

# (SC) SCIENCE

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## Courses

### SC 101. Introduction to Nutrition. 3 Hours.

This course serves as an introduction to nutritional concepts and to the interconnections of health, nutrition, weight, and physical activity. This course is particularly appropriate for students with no science background.

### SC 104. Principles of Biology. 3 Hours.

Principles of Biology is an introductory biology course with an integrated lab, intended primarily for non-science majors. This course enables the student to become aware of the complex biological systems in and around us. Students learn about core biological concepts such as cells, metabolism, genetics, and evolution, as well as introductions to plant biology, animal biology and microbiology.

### SC 105. Headline Science. 3 Hours.

This course explores various contemporary issues in science using an integrative and societal approach. Students will study the topics from a biological, chemical, physical, and environmental perspective, and relate the significance of the scientific matter to their major field of study. This course is intended for non-science majors. Prerequisite(s): MS 132.

### SC 106. Introduction to Exercise Science. 3 Hours.

This is an introductory course to exercise science. Topics for the course include acute and chronic physiological responses to exercise, nutrition, biomechanics, and physical fitness. The course also covers concepts related to health and statistics.

### SC 107. Foundations of Functional Fitness, Nutrition, & Wellness. 3 Hours.

In this foundational course, students examine the history and evolution of nutrition and fitness in individual and community health and explore the multi-dimensional elements of wellness, including the underlying basic biology and chemistry. Students identify assessment methods used to quantify baseline nutrition, fitness, and health levels and the application of population and individual interventions to modify behavior.

### SC 109. Introduction to Gardening. 3 Hours.

This course is an introduction to home gardening. In the Husson garden, students experientially learn about planting, growing, and harvesting crops within the framework provided by organic gardening practices. Students also explore gardening as it relates to larger societal issues, such as climate change and food insecurity. No previous gardening experience is assumed.

### SC 110. Personal Fitness. 3 Hours.

This course is intended to introduce students of all majors on best approaches to fitness. Appropriately utilizing the concepts of exercise science, students will gain insights on how to develop an individualized exercise program through assessment, design and implementation. Various technologies such as fit-bit, coach's eye, image capture and video will be used to practices fitness concepts. Through an online format this course promotes personal training approaches to improve understandings of fitness. Offering the course in this format allows for students to mimic best fitness approaches such as working out at times that fit the students' schedule, choosing the location of their workout, developing practices that may be utilized and progressed, and keeping a digital record.

### SC 120. Functional Anatomy and Physiology. 3 Hours.

Functional Anatomy and Physiology is a one semester, 3 credit lecture with a separate laboratory course designed to give the non-science major knowledge of the human body and its relationship with the environment. Topics covered include: the chemical basis of life, the anatomy & physiology of all organ systems, growth, development, heredity and biotechnology issues.

### SC 131. Human Genetics. 3 Hours.

This course is designed for nonscience majors to support the natural interest of most people in those human physical, behavioral, and social characteristics that have a hereditary basis. Lectures, discussions and the solving of simple genetic and statistical problems are used to form a basis for the consideration of current social issues with genetic implications.

### SC 134. Introduction to Geology. 3 Hours.

The course, specifically designed for the Environmental Science majors, introduces fundamentals of geology in the environmental context. The issues of local and global environmental changes are placed into a broader perspective of the functioning of the Earth system. Students are introduced into the science of Earth' materials: rocks, minerals, soils, and waters and the processes forming them. The internal processes (plate tectonics, earthquakes, volcanoes) and surface processes (streams, flooding, coastal zones, mass movements, glaciers, winds, desertification) are presented from the point of view of their influence on the geologic hazards, and on the distribution of natural resources. The interrelation of geology and human activities is examined in such contexts as waste disposal, air pollution, water contamination, climate change, land degradation, and resource and energy consumption. The format of this course includes one local field trip, lab activities on rocks and minerals identification, and introduction to topographic and geologic maps.

### SC 141. Environmental Science. 3 Hours.

This course is a survey of the important topics in environmental science. Concepts of energy flow and nutrient cycling are explored in the context of human impacts upon these processes. Sources of pollution and their total effect on ecosystem and biosphere function are also explored. Management of material wastes and energy efficiency is an integral theme of the class. This class satisfies the laboratory science requirement with a series on in-class lab experiences and field trips.

### SC 142. Conservation Biology. 3 Hours.

This course emphasizes the basic principles of conservation that are applied to utilization and management of natural resources such as soil, water, range lands, forests, wildlife, minerals, and human populations. The study of the interrelationships between living organisms and their environment is known as ecology. This course applies ecological concepts to conservation problems and policies.

