Biology (BIOL)

BIOL 1001 General Biology 1 (3 credits)
Covers the molecular basis of life, biology of the cell, genetics and evolution in a genetic context. 3 hrs. lec., disc.
Level of Study: Undergraduate
Interdisciplinary Studies: Bioinformatics, Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%201001)

BIOL 1001H Honors General Biology 1 (3 credits)
Covers the molecular basis of life, biology of the cell, genetics and evolution in a genetic context. As an Honors Program course, includes a more intensive research or project component. 3 hrs. lec., disc.
Prerequisite: Admission to Marquette University Honors Program.
Level of Study: Undergraduate
Interdisciplinary Studies: Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%201001H)

BIOL 1002 General Biology 2 (3 credits)
Covers the diversity of Life, plant form and function, animal form and function, ecology and evolution in context of diversity. 3 hrs. lec., disc.
Prerequisite: BIOL 1001 or cons. of instr.
Level of Study: Undergraduate
Interdisciplinary Studies: Bioinformatics, Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%201002)

BIOL 1002H Honors General Biology 2 (3 credits)
Covers the diversity of Life, plant form and function, animal form and function, ecology and evolution in context of diversity. As an Honors Program course, includes a more intensive research or project component. 3 hrs. lec., disc.
Prerequisite: BIOL 1001 or BIOL 1001H; or cons. of instr.; and admission to Marquette University Honors Program.
Level of Study: Undergraduate
Interdisciplinary Studies: Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%201002H)

BIOL 1003 Biology Matters (1 credits)
A seminar to introduce students early in their academic careers to modern biological and biomedical research. Students learn about various career paths biological science graduates can take. Medical school, dental school, and graduate school will be discussed, along with the possibility of combining biology with disciplines such as law, finance and computer science. Primarily for freshmen and sophomores. S/U grade assessment.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%201003)

BIOL 1004 Biology and the Health Professions (1 credits)
A seminar to introduce students to health-related career paths available to Arts & Sciences students. Primarily for freshmen. S/U grade assessment.
Prerequisite: Enrolled in the College of Arts and Sciences.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%201004)

BIOL 1009 Biology for Non-Science Majors (3 credits)
Designed for non-science students, the course introduces biological concepts and will focus on how scientific knowledge is created. Special emphasis on cell function, evolutionary biology, genetics, and modern genetic methods. Topics covered will include inheritance of genetic traits, cloning, and biotechnology, nervous system evolution, speciation, and extinction. 3 hrs. lec., disc. May be counted toward the Natural Science requirement of the College Curriculum.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%201009)

BIOL 1101 Foundations in Biological Inquiry (3 credits)
Develop research questions based on hypothesis, design and conduct experiments, analyze data, and draw conclusions using basic biology research techniques and laboratory practices (pipetting, microscopy, solution preparation, sterile technique, spectrophotometry, PCR/DNA electrophoresis, data analysis and basic statistics, etc.). 1 hr. lect, 3 hrs. lab.
Prerequisite: BIOL 1001 or BIOL 1001H, and cons. of instr. Consent required.
Level of Study: Undergraduate
Interdisciplinary Studies: Bioinformatics
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%201101)

BIOL 1406 Plants, Pathogens and People (3 credits)
Plant diseases and their effects on food supplies and human history. Biology of plants and the pathogens that cause plant diseases. Controversies related to pesticide use, biological control, genetic engineering, biodiversity. Covers the major biology concepts. Hands-on activities and class discussions. Designed for nonscience students and Biological Science for Education majors. Does not fulfill major requirements for other biological science majors.
Level of Study: Undergraduate
Marquette Core Curriculum: NSM Basic Needs & Justice, NSM Individuals & Communities
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%201406)

BIOL 1410 Biology of Human Disease (3 credits)
Explores human physiology in relationship to health and disease. Topics include the cardiovascular system, heart disease, the immune system, infectious diseases, cancer, drug addiction, the brain and neurodegenerative disorders such as Alzheimer's disease. Emphasis on understanding scientific reporting and critically assessing the value and importance of published findings. Students are required to research, analyze and critique an independent topic based on science in the news. Designed for nonscience students and Biological Science for Education majors. Does not fulfill major requirements for other biological science majors.
Level of Study: Undergraduate
Marquette Core Curriculum: NSM Basic Needs & Justice, NSM Cgntn, Lang, Mmry/Intlgnc
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%201410)

