BY-Biology Courses

Courses

BY 101. Topics in Contemporary Biology. 3 Hours.
Selected topics in the current understanding of biological systems, ranging from humans to ecosystems. Particular focus on scientific issues such as human diseases, genetic engineering, emerging infectious diseases, environmental causes of disease, and climate change, as well as analysis of these issues as presented in print and electronic media. NOTE: Not for biology majors or minors (with BY 102). This course meets Blazer Core Scientific Inquiry with a Flag in Sustainability.

BY 102. Topics Contemporary Biology Laboratory. 1 Hour.
Topics in Contemporary Biology Lab will expose the students to the science of the world around them by conducting hands-on scientific investigations. Students will work on projects focused on topics ranging from vector biology, to water quality, to human, animal and plant anatomy and physiology. This course, along with BY 101, meets the Blazer Core Scientific Inquiry requirement, with a Flag in Sustainability.

BY 103. Oceans and You. 4 Hours.
BY 103 covers an overview of the ocean and its importance to humans at a level accessible to those with a minimal previous scientific background. It seeks to build skills in understanding and interpreting scientific research of all kinds, as commonly reported in the print and electronic media, and to provide general knowledge of our current biological understanding of the world. Students will gain a fundamental understanding of the services that the ocean provides and the role that it has in their lives. They will also investigate what they can do to make a difference. Concurrent enrollment in BY 103L Laboratory is required. This course is appropriate for both Biology majors and non-majors, but does not count as a BY major elective. The course satisfies Blazer Core – Scientific Inquiry credit and meets the requirements to obtain the Sustainability flag.

BY 103L. Oceans and You - Laboratory. 0 Hours.
Oceans and You - Laboratory required with BY 103 lecture.

BY 108. Human Population and the Earth's Environment. 3 Hours.
Influence of human population on Earth's environment. Specific attention will be paid to environmental issues such as population growth, climate change, water and energy resources, pollution, waste disposal, plant and animal extinctions, and food resources. Strong emphasis will be placed on determining solution to the variety of environmental problems facing the earth. Lecture and film. Ethics and Civic Responsibility are significant components of this course. This course meets Blazer Core Curriculum Scientific Inquiry with a flag in Sustainability.

BY 109. Laboratory in Environmental Science. 1 Hour.
Experiments on topics essential to study of environment and which reveal complexity of solving environmental problems. Writing, Ethics and Civic Responsibility are significant components of this course. This course, when taken with its corresponding lecture, meets the Blazer Core Curriculum requirements for Scientific Inquiry credit.
Prerequisites: BY 108 [Min Grade: D](Can be taken Concurrently) or BY 108 [Min Grade: P] or ENV 108 [Min Grade: D](Can be taken Concurrently) or ENV 108 [Min Grade: P](Can be taken Concurrently)

BY 110. Biology's Guide to Surviving Stress. 3 Hours.
Stress can test the limit of an individual's ability to maintain balance, thrive and survive. This non-major, first-year experience (FYE) biology course explores the evolution of the stress response and how cells, organs and organ systems work together to maintain homeostasis. Equipped with the knowledge of how the body functions, students will explore how common stressors experienced by college students (sleep deprivation, lack of relaxation, poor diet, and others) can test the limits of maintaining homeostasis. Understanding the body's stress response and how stress impacts well-being will enable students to make informed decisions about how to promote balance in their own life. This course satisfies Blazer Core – Local Beginnings credit and the Freshman Year Experience and Wellness flags.

BY 111. Extended Topics in Contemporary Biology. 3 Hours.
Selected topics in contemporary biology of interest to students with minimal background in biology. Topics presented in interactive lecture/ discussion format. This course, when taken with its corresponding laboratory, meets the Core Curriculum requirements for Area III: Natural Sciences. NOTE: Only general elective credit for biology major or minor.
Prerequisites: BY 101 [Min Grade: D]

BY 112. Ext Topics Contemporary Biology Laboratory. 1 Hour.
Further examination, interpretation, and discussion of topics in BY 111. Independent and group projects. NOTE: Only general elective credit for biology major or minor.
Prerequisites: BY 111 [Min Grade: D](Can be taken Concurrently)

BY 115. Human Anatomy. 4 Hours.
Introduction to the gross and microscopic structure of the human body using a systemic approach. Lecture and laboratory.

BY 115L. Human Anatomy Laboratory. 0 Hours.
Human Anatomy Lab required with BY 115 lecture.

BY 116. Introductory Human Physiology. 4 Hours.
Integrated functions of human cells, tissues, and organ systems. NOTE: Only general elective credit for biology majors or minors. Lecture and laboratory.
Prerequisites: BY 115 [Min Grade: C] and (CH 105 [Min Grade: C] and CH 106 [Min Grade: C] or CH 115 [Min Grade: C] and CH 116 [Min Grade: C] or CH 125 [Min Grade: C] and CH 126 [Min Grade: C] or CH 117 [Min Grade: C] and CH 118 [Min Grade: C] or CH 127 [Min Grade: C] and CH 128 [Min Grade: C])

BY 116L. Introductory Human Physiology Laboratory. 0 Hours.
Human Physiology Lab required with BY 116 lecture.

BY 120. Living Biology at UAB and Beyond - Seminar. 1 Hour.
Living Biology at UAB and Beyond is a seminar for Biology freshmen students jointly taught by the Biology research faculty members. LivBio has two primary goals: 1) introduce students to the people, projects, and opportunities in the Biology Department at UAB, 2) foster and cultivate student STEM identities and interests to help them succeed in Biology at UAB (and beyond). Students will engage in active research talks from Professors, learn about novel research technologies, read and discuss breaking news in biological discoveries, and more.