### SC 151. Conceptual Physics. 3 Hours.

Conceptual Physics is an introductory physics course with an integrated lab, intended primarily for non-science majors. In this course we will study motion, mechanics, gravity, heat, electricity, magnetism, optics, atomic, nuclear and molecular physics, and relativity. We will also learn about the process by which physicists attempt to understand the intriguing laws of nature. The course will be taught using a combination of lectures, classroom demonstrations and laboratory experiments. Understanding of the fundamental concepts rather than number crunching is emphasized in this course and the equations will serve to refine the concepts and facilitate student's thinking process. Ultimately, it is hoped that by taking this course the student will develop a better appreciation for the natural world.

**SC 167. Energy and Society. 3 Hours.**

This course examines the basic physical principles underlying various energy technologies and develops the quantitative skills necessary to evaluate these technologies. Students present their work in both written and oral form. The end goal of this course is to help students become citizens that have the requisite background and communication skills to intelligently participate in energy policy discussions and decisions. Topics typically include basic scientific literacy and notation, introductory physics (such as force, work, energy, power), circuit analysis, thermodynamics, various energy technologies (fossil fuels, nuclear power, solar, hydroelectric, etc.), and placing these technologies in a broader environmental, social, and economic context. This course includes an integrated laboratory in order to introduce basic laboratory skills. Prerequisite(s): MS 141 or MS 180 or MS 181 or MS 182.

**SC 180. Principles of Gen Chemistry. 3 Hours.**

This course explores fundamental quantitative and qualitative principles of inorganic, organic and biological chemistry and provides a basic understanding of theoretical and applied aspects of general chemistry. Topics in inorganic chemistry include measurement, atomic theory and chemical bonding, chemical reactions and mass relationships, kinetic theory and gas laws, acids, bases, pH and buffers. Organic chemistry will provide an overview of the nomenclature, properties and reactivity of major groups of organic compounds, while biochemistry will focus on the chemistry of carbohydrates, lipids, proteins, and enzymes. An overview of biochemical energetics, nucleic acids and protein synthesis is also included.

**SC 181. Chemistry I. 3 Hours.**

This introduction to chemistry provides a basic understanding of theoretical and practical aspects of inorganic chemistry. The course includes the metric system, chemical elements and symbols, the structure of the atom, chemical bonds, molecules and compounds, and chemical reactions.

**SC 182. Chemistry II. 3 Hours.**

This course is a continuation of Chemistry I. It focuses on organic chemistry and biochemistry and provides a background for understanding the chemical mechanisms of health and disease. Organic chemistry will emphasize the study of carbon, its special properties, and its compounds. Biochemistry will focus on the chemicals of living organisms, carbohydrates, lipids, proteins, and nucleic acids. Selected physiological topics such as energy metabolism, the genetic code, and protein synthesis are included. Prerequisite(s): SC 181.

**SC 190. The Science of Fingerprints. 3 Hours.**

This course will allow students to examine every facet of the discipline, from the history of friction ridge identification and its earliest pioneers and researchers, skin growth in the embryo, structure of skin, scarring and histology, the chemistry of sweat and other secretions, to the scientific basis and the various steps of the identification process. The structure and growth of friction skin and how it can leave latent or visible prints are examined, as well as advanced identification methods in ridgeology, including Poroscopy, Edgeoscopy, Pressure Distortion and Complex or Problem Print Analysis. Students will learn how to process porous and non-porous items for friction ridge detail and how to preserve these impressions. Students will take known impressions and practice comparing developed impressions to these known exemplars.

**SC 191. General Biology I. 3 Hours.**

General Biology I focuses on biological principles that are fundamental to all of biology. This course covers the diversity of life and the commonalities of all living things including: molecular structure, cell structure and function, metabolism, cell division, heredity, and genetics. This course will also review the scientific process and the evaluation of scientific information. This course will prepare students for future courses in anatomy and physiology, cell biology, microbiology, biochemistry, genomic biology, and other biological specialties. This course is limited to students in programs requiring this course or are intending to take further biology courses.

**SC 192. General Biology II. 3 Hours.**

General Biology II is the continuation of a two-semester series in general biology for science majors. This course is designed to provide a thorough introduction to biology and prepare students for further study of evolution and ecology in SC 240. The goal of the course is to emphasize the diversity of species and for students to understand their relationship to, and their place in, the natural world. General Biology II is an introduction to the systematics, anatomy and physiology of the plant and animal kingdoms. This course will examine the structure and function of plant and animal organ systems in the framework of the evolution of adaptations. The course also concludes with an introduction to ecological systems.