BIOL 1420 Introduction to Environmental Biology (3 credits)
Provides an introduction to environmental biology both for non-science majors as well as students interested in pursuing environmental studies. Topics include global ecology and sustainability; fossil fuels, greenhouse gasses, housing, food production and water. Challenges students to draw on their introspective skills to form positions for use in class discussions and debates. Explorations of ethical and spiritual issues surrounding topics provide a framework for deeper discussions in the tradition of Jesuit education.
Level of Study: Undergraduate
Marquette Core Curriculum: NSM Expanding Our Horizons
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%201420)

BIOL 1510 Neuroscience for Non-majors (3 credits)
An introduction to the biology of human behavior. Students learn first, how the biological function of the brain affects thoughts, emotions, feelings and open behavior; and second, how our brain is affected by evolution, genes, life experiences and hormones.
Level of Study: Undergraduate
Marquette Core Curriculum: NSM Cgntn, Lang, Mmry/Intlgnc, NSM Expanding Our Horizons
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%201510)

BIOL 2001 Principles of Biological Investigation (3 credits)
Introduction to selected instrumentation and techniques, including light microscopy, staining, aseptic procedures, spectrophotometry, gel electrophoresis, and immunoassays. Topics may include: photosynthesis, protein quantification, bacteria, fungi, nematodes, histology, evolution, embryo development, and physiology of the nervous system. Recommended for freshman and sophomores who have completed BIOL 1002 but may be taken concurrently. 1 hr. lec., 3 hrs. lab.
Prerequisite: BIOL 1001 or BIOL 1001H.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%202001)

BIOL 2953 Seminar in Finding a Research or Internship Opportunity (1 credits)
A one-credit seminar for undergraduate students that seek to engage in an independent research and/or internship opportunity during a regular academic semester or summer period. Students meet weekly to discuss available opportunities, to learn how to prepare applications, to share experiences and to get feedback on their progress in the application process. Students will also discuss expectations and goal setting for their research/internship experience. S/U grade assessment.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%202953)

BIOL 2954 Entering Research 2 (1 credits)
A one-credit seminar for undergraduate students that is the second in a two course series, designed to complement the independent research experience. Students meet weekly to share their research experiences and to get feedback on the progress of their research projects. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%202954)

BIOL 2954H Honors Entering Research 2 (1 credits)
A one-credit seminar for undergraduate students that is the second in a two course series, designed to complement the independent research experience. Students meet weekly to share their research experiences and to get feedback on the progress of their research projects. As a Honors Program course, includes a more intensive research or project component.
Prerequisite: Admission to the BSCI Disciplinary Honors Program. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%202954H)

BIOL 3101 Biochemistry and the Molecular Basis of Biology (3 credits)
Major themes in biochemistry are examined in the context of mammalian physiology. Topics include: protein structure and enzyme catalysis, carbohydrate and lipid metabolism in relation to energy production, protein and nucleic acid synthesis, and the nature of the genetic code. 3 hrs. lec., disc.
Prerequisite: BIOL 1002 or BIOL 1002H and CHEM 2111 or CHEM 2113 (which may be taken concurrently). CHEM 2112 or CHEM 2114 are highly recommended; or cons. of instr.
Level of Study: Undergraduate
Marquette Core Curriculum: NSM Basic Needs & Justice
Interdisciplinary Studies: Bioinformatics
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%203101)

BIOL 3201 Genetics (3 credits)
Analysis of mechanisms of inheritance with emphasis on the nature of the gene, inheritance of genetic traits, and organisms with special advantages as model genetic systems. 3 hrs. lec., disc.
Prerequisite: BIOL 1001 or BIOL 1001H.
Level of Study: Undergraduate
Marquette Core Curriculum: NSM Expanding Our Horizons
Interdisciplinary Studies: Bioinformatics
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%203201)

BIOL 3301 Cell Biology (3 credits)
The cell is the basic unit of life; it is the fundamental unit from which all organisms are built. The concepts as well as the scientific evidence that underlie our current understanding of cellular organization and function are emphasized. Key cellular processes including membrane function, signaling, transcriptional regulation, protein targeting, vesicular trafficking, cytoskeleton, cell cycle regulation, and cell death are discussed. These processes are related to our understanding of human disease. 3 hrs. lec., disc.
Prerequisite: BIOL 1001 or BIOL 1001H.
Level of Study: Undergraduate
Interdisciplinary Studies: Bioinformatics
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%203301)

BIOL 3400 Ecology (3 credits)
Introductory study of the complex interactions of living organisms, including both micro-and macro-organisms, with each other and with their chemical and physical environments. Emphasis on the mathematical models underlying the principles of species interactions. 3 hrs. lec., disc.
Prerequisite: BIOL 1002 or BIOL 1002H; or cons. of instr.
Level of Study: Undergraduate
Marquette Core Curriculum: NSM Individuals & Communities
Interdisciplinary Studies: Environmental Studies, Environmental Ethics
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%203400)

