmental, and business industries. This course will focus on contemporary GIS data management, the structure of GIS applications, the types of mapping data that can be processed, and the types of customized products that can be developed. Case studies will be used to develop career-related skills such as utilizing GIS data to improve decision making, generating data visualization, and presenting findings to stakeholders. Through project-based learning, students will have the opportunity to utilize GIS tools within their individual fields of interest.

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 I. 3 Credit Hours.**

This course is part one of a two-part series that will prepare students to take the National Registry examination for Emergency Medical Technicians (EMT). Students will learn the basic life support skills needed to stabilize and safely transport sick or injured patients who have accessed the emergency medical services (EMS) system. Specific skills covered in this class include an overview of the EMS system and work force, medical legal issues, documentation, patient assessment, pharmacology, lifting and moving, airway management and respiratory emergencies, trauma, management of bleeding and shock, as well as management of acute disorders of the genitourinary, cardiovascular, neurological, gastrointestinal and urological systems.

Prerequisites: SCI 251 Corequisite: SCI L379

Session Cycle: Alternate Fall Semesters.

**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 provide 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.**

This course will examine human movement by studying the relationship between human structure and function. Normal and abnormal movement patterns will be defined in the context of osteokinematic and arthrokinematic motions. Consideration will be given to the internal and external forces that cause or resist human movement. Emphasis will be placed on joint biomechanics during stretching, functional activity, and resistance exercise, as well as the biomechanical factors that influence human strength and power.

Prerequisites: SCI 387

Session Cycle: Fall

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 384. Emergency Medical Technician II. 3 Credit Hours.**

This course is part two of a two-part series that will prepare students to take the National Registry examination for Emergency Medical Technicians (EMT). Students will learn the basic life support skills needed to stabilize and safely transport sick or injured patients who have accessed the emergency medical services (EMS) system. Specific skills covered in this class include management of patient exposed to hazardous materials, poisons, or allergens, endocrine and hematologic disorders, behavioral health crises, vehicular extractions, managing mass casualty incidents, special rescues (i.e. water), and managing special populations such as obstetrics, neonatal, pediatrics, geriatric, and patients with other special needs.

Prerequisites: SCI 379, SCI L379 Corequisites: SCI L384

Session Cycle: Alternate Spring Semesters.

**SCI 386. Sports Nutrition. 3 Credit Hours.**

This course examines the role that professionals in the exercise industry play in promoting optimal nutrition to optimize human health, athletic performance, and recovery. Analysis of nutrient requirements before, during, and after exercise will be explored from an evidence-based bioenergetics standpoint. The use of nutritional supplements, popular diets, weight control, and causes and treatment of eating disorders will be explored. Consideration will also be given to how hormone action, performance enhancing substances, alcohol and tobacco influence an athlete's performance.

Prerequisites: SCI 251 Biology I (with lab)

Session Cycle: Fall

Yearly Cycle: Annual.

**SCI 387. Functional Musculoskeletal Anatomy. 3 Credit Hours.**

A thorough understanding of functional musculoskeletal anatomy is necessary to become an expert in human movement and exercise. This course uses a regional approach to studying the anatomical structures that create both stability and movement in the human body, including muscles, bones, joints, and connective tissue. The function of individual muscles will be examined based on their anatomical attachment points.

Prerequisites: SCI 360 Anatomy and Physiology I (with lab)

Session Cycle: Spring

Yearly Cycle: Annual.

**SCI 388. Field Experience I. 3 Credit Hours.**

This course is the first of two field experiences in the Exercise and Movement Science program. During this field experience students spend 150 hours in an exercise science/wellness setting that meets Bryant's Exercise and Movement Science program requirements. This field experience provides students with the opportunity to gain real-world experience and to apply scientific and ethical principles learned in the classroom in an authentic environment.

Prerequisites: SCI 381, SCI L381: Kinesiology (with lab), SCI 471 and SCI L471: Exercise Testing and Prescription (with lab)

Session Cycle: Every Fall Semester.

**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 392. Real World Applications for Sustainability and Climate Action. 3 Credit Hours.**

This course presents a comprehensive assessment of environmental policy, emphasizing the interrelationship between science, business, and governance for mitigating climate change impacts. The course is enriched by hands-on learning experiences during domestic travel to facilities and locations dedicated to the conservation of biodiversity, achieving sustainable growth policies that encompass economic realities, or the development of technological and methodological innovations in sustainability. The course includes a semester long, student-designed research project. Depending on the destination, travel will occur either during spring break or during the week following the end of the spring semester. Expenses for the travel portion are in addition to the tuition for the course.