**SC 193. Foundational Concepts in Research I. 1 Hour.**

This course introduces students to conducting independent research while an undergraduate student at Husson University. Student will visit faculty laboratories and gain an understanding of basic research concepts. Should students elect to participate in the Husson Undergraduate Scholars Program, this course serves as the first foundational course.

**SC 195. Introduction to Life Science. 3 Hours.**

This integrated lecture and lab science course provides a comprehensive introduction to the foundational concepts in biology and chemistry while exploring their applications in the context of modern medicine, medical humanities, sustainability, global, community, and individual health. Through inquiry-based learning, students develop a deep understanding of the key elements that underlie life sciences and their importance in various aspects of health and medicine.

**SC 199. Topic/. 1-6 Hour.**

This course is intended to provide the opportunity to offer introductory courses in science that would not normally be a part of the Husson curriculum. As such the topics will depend upon the interests of students and faculty.

**SC 202. Science Immersion. 3 Hours.**

This course emphasizes conservation by providing students an experiential setting that illuminates various aspects of the precarious balance between people's effect on the environment and the natural order of things. Educational goals focus on the conservation and restoration of our natural heritage so that biodiversity is not depleted.

**SC 210. Marine Biology. 3 Hours.**

Oceans cover more than 70% of the earth's surface and support all life on the planet. This course follows an ecological approach to consider the adaptations and interactions of plants and animals with their marine habitats, with particular emphasis on the ecosystems and organisms in the Gulf of Maine. Communities discussed include the open ocean, the deep-sea, subtidal and intertidal zones, and estuaries, as well as habitats found exclusively in tropical and polar regions. Prerequisite(s): SC 191 or SC 192.

**SC 213. Sustainability Science Projects. 3 Hours.**

This course serves as the capstone project for the sustainability minor. Students will collaborate within multidisciplinary teams to propose and evaluate a solution (or solutions) to a sustainability problem developed by the team or proposed by the instructor. At the end of the semester each team will present its results in the form of a written thesis and an oral presentation. Prerequisite(s): EH 124 and (MS 141 or MS 180 or MS 181 or MS 182).

**SC 221. Anatomy and Physiology I. 3 Hours.**

This course provides an in-depth understanding of the structures and functions of the human body and its parts. It begins with the organization of the human body and descriptive terminology relating to various segments of the body. Cellular anatomy and physiology and study of tissues lead to the study of the organ systems. Topics included in the course are skin, the skeletal system, joints, the nervous system, and muscle. Prerequisite(s): SC 191.

**SC 222. Anatomy and Physiology II. 3 Hours.**

This course is a continuation of Anatomy and Physiology I. The course will provide a thorough understanding of structure-function relationships down to the molecular level. The semester will cover the special senses, blood, the cardiovascular system, lymphatics, the respiratory system, the digestive system, the urinary system, the endocrine system, and reproduction. Prerequisite(s): SC 221.

**SC 224. Research Design. 3 Hours.**

This course introduces basic concepts and skills needed for understanding and conducting research in the social, educational and health sciences. Students will receive a basic introduction to the fundamentals of research—what it involves, what types exist, and how to design and conduct such research. Examined are the essential terms and concepts of research necessary for students to critically evaluate research literature, develop solid research questions, and plan simple research projects. Active engagement with the research process will occur through class participation, exercises, literature reviews, development of research questions, and creation of inquiry strategies for answering research questions. Prerequisite(s): MS 132.

**SC 234. Nutrition. 3 Hours.**

This course examines the basic nutritional principles (biological, chemical and regulatory mechanisms); the changing nutritional requirements throughout the life cycle; the relationship between nutrition and disease; the principles of therapeutic nutrition (diet therapy) and the assessment of nutritional status. Prerequisite(s): SC 180 or SC 181.

**SC 240. Ecology. 3 Hours.**

This course explores the interaction of biotic and abiotic components in functioning ecosystems. It will examine topics in population distribution and dynamics, major terrestrial and aquatic habitats, community interactions such as competition and predation, nutrient cycling, energy flow, and ecosystem succession. The concurrently run lab will train students in identifying local flora and fauna, as well as collection and analysis of field data. Prerequisite(s): SC 191 and SC 192.

**SC 241. Microbiology for the Health Sciences. 3 Hours.**

This course provides a broad understanding of both beneficial and harmful microorganisms and their roles in human welfare, with an emphasis on pathogens. Topics will include the structure, physiology, and control of human pathogens, particularly bacteria and viruses. The associated laboratory course (SL241) provides experience in important techniques of culturing, identifying, and controlling microorganisms. Prerequisite(s): SC 191 and (SC 180 or SC 182) and (MS 141 or MS 180 or MS 181 or MS 182).