BIOL 3404 Evolutionary Biology (3 credits)
Evolution is integral to understanding all facets of the life sciences with scientist Theodosius Dobzhansky famously stating, “nothing in biology makes sense except in the light of evolution.” Covers core topics in evolution including: the history of evolutionary thought in biology, genetic variation, development, population genetics, classification and phylogeny; the fossil record; biogeography, natural selection and adaptation, genetic drift, speciation and sexual selection.
Prerequisite: BIOL 1001 or BIOL 1001H; and BIOL 1002 or BIOL 1002H; or cons. of instr.
Level of Study: Undergraduate
Marquette Core Curriculum: NSM Crossing Boundaries
Interdisciplinary Studies: Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%203404)

BIOL 3986 Internship in Biological Sciences - Part-time/Summer (0 credits)
Experience with a business or non-profit organization affording students opportunities to apply and integrate knowledge and skills acquired in the classroom in professional workplaces. For the student completing a part-time internship during the fall or spring term or during the summer. Also for the student participating in a full-time summer research program at an institution external to Marquette University. Requires placement in a pre-approved internship or summer research position for a minimum of 140 hours per term or during the summer under the joint supervision of personnel at the placement site and the Biological Sciences internship director. S/U grade assessment.
Prerequisite: Cons. of internship dir. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%203986)

BIOL 3986H Honors Internship in Biological Sciences - Part-time/Summer (0 credits)
Experience with a business or non-profit organization affording students opportunities to apply and integrate knowledge and skills acquired in the classroom in professional workplaces. For the student completing a part-time internship during the fall or spring term or during the summer. Also for the student participating in a full-time summer research program at an institution external to Marquette University. Requires placement in a pre-approved internship or summer research position for a minimum of 140 hours per term or during the summer under the joint supervision of personnel at the placement site and the Biological Sciences internship director. S/U grade assessment.
Prerequisite: Cons. of internship dir; admission to the BSCI Disciplinary Honors Program. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%203986H)

BIOL 3987 Internship in Biological Sciences - Full-time (0 credits)
Experience with a business or not-for-profit organization that affords students an opportunity to apply and integrate the biology knowledge and skills they have gained in the classroom to a professional workplace setting. For students completing a pre-approved full-time internship or co-op, with no other enrollment, during the fall or spring terms. Allows students to remain in full-time status for deferment purposes, while completing the internship; however, there is no financial aid provided for this class. Placement is for a minimum of 450 hours per term under the supervision of an internship mentor/supervisor. S/U grade assessment.
Prerequisite: Cons. of internship dir. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%203987)

BIOL 3987H Honors Internship in Biological Sciences - Full-time (0 credits)
Experience with a business or not-for-profit organization that affords students an opportunity to apply and integrate the biology knowledge and skills they have gained in the classroom to a professional workplace setting. For students completing a pre-approved full-time internship or co-op, with no other enrollment, during the fall or spring terms. Allows students to remain in full-time status for deferment purposes, while completing the internship; however, there is no financial aid provided for this class. Placement is for a minimum of 450 hours per term under the supervision of an internship mentor/supervisor. S/U grade assessment.
Prerequisite: Cons. of internship dir.; admission to the BSCI Disciplinary Honors Program. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%203987H)

BIOL 3988H Summer Research Program at Marquette - Work period (0 credits)
For students completing full-time Summer Research Program at Marquette University and not concurrently registered in other classes. Requires placement is in a pre-approved, full-time Summer Research Program at Marquette under the supervision of the program director.
Prerequisite: Cons. of summer research prog. dir. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%203988H)

BIOL 4102 Experimental Molecular Biology (3 credits)
Purification, characterization and molecular analysis of proteins, nucleic acids, lipids and other biomolecules with emphasis on standard techniques widely used in research laboratories. 1 hr. lec., 4 hrs. lab.
Prerequisite: BIOL 3101 or CHEM 4530 and BIOL 4532, which may be taken concurrently with cons. of instr.
Level of Study: Undergraduate
Marquette Core Curriculum: Writing Intensive
Interdisciplinary Studies: Bioinformatics
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204102)

BIOL 4201 Genomics and Bioinformatics (3 credits)
The analysis of the structure, organization, function and evolution of prokaryotic and eukaryotic genomes. Students gain an understanding of how recent technological advances have revolutionized the field of genomics and of how large genomic datasets are generated, analyzed and visualized.
Prerequisite: BIOL 3201 or cons. of instr.
Level of Study: Undergraduate
Marquette Core Curriculum: NSM Expanding Our Horizons
Interdisciplinary Studies: Bioinformatics
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204201)