BY 121. BioExcel: Excelling in Biology through Strategic Study Skills. 3 Hours.
This course is designed to help college students develop effective study skills while simultaneously exploring key concepts in biology. The course aims to enhance students' academic success by providing them with practical strategies for time management, note-taking, critical thinking, and active learning, while also covering fundamental topics in biology.

BY 123. Introductory Biology I. 4 Hours.
Basic chemistry, cell structure and function, metabolism, genetics, evolution, bacteria, and protists. For major in biology and related fields. Quantitative Literacy and Writing are significant components of this course. This course meets Blazer Core Curriculum Scientific Inquiry.
Prerequisites: MA 106 [Min Grade: C](Can be taken Concurrently) or MA 107 [Min Grade: C](Can be taken Concurrently) or MA 125 [Min Grade: C](Can be taken Concurrently) or MA 225 [Min Grade: C] (Can be taken Concurrently) or MA 126 [Min Grade: C](Can be taken Concurrently) or MA 226 [Min Grade: C](Can be taken Concurrently) or MA 168 [Min Grade: C](Can be taken Concurrently) or MA 268 [Min Grade: C](Can be taken Concurrently) or MA 225 [Min Grade: C] (Can be taken Concurrently) or MA 226 [Min Grade: C](Can be taken Concurrently) or MAC1 17 or MAAD 24 or MTH3 75 or MTH4 75 or MTH5 75 or MPL 61

BY 123L. Introductory Biology I Laboratory. 0 Hours.
Introductory Biology I Lab required with BY 123 lecture.

BY 124. Introductory Biology II. 4 Hours.
The course emphasizes the transition from cell, to tissue, to organs in multicellular systems. Specific attention in the course will be paid to a survey of the various groups of plants, fungi, invertebrates and vertebrates. Strong emphasis will be placed on comparing the anatomy and physiology of the major organ systems in humans with those of other organisms. The course is designed to expand the students understanding of the process of scientific writing. Quantitative Literacy and Writing are significant components of this course. This course meets Blazer Core Curriculum Scientific Inquiry.
Prerequisites: BY 123 [Min Grade: C]

BY 124L. Introductory Biology II Laboratory. 0 Hours.
Introductory Biology II Lab required with BY 124 lecture.

BY 170. Biology of Sex. 3 Hours.
This course will cover the overwhelming diversity generated by sex. We will survey molecular, physiological, ecological, and evolutionary concepts that help us understand what sex is and what it is not. Students will write weekly blog posts and learn how to read the scientific literature. Students will explore scientific methods and learn how to translate scientific literature into lay terms, allowing creativity and enhancing critical thinking and reasoning skills. This course meets Blazer Core Reasoning and can count as a Biology major elective.

BY 175. Discoveries in Natural Science - A Journey Through Time. 3 Hours.
Have you ever wondered about the importance of science in modern human history? Who were the major players and what did they do? In this course, we will explore historical biological figures and their documents and discuss their impact on society. What did they do and why was this important to humankind? Students will reflect on this historical knowledge and compare it to contemporary knowledge. In addition, students will research important discoveries, techniques, tools, etc. that altered modern human history. Students will connect the past, to the present and then what might the future bring. Course credit will not count towards BY electives. This course satisfies Blazer Core – History and Meaning credit.

BY 180. Introduction to Mycology: How to Grow Gourmet and Medicinal Mushrooms. 3 Hours.
Mycology is a scientific discipline that focuses on the study of fungi. In this online mushroom cultivation course, we will delve into the fascinating world of mycology, exploring topics such as the growth and cultivation of gourmet (edible) and medicinal (legal) mushrooms, the life cycle and ecology of fungi, and the potential applications of fungi in various industries. We will cover the selection and preparation of substrates, the inoculation and incubation of spawn, and the fruiting and harvesting of mushrooms. Mushroom cultivation kits will be available for hands-on learning and practice of techniques learned throughout the course. The final project will involve the planning and production of edible mushrooms at home. This course is designed for students with a background in biology, agriculture, or environmental science, or for anyone with an interest in the cultivation of gourmet and medicinal mushrooms. It is appropriate for both Biology majors and non-majors but does not count as a Biology major elective.

BY 201. CAC: Climate Change and the Environment. 3 Hours.
This introductory course will introduce the science of climate change and is designed for science and non-science majors. We will discuss the empirically driven principles of anthropogenic climate change and why we have high certainty that humans have caused this rapid global change. Next, we will address the ecological consequences of a changing climate. We will cover examples from various environments including polar, terrestrial, and ocean ecosystems and study microbial, plant, and animal interactions. Finally, we will discuss potential solutions to reduce the impact of humans on climate change. This will include local, regional and worldwide strategies. Lecture. 3 credit hours. This course meets the Blazer Core Curriculum requirements for City as Classroom credit with flags in Sustainability and Civic Engagement.

BY 203. CAC: Aging: From Cells to Society. 3 Hours.
Americans born in the 21st century can expect to live 100 years or more. That is what some prominent aging researchers believe. Already, we are living longer than at any time in human history. Does that mean that society can expect to be overwhelmed by Alzheimer's disease and other diseases of later life as the century progresses? Why do we age anyway? What goes wrong inside our body as we grow older? Why does it happen 5 times as fast in a dog? 30 times as fast in a mouse? What are the prospects for an aging "breakthrough" that might allow us to live much, much longer? What would be the societal impact of such a breakthrough? BY 203 is a course directed to non-majors that will address these and other questions, providing a solid background in the biology of aging, and the social implications of this biology in a rapidly changing world. This course meets the Blazer Core Curriculum requirements for City as Classroom credit with a flag in Service Learning.