**SC 242. Biotechnology. 3 Hours.**

The current explosion in wonder drugs, diagnostic tests and medical treatments has resulted, primarily, from advances in biotechnology. This course will explore the origins and current status of biotechnology and how it is applied in the world or research, product development, medical diagnosis, disease treatment and law enforcement. This course will primarily focus on those areas of biotechnology that pertain to molecular biology and biochemistry. The laboratory portion of this course will expose students to many of the techniques used in molecular biology/biotechnology laboratories around the world. Prerequisite(s): SC 102 and SC 103.

**SC 251. Astronomy. 3 Hours.**

This is an introductory course that will describe, develop and create physical models for many of the observable astronomical events in the sky. The topics may include motion in the night sky, the solar system, light, stars, star groups, the origin of the universe, life in the universe, and UFO's. The course has a required night sky/constellation observation component.

**SC 261. Integrated Physical Science I. 3 Hours.**

Integrated Physical Science I is the first course in the two semester sequence of Physical Science. The sequence is intended for, but not limited to, students planning career in elementary education. Using physical environment as a theme, principles of chemistry, physics, geology, atmospheric science, and space science are introduced, and reinforced through inquiry-based lab activities and field trips. This first course of the sequence, covers fundamental concepts of chemistry and physics, which include: motion, waves and particles, energy, structure and properties of inorganic and organic matter and their mixtures, interactions of energy and matter, order and equilibrium of physical systems.

**SC 262. Integrated Physical Science II. 3 Hours.**

Integrated Physical Science II is the second course in the two semester sequence of Physical Science. The sequence is intended for, but not limited to, students planning careers in elementary education. Using environment as a theme, principles of physical sciences are introduced and reinforced through inquiry-based lab activities. The course covers fundamental concepts of geology, atmospheric science, and space science.

**SC 271. Physics I. 3 Hours.**

Physics I is the first course in a two semester general physics sequence. The goal of this course is to introduce the student to the concepts of force and motion, work and energy, fluids and gases, heat and thermodynamics, and periodic motion. The class meets for three hours each week in lecture and recitation, and two hours each week in the lab. This course assumes no prior background in physics. Prerequisite(s): MS 180 or MS 181.

**SC 272. Physics II. 3 Hours.**

This course continues the development of the basic physical concepts begun in SC 271. Topics include electricity and magnetism, optics, atomic theory, relativity. Quantum mechanics, nuclear physics, and elementary particles. The class meets for three hours each week in lecture and recitation, and two hours each week in the lab. Prerequisite(s): SC 271.

**SC 285. University Physics I. 3 Hours.**

University Physics I is the first course in a two semester, calculus based university physics sequence. The goal of this course is to introduce students to the concepts of force and motion, work and energy, simple harmonic motion, and waves. The class meets for three hours each week in lecture, two hours each week in recitation, and two hours each week in the lab. This course assumes no prior background in physics. Prerequisite(s): MS 181.

**SC 286. University Physics II. 3 Hours.**

This course continues the development of the basic physical concepts begun in SC285. Topics include electricity, magnetism, and optics. The class meets for three hours each week in lecture, two hours each week in recitation, and two hours each week in the lab. Prerequisite(s): MS 181 and SC 285.

**SC 287. Organic Chemistry I. 3 Hours.**

This course comprises the first semester of a one-year introduction to the chemistry of carbon-containing compounds. It provides fundamentals of modern organic chemistry with an emphasis on chemical bonding, stereochemistry, and reaction mechanisms. Chemistry, as one of the exact sciences, requires quantification. Therefore, development of the critical thinking and problem solving strategies, as well as the experimental know-how and laboratory skills are major objectives of the course. Introduction to microscale lab techniques, modern analytical instrumentation, as well as computation technology additionally supports objectives of the course. Prerequisite(s): SC 182.

**SC 288. Organic Chemistry II. 3 Hours.**

This course comprises the second semester of a one-year introduction to the chemistry of carbon-containing compounds. It provides fundamentals of modern organic chemistry with an emphasis on stereochemistry, modern instrumental methods in identification of organic compounds, energetics, reaction mechanisms, and selected applications in biochemistry. Critical analysis of structure-properties' relationships in organic chemistry, and their applications, as well as more advanced know-how (FT-NMR or FT-IR, and UV/Vis spectroscopies) and laboratory skills (applications of semi-empirical molecular computations, and multistep synthetic procedures) are major objectives of this course. Prerequisite(s): SC 287.