BIOL 4202 Experimental Genetics (3 credits)
Using forward and reverse genetic techniques, analyze how gene function leads to phenotypic outcomes. Explore both gross phenotypic and molecular techniques and cover graphical and statistical analysis of data. At least half of the time in class is spent in doing experiments with no planned outcome and explore real scientific questions. 1 hr. lec., 4 hrs. lab.
Prerequisite: BIOL 3201, which may be taken concurrently; and cons. of dept. ch. Consent required.
Level of Study: Undergraduate
Marquette Core Curriculum: Writing Intensive
Interdisciplinary Studies: Bioinformatics
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204202)

BIOL 4302 Experimental Cell Biology (3 credits)
Molecular and biochemical studies of cellular structure and organization in relation to integrated cellular function. 1 hr. lec., 4 hrs. lab.
Prerequisite: BIOL 3301 and cons. of dept. ch. Consent required.
Level of Study: Undergraduate
Marquette Core Curriculum: Writing Intensive
Interdisciplinary Studies: Bioinformatics
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204302)

BIOL 4401 Advanced Ecology (3 credits)
Attain in-depth understanding of the ecology of the natural world beyond the scope of introductory-level general ecology. Learn about patterns and processes of ecological populations and communities, the mechanisms believed to be responsible for these processes, and the emergent properties of ecosystems. Focus on major theories in ecology and the empirical investigations that support or refute these theories. Read classic papers that introduced or popularized major theories in ecology, as well as more recent empirical tests of those theories.
Prerequisite: BIOL 3400 or equiv.; or cons. of instr.
Level of Study: Undergraduate
Interdisciplinary Studies: Environmental Studies, Environmental Ethics
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204401)

BIOL 4402 Experimental Ecology and Field Biology (3 credits)
Experimental approach of both laboratory and field exercises designed to emphasize experimental design, ecological measurement, observation, modeling and statistical analyses of fundamental concepts in ecology. 1 hr. lec., 4 hr. lab.
Prerequisite: BIOL 3400 or equiv. Consent required.
Level of Study: Undergraduate
Marquette Core Curriculum: Writing Intensive
Interdisciplinary Studies: Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204402)

BIOL 4403 Tropical Ecology in Panama (3 credits)
Tropical Ecology is the study of the biotic and abiotic interactions that shape the origin, maintenance and consequences of species diversity in the tropics. The incredibly high species diversity found in tropical forests has intrigued biologists for centuries, including such luminaries as Darwin and Wallace and continues to engage biologists today. Explores a variety of different forest types within the Republic of Panama to gain an appreciation for the basic patterns and processes of tropical forests and the mechanisms believed to be responsible for them. Modeled after the Organization for Tropical Biology's Tropical Ecology Field Course.
Prerequisite: BIOL 3400 or cons. of instr.
Level of Study: Undergraduate
Marquette Core Curriculum: Writing Intensive
Interdisciplinary Studies: Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204403)

BIOL 4404 Molecular Evolution (3 credits)
Covers introductory topics in molecular evolution based on readings from the literature. Topics include online sequence databases, sequence alignment, detecting natural selection, building phylogenetic trees, testing alternative phylogenetic hypotheses, molecular clocks, reconstructing ancestral sequences and gene duplication and loss. Students learn to use several software packages to perform these analyses.
Prerequisite: BIOL 3404 or equiv.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204404)

BIOL 4406 Plant Biology (3 credits)
Despite their tremendous diversity in form, seed plants share many similarities in their cellular organization, metabolism, and core development paradigms. Primary course objectives include student familiarity with organization, growth and development of vascular plants; application of genetic engineering to plants; and concepts of plant evolution and reproduction from algae to flowering plants. 3 hrs. lec.
Prerequisite: BIOL 1002 or BIOL 1002H or cons. of instr.
Level of Study: Undergraduate
Interdisciplinary Studies: Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204406)