BY 210. Genetics. 4 Hours.
Principles and mechanisms of inheritance; structure, action, and regulation of genes; molecular genetic technology and application to human health and agriculture. Preparation for advanced courses in biology. Students will engage in Course-based Undergraduate Research Experience (CURE) examining the fundamental principles of genetics, molecular biology and genomics. Lecture and Laboratory.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C]

BY 210L. Genetics Laboratory. 0 Hours.
BY210L lab required with BY210 lecture.

BY 211. Genetics for Honors-HON. 3 Hours.
Genetics, a study of heredity, refers to the understanding of how DNA and its products participate in diverse biological processes, molecular pathways and signaling cascades in both prokaryotes and eukaryotes. This CURE-based course is designed to increase student engagement and therefore student learning in this complex but very important discipline of biology hands-on training on a variety of topics. Lecture/lab. 3 credit hours.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C]

BY 212. Genetics for Biomedical Engineers. 3 Hours.
Principles and mechanisms of inheritance; structure, action, and regulation of genes; molecular genetic technology and application to human health and agriculture. Preparation for advanced courses in biology. Enrollment in BY 212L required with BY 212 lecture.
Prerequisites: BY 123 [Min Grade: C]

BY 212L. Genetics for Biomedical Engineers - Laboratory. 1 Hour.
Genetics for BME - Laboratory is required with BY 212 lecture.
Prerequisites: BY 123 [Min Grade: C]

BY 215. Introduction to Genomics. 3 Hours.
This course will feature basic and introductory concepts in –omics, sequencing technologies, applications in prokaryotes and eukaryotes, particularly human genome. Moreover, we will also discuss how the next generation sequencing information can be applicable to human health, agriculture and ecology. Key concepts of computing and data science will also be introduced. This will also include basic bioinformatics and bioinformatics tools in handling and management of genomic data.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C] and (BY 210 [Min Grade: C] or BY 211 [Min Grade: C])

BY 216. Pathophysiology. 3 Hours.
A course about human diseases emphasizing mechanisms of injury, altered physiology, disease development and progress, clinical assessments, and treatment strategies. Specific topics include diseases on genetic defects, infections, cancers, stress, altered immune actions, nutritional problems, fluid imbalances, hormone control issues, altered blood flow, and pulmonary inadequacies. The course incorporates historical and current case load relevancy and case study analysis.
Prerequisites: BY 116 [Min Grade: C] or BY 409 [Min Grade: C] or BY 124 [Min Grade: C]

BY 220. CLOne: Chromatin Laboratory 1. 0-4 Hours.
Students will learn laboratory skills in molecular genetics, with a focuses on generating CRISPR guide RNAs and testing their efficiency in Drosophila cells. The students will be introduced to the scope of the project, read relevant literature, and will conclude their research experience by writing a journal-style report on their results.
Prerequisites: BY 123 [Min Grade: C]

BY 225. Contemporary Issues in Science Policy. 3 Hours.
An introduction to cutting-edge science, medicine, and technology as well as the difficult ethical concerns they raise. This course provides students practical training in cross-disciplinary learning while engaging in discourse about difficult, controversial, and critical questions related to science and policy. This course is appropriate for Biology majors and non-majors. This course meets Blazer Core Curriculum Communicating in the Modern World with a flag in Civic Engagement.

BY 245. Biological Data Interpretation and Analysis. 3 Hours.
The course covers the basics of scientific investigation with an emphasis on understanding what science is, the methods of the scientific process, experimental design, data analysis and interpretation, graphical presentation, and scientific writing. Special emphasis will be placed on the understanding of statistical language and the most common types of data analyses used in biology. Quantitative Literacy is a significant component of this course. Recommend course is taken before junior year.
Prerequisites: BY 124 [Min Grade: C]

BY 250. Evolutionary and Behavioral Ecology. 3 Hours.
An examination of the evolutionary explanations for animal behavior and how behavior shapes animals' interactions with their environment. The course will focus on behavioral agents of selection (e.g., predator-prey relationships, territoriality, kinship, sexual selection, parental investment, etc.) and discussion and analysis of primary research in evolutionary and behavioral ecology.
Prerequisites: BY 124 [Min Grade: C]

BY 255. Invertebrate Zoology. 4 Hours.
Invertebrate phyla, emphasizing evolutionary relationships, biological principles demonstrated by invertebrates, and significance of invertebrates in total ecology. Lecture and laboratory.
Prerequisites: BY 124 [Min Grade: C]

BY 255L. Invertebrate Zoology Laboratory. 0 Hours.
Invertebrate Zoology Lab required with BY 255 lecture.

BY 256. Vertebrate Zoology. 4 Hours.
Comparative approach to the structure, function, ecology, life history, and conservation of vertebrates. Lecture and laboratory.
Prerequisites: BY 124 [Min Grade: C] and CH 115 [Min Grade: C] and (CH 116 [Min Grade: C] or CH 114 [Min Grade: C])

BY 256L. Vertebrate Zoology Laboratory. 0 Hours.
Vertebrate Zoology Lab required with BY 256 lecture.

BY 261. Introduction to Microbiology. 4 Hours.
Cell structure and function, microbial genetics, viruses, and epidemiology and infectious disease. NOTE: Cannot be applied toward requirements for a biology major. Lecture and laboratory.
Prerequisites: BY 123 [Min Grade: C] or CH 107 [Min Grade: C] (Can be taken Concurrently) and CH 108 [Min Grade: C](Can be taken Concurrently) or (CH 237 [Min Grade: C] and CH 238 [Min Grade: C]) or (CH 237 [Min Grade: C] and CH 239 [Min Grade: C]) and BY 116 [Min Grade: C]

BY 261L. Introduction to Microbiology Laboratory. 0 Hours.
Introduction to Microbiology Lab required with BY 261 lecture.