**SC 291. Cell Biology. 3 Hours.**

This course is a detailed exploration of cell structure and function with an emphasis on the cytoplasm and extracellular matrix. Topics in membrane structure, transmembrane transport, vesicle trafficking, cytoskeletal organization, and macromolecular assembly processes are considered. Cell to cell communications and the role of the extracellular matrix in tissue level processes are also explored. Superficial examination is given to the structure and organization of the nucleus, chromosomes and gene expression to prepare students for the companion course entitled Genomic Biology. Prerequisite(s): SC 191.

**SC 299. Topic/. 1-6 Hour.**

This course is intended to provide the opportunity to offer introductory courses in science that would not normally be a part of the Husson curriculum. As such the topics will depend upon the interests of students and faculty.

**SC 312. Adult, Infant, and Child CPR First Aid. 3 Hours.**

This is a standard American Heart and American Red Cross course in adult, infant and child emergency care of injuries and CPR. Standard certificate awarded on successful completion of course.

**SC 322. Epidemiology. 3 Hours.**

The Introduction to Epidemiology covers basic concepts of field, practical and analytical epidemiology. The course examines methods for identification of factors influencing health and disease in human populations. Considerations are centered on physical, biological, and cultural factors in relation to infectious and noninfectious diseases; interactions between agent, host, and environmental factors as determinants of health and disease; application of the epidemiologic approach to health services; and retrospective and prospective analysis of morbidity data. Instruction is by lecture and in-class exercises.

**SC 330. Exercise Physiology. 3 Hours.**

This course examines changes within the human body due to the effects of acute and chronic exercise. The student is challenged to expand both their knowledge of and appreciation of human physiological reaction, regulation, and adaptation to exercise. Prerequisite(s): SC 111 or SC 120 or SC 222.

**SC 332. Physiological Ecology of Animals and Plants. 3 Hours.**

This course explores the structural and functional relationships within plants and animals that make them adapted to their environment. This course uses numerous examples to illustrate how plants and animals survive given the constraints of their environment. Examples will be taken from temperate, arctic, alpine, tropical, desert, and aquatic ecosystems. Prerequisite(s): SC 191 and SC 192.

**SC 333. Pathophysiology. 3 Hours.**

Pathophysiology is the study of abnormal, diseased physiological processes. The course begins with an examination of altered cell functioning, injury and death. The course continues with pathophysiology of the body systems and inability of diseased systems to maintain homeostasis. Also included are topics in inflammation, immunity, neoplasia, and adaptations of the body to stress. Although aging is not considered a disease, some aspects of aging will be discussed. Prerequisite(s): SC 221 and SC 222.

**SC 334. General Genetics. 3 Hours.**

This class reviews the basic mechanisms of inheritance (Mendelian genetics) and molecular mechanisms of gene expression. The course covers how DNA is organized in chromosomes and how chromosomes behave as cells progress through the cell cycle. Students also examine complex hereditary phenomena such as gene linkage, recombination and epistasis, and explore the sources and consequences of mutation as well as DNA repair mechanisms that normally operate in organisms. Additional topics include how gene expression is regulated, both in prokaryotes and eukaryotes. Students then present on a variety of topics related to genetics. Prerequisite(s): SC 191 and SC 181.

**SC 336. Evolution. 3 Hours.**

This course provides an overview of the current field of evolutionary biology. In this course students develop a basic understanding of the major topics in evolutionary biology, including: the theory of evolution by natural selection, the history of evolutionary thought, population genetics, sexual and kin selection, evolutionary trees/ phylogenies, how new species arise, and how scientists explain the origin of life on earth and human evolution. In addition, students come to understand how evolution provides a framework for the broader field of biology and how evolutionary theory can be used to address some social issues. Prerequisite(s): SC 191 and SC 192 and SL 191 and SL 192 and SC 334.

**SC 340. Anatomical Basis of Kinesiology. 3 Hours.**

This course involves studying the mechanics of human body movements and the interrelationships of bones, joints, and muscles. Prerequisite(s): SC 120 or SC 122.

**SC 349. Environmental Inorganic Chemistry. 3 Hours.**

In this course, students obtain an understanding of the fundamental chemistry implicit in the environment. Students also become familiar with aspects of mineralogy, oceanography, soil science, sedimentology and microbiology. The course emphasizes natural geochemical processes and how they operate over a variety of scales. Topics range from global issues such as atmospheric pollution and its effect on global warming and ozone destruction to the link between microbiological populations and local and global scale nutrient and chemical cycling. The course is designed to introduce the student to major systems and cycles in the environment and how materials and energy are cycled in these systems. Prerequisite(s): SC 181 and SC 182 and SL 181 and SL 182 and MS 180.