Prerequisites: SCI 268, or SCI 269, or permission of the instructor

Session Cycle: Every Spring.

**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 401. Fundamentals of Strength and Conditioning. 3 Credit Hours.**

This course provides a broad-based exposure to the theory and practice of strength training and physical conditioning. Current evidence will be presented for designing and optimizing aerobic exercise and anaerobic exercise programs, including cardiovascular training, resistance training, and functional exercise for strength, agility, balance and coordination. The impact of program design and periodization on physical performance will be explored. Injury prevention, including the use of warm up programs and stretching will also be covered. NOTE: This course is designed for students outside the Exercise and Movement Science major, and students may not receive credit for SCI 401 Fundamentals of Strength and Conditioning if they have or will receive credit for SCI 476: Principles of Strength and Conditioning I and/or SCI 477: Principles of Strength and Conditioning II.

Prerequisites: SCI 251, and (SCI 353 OR SCI 381).

**SCI 402. Current Topics in Nutrition. 3 Credit Hours.**

This course presents an overview of current topics in nutrition for health and disease. Students will review and critically evaluate a wide variety of topics in nutrition. Examples include emerging techniques to assess nutrient intake, advancements in food technology to improve nutrient quality and reduce environmental impact, and upcoming policy change that will impact our food environment. A major focus will be placed on nutritional interventions to prevent, reverse, or manage the most common chronic metabolic conditions including obesity, diabetes, and cardiovascular disease.

Prerequisites: SCI 354 or SCI 386

Session Cycle: Spring

Yearly Cycle: Annual.

**SCI 403. Innovations for Sustainable Futures. 3 Credit Hours.**

As climate change alters ecosystems and impacts lives globally, immediate action is essential for a sustainable future. "Innovations for Sustainable Futures" takes an interdisciplinary approach to explore the climate crisis—its history, current challenges, and future projections. The course evaluates energy use, economic development, technological innovations, and lifestyle adaptations. Through readings and discussions, students will gain insights into the scientific, technical, and socio-economic factors that underpin renewable energy solutions. Engaging in debates and group projects, students will analyze climate data and develop creative, economically viable strategies for sustainable, ethical, and equitable responses. This course aims to inspire imaginative actions toward a low-carbon future.

Prerequisites: SCI 268, or SCI 269

Session Cycle: Every Fall.

**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 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 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. 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 especially for 500 level graduate course content  
Session Cycle: Fall  
Yearly Cycle: Varies.

**SCI 467. Management Principles in Fitness and Athletics. 3 Credit Hours.**

This course will examine the administrative principles associated with development, maintenance and operation of a fitness or sports organization in the public or private sector. Organizational business structures, equipment, staffing, as well as ethical, legal and economic considerations will be explored. Factors related to emergency planning and response will also be presented. One business course and one marketing course at the 200-level or above are recommended before taking this course.  
Prerequisites: Junior standing  
Session Cycle: Fall  
Yearly Cycle: Annual.

**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 471. Exercise Testing and Prescription. 3 Credit Hours.**

This course will review how to select appropriate field-based and laboratory-based exercise testing techniques for assessing cardiorespiratory fitness, muscular strength and endurance, flexibility, and body composition. Students will learn how to score and interpret exercise test results. Emphasis will also be placed on creating individual and group exercise prescriptions and training programs for healthy and special populations based upon findings.  
Prerequisites: SCI 251 General Biology I (with lab), SCI 360 Anatomy & Physiology I (with lab), SCI 380 Anatomy & Physiology II (with lab), SCI 352 Exercise Physiology, SCI 387 Functional Musculoskeletal Anatomy SCI 381 Human Kinesiology (with lab)  
Corequisites: SCI L471 Exercise Testing and Prescription Lab  
Session Cycle: Spring  
Yearly Cycle: Annual.

**SCI 476. Principles of Strength and Conditioning I. 3 Credit Hours.**

This course will review the scientific principles behind designing safe and effective aerobic exercise and resistance training programs. Strengthening with free weights, machine training, and Olympic style lifting will be covered. Methods for integrating warm up activities, designing stretching programs, and for optimizing physical performance through program design and periodization will be explored. An overview of the physiologic principles that govern tissue injury and healing, and introduction of the basic tenants of injury prevention will also be provided.  
Prerequisites: SCI 251/L Biology I (with lab), SCI 360 Anatomy & Physiology I (with lab), SCI 380 Anatomy & Physiology II (with lab), SCI 352 Exercise Physiology, SCI 387 Functional Musculoskeletal Anatomy, SCI 381 Human Kinesiology (with lab)  
Corequisites: SCI L476: Principles of Strength and Conditioning I Lab  
Session Cycle: Fall  
Yearly Cycle: Annual.