BY 267. Tropical Ecology. 3 Hours.
Major tropical ecotypes; ecology of terrestrial, aquatic, and marine tropical organisms. Major portion conducted at tropical field station in Caribbean. Lecture and field trips (May session, alternate years). Permission of Instructor required.
Prerequisites: BY 124 [Min Grade: C]

BY 268. Galapagos Ecology. 3 Hours.
An overview of the ecology of the Galapagos Island, with an emphasis on the ecology of terrestrial and marine organsims. Major portion of course conducted on the Galapagos Islands. Lecture & field trips. Permission of instructor required.
Prerequisites: BY 124 [Min Grade: C]

BY 269. Rain Forest Ecology. 3 Hours.
Physical and environmental factors that structure rain forest, biodiversity of life, and interactions of its organisms. Prominent biota. Major portion of course taught at tropical field station in Costa Rica. Lecture and field trips (May session, alternate years). Permission of instructor required.
Prerequisites: BY 124 [Min Grade: D]

BY 271. Biology of Microorganisms. 4 Hours.
Microbiology with emphasis on molecular aspects of microbial cell structure, function, and diversity. Host defense mechanisms, infectious disease, and microbial ecology. Preparation for advanced courses in biology. Lecture and laboratory.
Prerequisites: (BY 210 [Min Grade: C] or BY 211 [Min Grade: C]) or (BY 330 [Min Grade: C]) and CH 117 [Min Grade: C] and (CH 118 [Min Grade: C] or CH 119 [Min Grade: C])

BY 271L. Biology of Microorganisms Laboratory. 0 Hours.
Biology of Microorganisms Lab required with BY 271 lecture.

BY 285. Biology Career Readiness Seminar. 1 Hour.
This course is designed to prepare biology majors for a career after graduation. In order to develop the skills and habits needed to succeed professionally, we will investigate what it means to be a professional in biology and look at strategies needed for success. Topics covered will be career exploration, networking, personal branding, career planning, strategic career search, interviewing techniques, and professional etiquette. In addition to these topics which are important for all career paths, strategies for applying to graduate and professional school will be surveyed.

BY 286. Research Skills Seminar. 1 Hour.
This course will provide an introduction to undergraduate research students joining the UAB Department of Biology. The course will guide the students through the process of joining a research lab and prepare them to begin a mentored undergraduate research experience in the following semester. While this course is open to all biology majors, it particularly focused on reaching transfer students to facilitate their engagement in undergraduate research.

BY 311. Molecular Genetics. 3 Hours.
The function of every organism is orchestrated through the structure, maintenance, and translation of its genome. Using the latest molecular tools, this course will guide students through topics from the structure of individual genes, their expression, and the regulation of RNAs, to the 3D world of chromatin. With biomedical and biotechnological applications, the course will cover the fundamental molecular, genetic processes that span eukaryotes, prokaryotes, and viruses.
Prerequisites: BY 210 [Min Grade: C] or BY 211 [Min Grade: C]

BY 314. Embryology. 3 Hours.
Descriptive and experimental studies of vertebrate development at the molecular, cellular and tissue levels.
Prerequisites: CH 117 [Min Grade: C] and CH 118 [Min Grade: C]

BY 327. Histology. 4 Hours.
Microscopic anatomy of cells, tissues, and organs of animals; correlation of structure and function. Techniques and methodology. Lecture and laboratory.
Prerequisites: BY 115 [Min Grade: C] or BY 124 [Min Grade: C]

BY 327L. Histology Laboratory. 0 Hours.
Histology Lab required with BY 327 lecture.

BY 330. Cell Biology. 3 Hours.
Structure and function of the cell, cellular components and major cellular processes. Topics include biological molecules and metabolism, energetics, synthesis and regulation of macromolecules, mechanisms for transcription and translation, membranes and organelles, small molecule transport and intracellular trafficking, cytoskeleton and cell movement, cell signaling, cell cycle, and cancer cell biology.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C] and BY 210 [Min Grade: C](Can be taken Concurrently) or CH 235 [Min Grade: C](Can be taken Concurrently) and CH 234 [Min Grade: C] (Can be taken Concurrently) or CH 236 [Min Grade: C](Can be taken Concurrently)

BY 340. Animal Nutrition. 3 Hours.
This course is designed for the study of comparative animal nutrition, and is targeted for biology majors with interest in Veterinary and Medical Schools. Topics include: 1. the classification and function of nutrients, 2. the anatomy, physiology and biochemistry of the gastrointestinal system, 3. nutrient procurement, 4. methods of analysis for nutrients and feed, and 5. feed formulation and manufacture.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C] and BY 210 [Min Grade: C]

BY 351. Plant Biology. 3 Hours.
This course introduces the student to the basic concepts of plant biology including plant diversity, structure, physiology, metabolism, reproduction, genetics, molecular biology, evolution and ecology. It is targeted to Biology Majors. This class brings together knowledge and methodologies from a number of different disciplines to provide students with an intensive and comprehensive plant curriculum from the molecular to the organismal level. In this course, students will be introduced not only to plant biology, but also to plant-specific concepts and techniques in molecular biology and genetics. Lecture. 3 credit hours.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C] and (BY 210 [Min Grade: C] or BY 211 [Min Grade: C])

BY 354. Field Phycology. 4 Hours.
Students will be introduced to freshwater and marine phycology, with an emphasis on evolutionary ecology. A major portion of the course will be based in the field along the Eastern Shore of Virginia and throughout the freshwater habitats of Alabama. Lecture, laboratory, and field trips (May session). Permission of Instructor required.
Prerequisites: BY 123 [Min Grade: C] or BY 124 [Min Grade: C] or BY 210 [Min Grade: C]