**SC 352. Biochemistry. 3 Hours.**

In this offering, the student will be exposed to reductionism in the field of biology. Biochemistry overlaps and articulates with many fields of endeavor. The discipline embraces physiology, pharmacology, enzymatics, nutrition, immunology, structural biology, biotechnology, and molecular biology all at the same time. The course curriculum will focus upon the role of enzymes in guiding metabolic processes and pathways. The student will come to understand the details of biological functioning at these three levels of organization: Metabolism, metabolic pathways, enzymatic mechanisms and kinetics. Prerequisite(s): SC 182 and SC 191 and SL 191.

**SC 353. Principles of Strength and Cardiovascular Conditioning. 3 Hours.**

This course provides students with an opportunity to develop an in-depth understanding of the principles of strength training and conditioning. By critically analyzing current research, students utilize an evidence-based approach to develop and justify conditioning programs and techniques for a broad range of sports and activities. Prerequisite(s): SC 340.

**SC 354. General Microbiology. 3 Hours.**

This course serves as an introduction to the broad field of microbiology with an emphasis on microbial evolution, diversity, and ecology. Topics include cell structure and function, metabolic pathways, genetics, microbial systems, the impact microorganisms have on the environment, and microorganisms of medical and veterinary importance. In the recommended associated laboratory course (SL 354) students apply course concepts to explorations of microbial genetics, systems, and interactions. Prerequisite(s): SC 191 and SC 180 and SC 182 and (MS 141 or MS 180 or MS 181 or MS 182).

**SC 356. Nutrition for Health and Exercise Performance. 3 Hours.**

This course focuses on the current concepts of nutrition, the integration of these concepts into human health, and the role of nutrition in the enhancement of fitness and exercise performance. Students will be introduced to the underlying biochemical mechanisms of nutrition and apply the evidence-based nutritional information to improve health and exercise performance. Prerequisite(s): SC 222.

**SC 360. Biomechanics & Kinesiology in Human Performance. 3 Hours.**

This course examines the application of anatomical and physiological principles of kinesiology and physical movement. Topics include the scientific study of human movement, analysis of motor skills, and programs of exercise and evaluation of human performance. Prerequisite(s): SC 222 or SC 120.

**SC 363. Group Exercise Instruction, Design & Management. 3 Hours.**

This class teaches the skills needed to design, instruct and manage a fitness or wellness class/program based on organizational and individual needs. These skills include ensuring the safety and efficacy of group exercise endeavors and addressing members' social dynamics, physical activity types, expertise levels, and environmental/emergency situations. Students learn evidence-based best practices regarding instruction techniques, choreography principles, exercise class components (warm-up, endurance, and cool-down components), group facilitation, and class management (intensity, pacing, duration) in an exercise setting. Students are also required complete an online Adults CPR/AED Online course through American Red Cross. Prerequisite(s): SC 107.

**SC 368. Gut Microbes, Diet & Health. 3 Hours.**

In this course, students delve into the science of gut health and Nutrigenomics as a predictor of physical and mental well-being. They study nutritional interventions like using probiotics, prebiotics and superfoods and their effects on gut health, digestive disorders, and other diseases. By the end of the course, students are able to explain the dynamic microbiome, bacteria/host relationship, identify factors and situations that affect gut health, explain how dietary practices affect disease outcomes, and conduct an analysis of published work regarding dietary interventions. Prerequisite(s): SC 234.

**SC 373. Inorganic Chemistry. 3 Hours.**

This course is designed to introduce the basic principles and concepts of inorganic chemistry. The course is intended for students who wish to pursue careers in chemistry, biochemistry, pharmacology, or the life sciences. Topics to be covered include: atomic and molecular structure, experimental techniques, bonding in polyatomics, acid/base chemistry, oxidation/reduction, descriptive chemistry of hydrogen and the s, p, d, and f block elements. Prerequisite(s): SC 181 and SC 182 and MS 181.

**SC 383. Junior Science Seminar. 3 Hours.**

This course introduces students to careers in science, the scientific research process, and research expectations within the biology, health science, chemistry and environmental science majors. The major focus is to develop a senior research proposal on the basis of what is attainable, interesting, and meaningful. Students learn, in detail, both the limits and expectations of undergraduate research in the sciences. Students are introduced to the important role of library resources and the professional literature as they investigate their chosen topic. Students are also expected to write a resume and career goals statement, give an oral presentation on a chosen career field in science, lead a class discussion of a scientific article, and submit a written research proposal that includes a scientific literature review, problem statement or hypothesis, a timeline for completion, and detailed budget for their proposed senior thesis research. Students present their proposed research and evaluate other student's research proposals. Prerequisite(s): MS 132.