**SCI 477. Principles of Strength and Conditioning II. 3 Credit Hours.**

This course will review the scientific principles behind designing safe and effective anaerobic exercise and functional strengthening programs. The use of balance, core stabilization, coordination, agility, and plyometric activities will be explored, as well as nontraditional techniques such as blood flow restriction training. Application of rehabilitation and reconditioning principles after musculoskeletal injury and concussion will be introduced. In addition, exercise considerations for special populations such as children, older adults and the female athlete will be discussed.  
Prerequisites: SCI 251 Biology I (with lab), SCI 360 Anatomy & Physiology I (with lab), SCI 380 Anatomy & Physiology II (with lab), SCI 352 Exercise Physiology, SCI 387 Functional Musculoskeletal Anatomy, SCI 381 Human Kinesiology (with lab) & SCI 476 Principles of Strength and Conditioning I (with lab)  
Corequisites: SCI L477: Principles of Strength and Conditioning II Lab  
Session Cycle: Spring  
Yearly Cycle: Annual.

**SCI 488. Field Experience II. 3 Credit Hours.**

This course is the second and final field experience in the Exercise and Movement Science program. During this field experience students spend 150 hours in an exercise science/wellness setting that meets Bryant University's Exercise and Movement Science program requirements. This field experience provides students with the opportunity to gain real-world experience and to apply scientific and ethical principles learned in the classroom in an authentic environment. With guidance from their faculty and field experience supervisor, students also complete a research-based project related to exercise science.  
Prerequisites: SCI 388: Field Experience I  
Session Cycle: Every Spring Semester.

**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 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, 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 studied 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: Fall

Yearly Cycle: Annual.

**SCI L265. Introductory 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. Introductory 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 L269. Climate Change Laboratory. 1 Credit Hour.**

This laboratory course complements the "SCI 269 Climate Change - Causes, Impacts, and Solutions" lecture course. This course will cover topics including weather and climate, natural and human-induced causes of climate change, major impacts of climate change, and possible solutions for climate change mitigation and adaptation. Methods of ancient climate change reconstruction and future climate prediction will be included, providing students a hands-on and experiential learning opportunity to acquire climate change related knowledge.

Pre/Corequisites: SCI 269

Session Cycle: Every Fall and Spring.

**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: Spring

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 L352. Exercise Physiology Laboratory. 1 Credit Hour.**

This laboratory course complements and reinforces the content in the Exercise Physiology lecture course. Students will have the opportunity to perform basic laboratory tests and measurements commonly used in human exercise physiology studies including but not limited to heart rate, blood pressure, EMG, VO<sub>2</sub>, and blood lactate levels. Emphasis will be placed on interpretation of data, and application of knowledge in real-world scenarios related to exercise physiology.

Prerequisites: SCI 251.

**SCI L355. Energy Strategies for a Sustainable World Lab. 1 Credit Hour.**

This laboratory course complements the Energy Strategies for a Sustainable World lecture course. 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: SCI 355

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 the Global Environment Lab. 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 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 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 L379. Emergency Medical Technician I Skills Lab. 1 Credit Hour.**

This lab is part one of a two-part series that will prepare students to take the National Registry examination for Emergency Medical Technicians (EMT). Students will learn the basic life support skills needed to stabilize and safely transport sick or injured patients who have accessed the emergency medical services (EMS) system. Specific skills covered in this class include CPR training, the use of protective equipment, medical documentation, medical and trauma assessment, lifting and moving, airway techniques, medication administration, management of bleeding, and splinting.

Prerequisites: SCI 251 Corequisite: SCI 379

Session Cycle: Alternative Fall Semesters.

**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 L381. Kinesiology Lab. 1 Credit Hour.**

This laboratory course is intended to complement the Human Kinesiology lecture course. Surface palpation of the major bony landmarks and muscles of the trunk and extremities will be performed. Functional analysis of muscle stretching, as well as activation of muscles during concentric and eccentric challenges will be completed. Students will explore the biomechanical forces on the joints during common exercises and explore how changing body position alters the level of resistance that is encountered. An analysis of the mechanics of human gait will also be performed.