BY 355. Invasions Unveiled: The impact of invasive species from genomes to ecosystems. 4 Hours.
Join us on a captivating journey through the dynamic world of invasive species and genomics in our course, 'Invasions Unveiled.' Delve into the intricacies of how invasive species disrupt native ecosystems, alter genetic landscapes, and impact biodiversity. Explore the fascinating intersections of ecology, genetics, and conservation as we unravel the mechanisms behind these invasions. We will explore diverse case studies from medicine, agriculture, and conservation. Whether you are a pre-med student seeking to understand how new pathogens spread, want to understand complex ecological systems, or simply intrigued by the wonders of our natural world, this course offers a unique opportunity to deepen your knowledge and appreciation of the delicate balance between species interactions and how they shape genomes.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C] and BY 210 [Min Grade: C]

BY 362. Neurobiology. 3 Hours.
This course teaches the biological basis of nervous system function, i.e., how the central nervous system is organized, and how neurons, synapses and neuronal circuits function in order to produce behavior. The course also provides the student with basic concepts in mammalian neuroendocrinology and age-related changes in nervous system structure and function.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C]

BY 363. Model and Non-Model Organisms in Biological Research. 1 Hour.
This course will introduce students to the relevance of live organisms in research and promote the research ethics and humane care of organisms used in biological research and teaching. Students will gain experience working with several model and non-model organisms used in biological research, including fish, plants, reptiles, rodents, flies, and more.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C]

BY 394. Biology Laboratory Teaching. 1-6 Hour.
Student will assist in instruction of a biology laboratory. Student is required to attend scheduled preparatory sessions each week, assist in teach assigned laboratory section, help develop student assignments such as examinations and/or practicals and assist the laboratory coordinator in other capacities as assigned. Students work under the direction of the course instructor and/or the laboratory coordinator. Student must have completed the course in which the student is assisting with a grade of B or higher. Permission of the instructor is required. May be repeated for credit to a maximum of six semester hours.

BY 395. Special Topics in Biology. 1-4 Hour.
This course will consider topics from the various disciplines in the biological sciences and the topic will differ each term. Course requirements may include lecture, laboratory, readings, discussion, reporting, and internships or fieldwork, which may be conducted on- or off-campus. May be taken more than once for credit.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C] and (BY 210 [Min Grade: C] or BY 211 [Min Grade: C])

BY 397. Advanced Directed Readings. 1-3 Hour.
Reading and independent study in selected areas under supervision of faculty sponsor. May be repeated for total of three semester hours credit. 12 semester hours of BY with BY GPA of 3.0 and permission of instructor required.

BY 398. Undergraduate Research. 0-3 Hours.
Research project under supervision of faculty sponsor. May be repeated for a total of 3 semester hours credit. BY 123 with a B or better, completion of BY 286 and permission of instructor required.

BY 405. Microbial Physiology. 3 Hours.
Microbial structure and function, growth, metabolism, and regulation of cellular activity.
Prerequisites: BY 271 [Min Grade: C]

BY 407. Microbial Ecology. 3 Hours.
This course examines microorganisms in their natural habitats, with a focus on soil and aquatic ecosystems as well as symbiotic interactions between microbes and animals and plants. Students will learn both theory and practical techniques for studying microbial ecology, including hands-on exposure to modern bioinformatic analysis methods for microbial communities. 3 credit hours.
Prerequisites: BY 271 [Min Grade: C]

BY 409. Principles of Human Physiology. 4 Hours.
The lecture and laboratory course uses humans as a model system to investigate physiological processes occurring at cell, tissue, organ, and system levels. Additionally the use of experimental examples and laboratory experiments and the interpretation of data will be used to understand all aspects of productivity. The class is designed to improve scientific writing skills related to research experiment. Writing and Quantitative Literacy are significant components of this course. Foundation in anatomy recommended (BY 115 or BY 256).
Prerequisites: (BY 210 [Min Grade: C] or BY 211 [Min Grade: C]) and CH 237 [Min Grade: C] and (CH 238 [Min Grade: C] or CH 239 [Min Grade: C])

BY 409L. Principles of Human Physiology Laboratory. 0 Hours.
Human Physiology Lab required with BY 408 and BY 409 lecture.

BY 410. Comparative Animal Physiology. 3 Hours.
Comparative examples to illustrate general principles of physiology; study of how animals function in their environment.
Prerequisites: BY 256 [Min Grade: C]

BY 411. Advanced Human Anatomy. 4 Hours.
Regional study of human gross anatomy by dissection of human donor bodies.
Prerequisites: BY 115 [Min Grade: C]

BY 412. 21st Century Gene Editing. 3 Hours.
The course will cover basic concepts of molecular genetics, including an introduction to the DNA biology (structure and function), the use of model organisms and experimental approaches for molecular genetic analysis and an understanding of human genetic disorders and possible genetic therapies. The first part of the course, while dealing with introductory material through lectures and discussions, will give students a hands-on experience with well-known molecular techniques like DNA isolation and polymerase chain reaction (PCR), and how these techniques are used in the context of gene editing. The participants will also have direct exposure to working with zebrafish (Danio rerio) embryos (<3 days old, therefore exempt from detailed IACUC regulations) and roundworms (C. elegans) as an alternate model system to use the CRISPR-Cas9 technology. These broadly applicable techniques will be reiterated in the second part of the course with a special emphasis on the CRISPR-Cas9 technology. The activities involved in these two parts will provide an opportunity for rich discussion on fundamental concepts in biology and chemistry, the process of scientific experimentation, and the nature of evidence.
Prerequisites: (BY 210 [Min Grade: C] or BY 211 [Min Grade: C]) and CH 235 [Min Grade: C](Can be taken Concurrently) and CH 236 [Min Grade: C](Can be taken Concurrently)

BY 414. Advanced Cell Biology. 3 Hours.
This course will focus on understanding cell signaling, function, and dynamics, which is the core of modern cell biology topics. This course is targeted for senior undergraduate students who are interested in current topics of Cell Biology and have successfully completed undergraduate courses in genetics and cell biology. Topics include the cellular organization and function, cell cycle, autophagy, apoptosis, stem cell and cellular signaling pathways. This course also includes reading of primary literature and writing a research proposal.
Prerequisites: BY 210 [Min Grade: C] and BY 330 [Min Grade: C]