**SC 386. Pre-Medicine Seminar. 1 Hour.**

This seminar course introduces students enrolled in the Pre-Medicine program to the expectations for admission to medical school, including the application process, entrance examination requirements, and financial considerations. In this course, students develop a personalized medical school application timeline, write an application essay, participate in a mock interview, and prepare an MCAT study plan with support and feedback from instructors, peers, and guest lecturers.

**SC 389. Environmental Sampling and Analysis. 4 Hours.**

This course covers the methodology of obtaining, managing, and interpreting the analysis results of environmental media including air, water, groundwater, biological, and soil samples. This course is intended to give the students hands-on training in designing sampling and analysis protocols for a variety of applications. These include preparing a sampling/analysis plan for a research proposal, writing Phase 1 proposals for an engineering firm or laboratory setting, or designing sampling/analysis for a forensics investigation. Jobs in these fields require involvement with some aspect of such work. This class is designed to help students understand how samples are obtained and analyzed and what those reports mean. Quality control and quality assurance policies and procedures are emphasized. Students gain competency in interpreting results so that they can participate in decision-making. Prerequisite(s): MS 132 and SC 181 and SL 181 and SC 182 and SL 182.

**SC 390. Biochemical and Molecular Methods. 4 Hours.**

This is a combined lecture and lab course that focuses on the theory, techniques, and instrumentation used in the Biochemistry laboratory. The methods covered include gene cloning, protein purification, chromatography, electrophoresis, spectroscopy, centrifugation, nucleic acid structure, protein structure, and PCR. Students apply these methods isolating and characterizing proteins and nucleic acids. Prerequisite(s): SC 352 and SC 287 and SL 287.

**SC 393. Physical Chemistry. 3 Hours.**

This course provides an introduction to the methods describing complex physicochemical systems and their responses to external chemical and/or physical stresses. Classical and modern theories of equilibrium and non-equilibrium thermodynamics, kinetic theory of transport phenomena, as well as quantum and statistical mechanics are introduced and applied to molecular systems and spectroscopy. Biological and biochemical problems are shown how to be formulated and solved by using principles of physical chemistry. Prerequisite(s): MS 132 and MS 181 and SC 182 and SC 272.

**SC 394. Analytical Chemistry. 3 Hours.**

This course is an introduction to the fundamentals of analytical chemistry. It covers sample treatment, statistical analysis of data, measurement errors, and applications of chemical equilibrium, kinetics, transport, light scattering, emission, and absorption to chemical analysis. The following analytical methods are studied: Volumetric, gravimetric, electrochemical, chromatography, and spectroscopy. The course includes lab. Prerequisite(s): MS 132 and (MS 180 or MS 181) and SC 382 and SL 382.

**SC 399. Topic/. 1-6 Hour.**

This course is intended to provide the opportunity to offer advanced courses in science that would not normally be a part of the Husson curriculum. As such the topics will depend upon the interests of students and faculty.

**SC 401. Exercise Testing and Interpretation. 3 Hours.**

This course explores how fitness assessments can be used to quantify health and performance. Through a variety of hands-on experiences students will utilize statistical approaches to successfully interpret measured values so that a more complete view of an individual's overall health and performance may be gained. Prerequisite(s): SC 222 and SC 340.

**SC 402. Exercise Training for Health and Performance. 3 Hours.**

The lecture component of the course is aimed at the physical basis and physiological basis for developing and implementing a fitness program. The laboratory component of the course is aimed at program development and program implementation for fitness and/or performance. Utilizing course concepts, students will design and implement an exercise program. Prerequisite(s): SC 222 and SC 401.

**SC 403. Prevention and Management of Chronic Disease. 3 Hours.**

This course considers the molecular and cellular basis of chronic disease. From biochemistry and immunology perspectives, emphasis will be placed on how exercise and nutrition may be used to prevent and manage chronic disease. Specific conditions discussed will include: obesity, diabetes, hypertension, atherosclerosis, chronic fatigue syndrome and aging. Prerequisite(s): SC 222 and SC 402.

**SC 410. Motor Learning in Human Performance. 3 Hours.**

This course explores the application of learning and performance of motor skills. Topics include the scientific study of motor skills and abilities, motor control, attention and memory, motor skill learning, instruction and augmented feedback, and practice conditions. Prerequisite(s): SC 222 or SC 120.