Prerequisites: SCI 360 Anatomy and Physiology I (with lab) & SCI 387 Functional Musculoskeletal Anatomy

Corequisites: SCI 381 Human Kinesiology

Session Cycle: Spring

Yearly Cycle: Annual.

**SCI L384. Emergency Medical Technician II Skills Lab. 1 Credit Hour.**

This lab is part two of a two-part series that will prepare students to take the National Registry examination for Emergency Medical Technicians (EMT). Students will learn the basic life support skills needed to stabilize and safely transport sick or injured patients who have accessed the emergency medical services (EMS) system. Specific skills covered in this class include medication administration, management of trauma injuries and medical emergencies, lifting and moving, childbirth and pediatrics, management of mass casualty incidents, and well as other special scenarios.

Prerequisites: SCI 379, SCI L379 Corequisites: SCI 384

Session Cycle: Alternate Spring Semesters.

**SCI L401. Fundamentals of Strength and Conditioning Laboratory. 1 Credit Hour.**

This laboratory course complements the Fundamentals of Strength and Conditioning lecture course. Students will engage in hands-on experiences with exercise equipment while designing and implementing aerobic and anaerobic exercise programs, including cardiovascular training, resistance training using free weights and machines, as well as functional exercise for strength, agility, balance and coordination. Warm up programs and stretching will also be covered. NOTE: This course is designed for students outside the Exercise and Movement Science major, and students may not receive credit for SCI L401 Fundamentals of Strength and Conditioning Lab if they have or will receive credit for SCI L476: Principles of Strength and Conditioning I Lab and/or SCI L477: Principles of Strength and Conditioning II Lab.

Pre/Corequisites: SCI 401

Prerequisites: SCI 251, and (SCI 353 or SCI 381).

**SCI L471. Exercise Testing and Prescription Lab. 1 Credit Hour.**

This laboratory course is intended to complement the Exercise Testing and Prescription lecture course. Laboratory sessions will provide the opportunity for students to practice delivering and scoring field-based and laboratory-based exercise testing techniques for assessing cardiorespiratory fitness, muscular strength and endurance, flexibility, and body composition, as well as measure and interpret vital signs such as heart rate, blood pressure, respiratory rate and oxygen saturation.

Prerequisites: SCI 251 Biology I (with lab), SCI 360 Anatomy & Physiology I (with lab), SCI 380 Anatomy & Physiology II (with lab), SCI 352 Exercise Physiology, SCI 387 Functional Musculoskeletal Anatomy & SCI 381 Human Kinesiology (with lab)

Corequisites: SCI 471 Exercise Testing and Prescription

Session Cycle: Spring

Yearly Cycle: Annual.

**SCI L476. Principles of Strength and Conditioning I Lab. 1 Credit Hour.**

This laboratory course is intended to complement the Principles of Strength and Conditioning I lecture course. Laboratory sessions will provide the opportunity for students to practice designing stretching, resistance training, and aerobic exercise programs, while implementing the principle of periodization. Students will learn to apply progressions and regressions at the appropriate times, and to optimize athletic performance through manipulation of the program design.

Prerequisites: SCI 251 Biology I (with lab), SCI 360 Anatomy & Physiology I (with lab), SCI 380 Anatomy & Physiology II (with lab), SCI 352 Exercise Physiology, SCI 387 Functional Musculoskeletal Anatomy & SCI 381 Human Kinesiology (with lab)

Corequisites: SCI 476: Principles of Strength and Conditioning I

Session Cycle: Fall

Yearly Cycle: Annual.

**SCI L477. Principles of Strength and Conditioning II Lab. 1 Credit Hour.**

This laboratory course is intended to complement the Principles of Strength and Conditioning II lecture course. Laboratory sessions will provide the opportunity for students to practice designing anaerobic, as well as functional strengthening and conditioning programs, with integration of balance, core stabilization, coordination, agility, and plyometric activities. There will also be an opportunity to experience blood flow restriction training and other nontraditional techniques. Students will learn to apply progressions and regressions at the appropriate times, and to optimize athletic performance through manipulation of the program design.

Prerequisites: SCI 251, SCI L251, SCI 352, SCI 360, SCI L360, SCI 380, SCI L380, SCI 387, SCI 381, SCI L381, SCI 476 & SCI L476

Corequisites: SCI 477: Principles of Strength and Conditioning II

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.