BY 416. Cellular Physiology. 3 Hours.
Biochemical and thermodynamic aspects of cellular energy metabolism. Foundation in physiology recommended (BY 124, BY 116, BY 409 or BY 410).
Prerequisites: BY 330 [Min Grade: C] and CH 237 [Min Grade: C] (Can be taken Concurrently) and CH 238 [Min Grade: C](Can be taken Concurrently) or CH 239 [Min Grade: C])

BY 420. General Endocrinology. 3 Hours.
The central theme of this course is the role of hormone chemical messengers in the regulation of physiological processes. Topics include structure of endocrine cells and glands, hormone synthesis and chemistry, physiological effects of hormones, and mechanisms of hormone action. Emphasis is placed on vertebrate systems, but instructive invertebrate systems are also considered.
Prerequisites: BY 256 [Min Grade: C]

BY 426. Evolutionary Medicine. 3 Hours.
An evolutionary approach to issues relating to human health and disease.

Prerequisites: (BY 116 [Min Grade: C] or BY 409 [Min Grade: C]) and BY 330 [Min Grade: C]

BY 429. Evolution. 3 Hours.
The course includes the history of evolutionary thought and modern evolutionary theory. Discussions cover (but are not limited to) the history of life, mechanisms of evolutionary change, sexual selection, adaptation, speciation, and molecular evolution. Students will also be introduced to historical and contemporary studies of evolution on a wide variety of topics and organisms.
Prerequisites: BY 210 [Min Grade: C] or BY 211 [Min Grade: C]

BY 431. Principles of DNA Technology. 3 Hours.
Manipulation of genes and their regulation; techniques used in recombinant DNA technology. Lecture.
Prerequisites: (BY 210 [Min Grade: C] or BY 211 [Min Grade: C])

BY 433. Advanced Molecular Genetics and Medicine. 3 Hours.
Molecular genetics of eukaryotic organisms, including analysis of the features and nature of eukaryotic genomes, genes, nucleosomes, and chromosomes; processes involved, such as transcription, splicing, transposition, and signal transduction. The role of molecular biology in cell growth and cancer. Lecture.
Prerequisites: BY 311 [Min Grade: C]

BY 434. Functional Genomics and Systems Biology. 3 Hours.
Systems biology is an inter-disciplinary study underlying complex biological processes as integrated systems of many interacting components. This course will give students a foundation in understanding complex biological interactions at the molecular, network and genomic level. This course will cover state-of-the-art high throughput established and novel approaches used in genome sequencing, transcriptomics, proteomics and metabolomics to obtain, integrate and analyze complex data. The students will also get familiar with knowledge on experimental perturbation of genomes, gene regulatory networks, comparative genomics and evolution, basic bioinformatics. This course will be a combination of text based lectures and discussions of the current literature relevant to Functional Genomics and Systems Biology.
Prerequisites: BY 210 [Min Grade: C] or BY 211 [Min Grade: C]

BY 435. Natural History of Vertebrates. 4 Hours.
Lecture and field study of adaptations of vertebrate classes for survival in particular environments. Survey and classification of local vertebrates. Lecture and laboratory.
Prerequisites: BY 256 [Min Grade: C]

BY 435L. Natural History of Vertebrates Laboratory. 0 Hours.
Natural History of the Vertebrates Lab required with BY 435 lecture.

BY 436. Biological Processes in Aging. 3 Hours.
The #1 threat to human health – far greater than cancer, heart disease, and Alzheimer's disease combined – is aging. Aging is also a fascinating biological puzzle. Why do we, and virtually every other species, age in the first place? Why can't nature simply maintain the body it built? This course will introduce you to the fascinating process of biological aging, its impact on human and animal life, how it evolved, and the manner in which its biology is investigated, the cellular and molecular process that underlie aging, and how efforts to slow human aging are progressing. We will cover the history of exceptionally long human and animal lives and also delve into current and historical approaches to alter the rate of aging in humans with an emphasis on current promising research areas. In covering this material we will also encounter some of the many colorful scientists who have worked on the problem of aging as well as the past and current frauds and charlatans who are just trying to make a buck off of people's fear of death and disability.
Prerequisites: BY 123 [Min Grade: C] and BY 210 [Min Grade: C]

BY 437. Epigenetics. 3 Hours.
This course provides a survey of the field of epigenetics, introducing the student to the diverse areas of epigenetic research in a variety of eukaryotic systems. The course combines lectures with discussion of primary literature and research talks from invited faculty speakers working in epigenetics. In addition to providing an overview of the field of epigenetics, this course emphasizes working with primary scientific literature and the development of critical reading skills. Recommended that Molecular Genetics be completed prior to enrollment.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C] and (BY 210 [Min Grade: C] or BY 211 [Min Grade: C])

BY 440. Immunology. 3 Hours.
Immune system and functions of host humoral and cellular immune responses. Mechanisms of antigen and antibody reactions and basic immunological methods.
Prerequisites: BY 271 [Min Grade: C] and BY 330 [Min Grade: C]

BY 442. Experimental Phycology. 4 Hours.
The course uses Algae as a model system to investigate various experimental approaches to assessing productivity with specific emphasis placed on classification, respiration, photosynthesis, growth and nutrient limitation. Additionally the use of experimental examples and laboratory experiments and the interpretation of data will be used to understand all aspects of productivity. Designed to improve scientific writing skills related to research experiments. Quantitative Literacy is a significant components of this course.
Prerequisites: BY 124 [Min Grade: C] and CH 117 [Min Grade: C] and (CH 118 [Min Grade: C] or CH 119 [Min Grade: C])