**SC 429. Specialized Therapeutic Exercise Programs. 3 Hours.**

This class teaches students to anticipate, implement, and monitor the needs of those engaged in specialized therapeutic exercise programming and instruct clients on proper form and technique. Students learn types of therapeutic exercises, common considerations and contraindications for each, specific therapeutic exercise tools (like functional fitness assessments, Range of motion or Time Up and Go), and how to instruct individuals and groups to perform therapeutic exercises with proper modifications, technique and form. By the end of the course, students are able to implement medical professionals therapeutic exercise prescription orders and adapt to individual needs accordingly. Prerequisite(s): SC 363.

**SC 435. Advanced Principles of Physiology. 4 Hours.**

Physiology is the foundation for the understanding of biological and medical sciences. The purpose of this class is to examine advanced concepts of physiology and how perturbations both physical, chemical and environmental affects systems and connections between systems. Prerequisite(s): SC 221 and SC 222 and SC 291.

**SC 439. Nutrition, Disease & Lifespan. 3 Hours.**

The Recommended Dietary Allowances for nutrients change based on developmental phases and are affected by specific diseases. In this class, students categorize and prioritize nutritional needs and behaviors based on life stage issues and integrate them into appropriate dietary considerations and practices. By the end of the course, students evaluate and design nutritional plans from five categories of disease using developmental science, understanding of disease models, and behavioral interventions across individuals' lifespans. Prerequisite(s): SC 234.

**SC 450. Physical Biochemistry. 4 Hours.**

All biological processes are governed by the same physical and chemical principles that control all chemical reactions. Thermodynamics and kinetics are core disciplines in the study of biophysical chemistry. This course examines the fundamental concepts of physical chemistry and biophysical techniques to study the biological processes in the cell. Topics include entropy, free energy, kinetics of complex biological reactions, non covalent forces that determine protein and nucleic acid stability (hydrophobic effect, electrostatic interactions and the hydrogen bond). Other topics for the course include the structural organization in nucleic acids and proteins, nucleic acid-protein interactions, and the underlying principles of chemical kinetics and thermodynamics that guides their behavior. Prerequisite(s): MS 182 and SC 285 and SL 285 and SC 286 and SC 352.

**SC 481. Senior Science Capstone Project I. 3 Hours.**

This course serves as the capstone project for science majors in the School of Science & Humanities. The course provides experiential learning relevant to the student's area of study. Acceptable projects include laboratory or field research, an internship with an approved mentor, research survey or some other project deemed appropriate by the faculty. During the course, students meet periodically with their faculty advisor to plan their progress through the project. At the end of the semester, students present the final results of their research or a summary of their experience in the form of an oral presentation and a written thesis. Prerequisite(s): SC 224 or SC 383.

**SC 482. Senior Science Capstone Project II. 3 Hours.**

This course serves as a continuation of the science capstone course SC481. Students who wish to continue with their laboratory or field research may elect to take this course. Additionally, students who wish to explore other research projects or internship opportunities may elect to take this course. Students are encouraged to share their final results with the Husson University community and to publish their work in the peer-reviewed literature. Prerequisite(s): SC 481.

**SC 492. Senior Chemistry Research Seminar. 3 Hours.**

This capstone course provides an introduction to research in chemical sciences. In the seminar setting students critically review primary literature sources and design, with help of the instructor, a serious and original research proposal in theoretical or experimental chemistry. Students discuss their ideas and applied methodology with classmates during regular weekly meetings. The approved by instructor research hypotheses are subsequently validated by experiments, field studies, or theoretical calculations. Students report and share the research findings with classmates in the seminar format. The authors of projects of very high quality will be encouraged to present their work at regional chemical conferences. Prerequisite(s): SC 393 and SC 394.

**SC 499. Topic/. 1-6 Hour.**

This course is intended to provide the opportunity to offer advanced courses in science that would not normally be a part of the Husson curriculum. As such the topics will depend upon the interests of students and faculty.

**SC 624. Research Methods and Application. 3 Hours.**

This course is designed to provide students with a comprehensive understanding of the research process, basic methodology, and how to apply and interpret both qualitative and quantitative data. Topics include the fundamentals of the scientific method and scientific inquiry, literature review, ethical considerations and requirements in research, strengths and weaknesses of various data collection methods, and basic methods of quantitative and qualitative data collection. Through discussions, article analysis, and hands-on practice, this course teaches students how to understand the components of research from start to finish, and be able to evaluate and interpret data.

**SC 791. Professional Capstone. 3 Hours.**

The Professional Capstone is a culminating course for students to apply skills and knowledge achieved during the program. Students are guided to develop an in-depth project illuminating career interests, applying their knowledge to the career, and analyzing a problem or situation within it. Students are expected to apply interdisciplinary problem-solving, analyze complex systems, and propose solutions to questions derived from their project.