BY 442L. Experimental Phycology Laboratory. 0 Hours.
Experimental Phycology Lab required with BY 442 lecture.
Prerequisites: BY 124 [Min Grade: C] and CH 117 [Min Grade: C] and (CH 118 [Min Grade: C] or CH 119 [Min Grade: C])

BY 443. Delving into Science using DNA. 4 Hours.
Are you interested in knowing how to use DNA to answer questions? Are you interested in learning more about careers in biology? If so, please join us and delve into science using DNA. In this course we will explore conservation biology, seafood integrity and safety, as well as provide you with a chance to present a research poster. You will get to interact with industry professionals as you learn about how technology is used in their jobs on a daily basis. This course will take you past of the steps of knowing what DNA is to applying it to answer meaningful questions.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C] and BY 210 [Min Grade: C]

BY 444. Biological Experimental Design and Methods. 3 Hours.
This course focuses on modern experimental design and its use in biological research. Specifically, we will discuss principles of open science and their implications for data management as they apply to commonly used methods in biological research. We will discuss experimental design, the use of appropriate controls, and the interpretations of the results obtained. Methods covered in detail will include for example PCR, DNA sequencing (Sanger and NGS), fluorescent microscopy, and bioinformatics.
Prerequisites: (BY 210 [Min Grade: C] or BY 211 [Min Grade: C]) and BY 245 [Min Grade: C]

BY 450. Plant Physiology. 3 Hours.
Metabolic activities and growth processes of plants, with emphasis on photosynthesis, respiration, germination, dormancy, and hormones; physiological phenomena associated with phases of development. Lecture.
Prerequisites: BY 210 [Min Grade: C]

BY 454. Bio Capstone: Field Phycology. 4 Hours.
Students will be introduced to freshwater and marine phycology, with an emphasis on evolutionary ecology. A major portion of the course will be based in the field along the Eastern Shore of Virginia and throughout the freshwater habitats of Alabama. Lecture, laboratory, and field trips (May session). Permission of Instructor required. Students who enroll in this class as their capstone experience are expected to do writing and ethics assignments to fulfill their capstone requirements.
Prerequisites: BY 123 [Min Grade: C] or BY 124 [Min Grade: C] or BY 210 [Min Grade: C]

BY 456. Comparative Vertebrate Anatomy. 4 Hours.
Study of the anatomical systems of vertebrates in an evolutionary and functional context. Covers form, function, development and phylogeny of vertebrates, with overviews of organ systems, and the major adaptive events of vertebrate evolution. Labs complement lectures with dissections of representative species, and surveys of specializations in other forms. Lecture and laboratory.
Prerequisites: BY 124 [Min Grade: C]

BY 456L. Comparative Vertebrate Anatomy Lab. 0 Hours.
Comparative Vertebrate Anatomy Lab required with BY 456 lecture.
Prerequisites: BY 124 [Min Grade: C]

BY 460. Advanced Invertebrate Zoology. 3 Hours.
This course takes an in-depth look at aspectd of the biology of the Echinodermata and Crustacea. The course fromat includes lectures, guest lectures, and student critiques of papers from the scientific literature. There is a field trip to Blunt Springs to search for echinoderm fossils. Lecture and student projects.
Prerequisites: BY 255 [Min Grade: C]

BY 467. Population Ecology. 3 Hours.
The course covers the structure and dynamics of populations with an emphasis on understanding how reproduction, mortality and dispersal interact to control fluctuations in population size and structure. Special emphasis will be placed on the use of computer models and interpretation of data to address specific applications in conservation biology and natural resource management. Quantitative Literacy is a significant component of this course.
Prerequisites: BY 124 [Min Grade: C]

BY 468. Ecological Genetics. 3 Hours.
This intensive course will introduce students to the genetic tools of modern population biology – which ones are available, practical, and useful for particular questions – and how these genetic analyses have been applied to a wide variety of ecological topics, including: dispersal, life histories, recruitment, habitat and mate choice, local selection, genetic differentiation, the conservation of biodiversity, and speciation. Importantly, this course is an opportunity to become proficient at applying molecular tools to bolster ecological studies. Time will be spent in lectures and learning practical coding and data analyses.
Prerequisites: BY 210 [Min Grade: C]

BY 470. Ecology. 3 Hours.
The study of interactions between organisms and their environment. An introduction to ecological processes at individual, population, community, and ecosystem levels and their relevance to current environmental problems. Lecture.
Prerequisites: BY 255 [Min Grade: C] or BY 256 [Min Grade: C] or BY 260 [Min Grade: C] or BY 271 [Min Grade: C]

BY 474. Chemical Ecology. 3 Hours.
Study of chemical interactions between organisms or between organisms and their enviroment. Topics include chemical signaling between organisms, sensing of the chemical environment, and chemical defenses against predators, pathogens, biofoulers, or competitors. Students will be introduced to these topics in a wide variety of terrestrial and aquatic habitats.
Prerequisites: BY 124 [Min Grade: C] and CH 235 [Min Grade: C]

BY 475. Comparative Developmental Biology. 3 Hours.
Mechanisms of development with emphasis on comparative biology.
Prerequisites: BY 210 [Min Grade: C] or BY 211 [Min Grade: C]

BY 480. Emergency Medicine Internship. 3 Hours.
This semester-long internship is designed to provide undergraduate students with an authentic hands-on medical research experience. The course will allow students the opportunity to assist faculty members and residents of the UAB Department of Emergency Medicine in their clinical research studies. Specifically, students will be involved in patient recruitment for the study, determine patient eligibility, reading information about the studies to patients, and collecting data regarding patient history. Students will also have the methodology associated with clinical research. Junior or senior standing, minimum GPA of 3.5, completed application and acceptance into the internship program required.

BY 481. Professional Internship in Biology. 1-3 Hour.
This course is designed for students that want to participate in professional internships with organizations employ working biologists and earn credit towards their degree for these experiences. The purpose of these internships is to allow the students to gain insights into biology career options beyond medical and professional schools, or bench research in academia or industry. Internships in any setting, including government agencies, non-profits, industry, agriculture, etc., are suitable for students enrolling in this course, given the internship provides insights into the day-to-day work life of working biologists at these institutions. Credit hours earned are dependent on the length of the internship experience.

BY 484. Bio Capstone: Chemical Ecology. 4 Hours.
Biology Capstone. Study of chemical interactions between organisms or between organisms and their environment. Topics include chemical signaling between organisms, sensing of the chemical environment, and chemical defenses against predators, pathogens, biofoulers, or competitors. Students will be introduced to these topics in a wide variety of terrestrial and aquatic habitats. Students who enroll in this class as their capstone experience are expected to do writing and ethics assignments to fulfill their capstone requirement. Cannot satisfy the capstone requirement if BY 474 credit is also present.
Prerequisites: BY 124 [Min Grade: C] and CH 235 [Min Grade: C]

BY 485. Special Topics in Biology. 0-4 Hours.
This course will consider topics from the various disciplines in the biological sciences and the topic will differ each term. Course requirements may include lecture, laboratory, readings, discussion, reporting, and internships or fieldwork, which may be conducted on- or off-campus. May be taken more than once for credit.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C] and (BY 210 [Min Grade: C] or BY 211 [Min Grade: C])

BY 487. Biology Senior Experience. 0 Hours.
Graduating Seniors in the Undergraduate Biology Major will submit documents and complete assessments required for graduation.

BY 488. Instructional Teaching Practicum. 1-3 Hour.
This course is specially designed to introduce students to the learning and teaching of biology in the college classroom. We will begin our discussions with exploring current issues in biology education and the need for a reform in the light of different teaching methodologies. It will then be followed upon by easily implementable strategies for your respective weekly group discussions. These sessions will be in the form of a series of four/five workshops followed by monthly check-in dates. Honors section will include semester projects.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C]

BY 489. Chromatin Biology Research Lab. 0-3 Hours.
This Classroom Undergraduate Research Experience is designed for students transferring to UAB and introduces them to original research in a classroom setting. The students will learn laboratory skills in molecular genetics by producing the reagents such as plasmid constructs or recombinant proteins. The students will be introduced to the scope of the project, read relevant literature, and will conclude their research experience by writing a journal-style report on their results. Thus, this course promotes proficiency in laboratory skills, writing of laboratory reports, and scientific literacy.

BY 490. Bio Capstone: Human Physiology. 4 Hours.
Biology Capstone. Physiological processes occurring at cell, tissue, organ, and system levels in mammals with an emphasis on humans. Students that enroll in this capstone experience will be expected to do additional work to fulfill their biology capstone requirement. Lecture and Laboratory. Foundation in anatomy recommended (Human Anatomy or Vertebrate Zoology). Cannot fulfill the capstone requirement if BY409/409L credit is also present.
Prerequisites: (BY 210 [Min Grade: C] or BY 211 [Min Grade: C]) and CH 237 [Min Grade: C] and (CH 238 [Min Grade: C] or CH 239 [Min Grade: C])

BY 491. Biology Capstone - Evolution. 4 Hours.
Biology Capstone. The course introduces the history of evolutionary thought and modern evolutionary theory. Discussions cover (but are not limited to) the history of life, mechanisms of evolutionary change, sexual selection, adaptation, speciation, and molecular evolution. Students will be introduced to historical and contemporary evolution studies on various topics and organisms. Students that enroll in this class as their capstone experience are expected to do writing and ethics assignments to fulfill their capstone requirement.Cannot satisfy the capstone requirement if BY429 credit is also present.

BY 492. Biology Capstone - Undergraduate Research. 4 Hours.
Research project under supervision of faculty sponsor. Student must enroll for 4 credit hours and must have senior standing. Students who enroll in this course as their capstone experience will be required to do additional work to fulfill their biology capstone requirement.

BY 493. Biology Capstone - Honors Research. 4 Hours.
Research project under supervision of faculty sponsor. You must enroll in 4 credit hours and you must have senior standing. Students that identify this course as their capstone experience will be required to do additional work to fulfill their biology capstone requirement.

BY 495. Special Topics in Biology. 0-4 Hours.
This course will consider topics from the various disciplines in the biological sciences and the topic will differ each term. Course requirements may include lecture, laboratory, readings, discussion, reporting, and internships or fieldwork, which may be conducted on- or off-campus. May be taken more than once for credit.
Prerequisites: BY 123 [Min Grade: C] and BY 124 [Min Grade: C] and (BY 210 [Min Grade: C] or BY 211 [Min Grade: C])

BY 495L. Special Topics Lab. 0 Hours.
Companion Lab for BY 495 Special Topics.

BY 496. Fundamentals of Clinical Research. 3 Hours.
Issues relevant to the conduct of clinical research: ethics, hypothesis testing, study design, and data collection and management. Lecture and clinical interaction with patients. Prerequisites: Junior or Senior level biology majors; 15 hours of biology credit with a 3.5 GPA in biology courses, and permission of instructor.

BY 498. Honors Research. 1-6 Hour.
Research project for students admitted to Honors Research Program. Two or three terms required during which minimum of 6 semester hours must be earned. Grade assigned at completion of program. 18 hours of biology with minimum GPA of 3.5 in biology classes and admission to Honors Research Program required.

BY 499. Biology Seminar. 1 Hour.
Student presentations and discussions. Subject matter varies by term. See current class schedule for topic. Senior standing and permission of instructor required.