BIOL 4410 Conservation Biology (3 credits)
The goals of conservation biology are to understand the causes and consequences of biodiversity loss – from genes to populations to species to ecosystems – and to develop tools and techniques to conserve biodiversity. Reviews what is known about the causes and consequences of current biodiversity loss, established and emerging strategies and tools to conserve biodiversity, and the ecological and evolutionary theory underlying these strategies. Includes population-modeling approaches such as population viability analysis, life-history tables, and sustainable harvest models, and conservation techniques such as species recovery plans, reserve design, habitat suitability models, seed banks, and restoration ecology. Focuses on the implications of biodiversity for ecosystem function and services, as well as the implications of conservation for policy, economics, and society. Builds essential skills for a career in biology, natural-resource management or conservation, including critical review of evidence and scientific literature, quantitative and conceptual modeling and practical decision making.
Prerequisite: BIOL 3400 or cons. of instr.
Level of Study: Undergraduate
Marquette Core Curriculum: NSM Expanding Our Horizons
Interdisciplinary Studies: Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204410)

BIOL 4501 Cellular Neurobiology (3 credits)
General principles of the organization and function of the vertebrate nervous system. Topics include the cellular and molecular mechanisms of cell excitability, synaptic transmission, and how neuromodulators regulate these functions in neuronal networks; mechanisms of learning and memory at the synaptic level; sensory systems from transduction to higher-order processing; and motor systems from the neuromuscular junction to voluntary movement to provide an integrative understanding of the nervous system. A functional approach to neuroanatomy are integrated throughout the course. 3 hrs. lec., disc.
Prerequisite: BIOL 3301; or BIOL 4701, BISC 4145 or BIEN 4700.
Level of Study: Undergraduate
Marquette Core Curriculum: NSM Cgntn, Lang, Mmry/Intlgnc
Interdisciplinary Studies: Cognitive Science
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204501)

BIOL 4502 Experimental Neurobiology (3 credits)
Experimental analysis of synapses and neuronal circuitry using a variety of preparations and electrophysiological techniques. The basic electrical properties of excitable cells and chemical communication between cells are investigated. 1 hr. lec., 4 hrs. lab.
Prerequisite: BIOL 4501, which may be taken concurrently, and cons. of dept. ch.; or BIOL 4701 and cons. of dept. ch. Consent required.
Level of Study: Undergraduate
Marquette Core Curriculum: Writing Intensive
Interdisciplinary Studies: Cognitive Science
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204502)

BIOL 4532 Biochemistry 2: Bioenergetics and Metabolism (3 credits)
An exploration of the thermodynamic, cellular and molecular features contributing to the organization and regulation of major metabolic pathways in plants and animals. Major topics focus on the thermodynamic and mechanistic principles governing pathways associated with carbohydrate, nucleic acid, lipid and amino acid metabolism. The integration, regulation and origins of these metabolic systems are explored in the context of biotechnology and disease.
Prerequisite: BIOL 3301, CHEM 2112 or CHEM 2114, CHEM 4530.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204532)

BIOL 4601 Animal Development (3 credits)
The study of the ordered formation of complex, multi-cellular organisms from a single cell. A multidisciplinary exploration of the integrative processes underlying animal development, incorporating techniques of cellular and molecular biology for the study of development. 3 hrs. lec.
Prerequisite: BIOL 3301 or cons. of instr.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204601)

BIOL 4602 Experimental Vertebrate Anatomy and Development (3 credits)
Study of vertebrate anatomy at both gross and microscopic levels, facilitated by dissection of representative mammals and examination of microscope slides. Includes a developmental component supported by a study of early chick embryos.
Prerequisite: BIOL 1001 or BIOL 1001H and BIOL 1002 or BIOL 1002H, or equiv. and cons. of dept. ch. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204602)

BIOL 4701 Human Physiology (4 credits)
Designed to explain to students in Biological Sciences, Physiological Sciences and Physical Therapy curricula the systemic and cellular mechanisms responsible for cellular, organ, and system functions in the human organism. 4 hrs. lec., disc.
Prerequisite: BIOL 1002 or BIOL 1002H; or cons. of instr. BIOL 3301 recommended.
Level of Study: Undergraduate
Marquette Core Curriculum: NSM Basic Needs & Justice
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204701)

BIOL 4702 Experimental Physiology (3 credits)
Investigation of selected topics relating to the regulation of physiological activity in vertebrate organisms. Emphasis on use of modern recording systems and experimental preparation of the vertebrate for the study of integrated systemic functions. 1 hr. lec., 4 hrs. lab.
Prerequisite: BIOL 4701, which may be taken concurrently; cons. of dept. ch. Consent required.
Level of Study: Undergraduate
Marquette Core Curriculum: Writing Intensive
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204702)

BIOL 4703 Exercise Physiology (3 credits)
Study of the effects of acute and chronic exercise on selected organ systems. Particular emphasis is placed on muscle, cardiovascular, respiratory and environmental physiology.
Prerequisite: BIOL 4701 or equiv., or cons. of instr.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204703)

BIOL 4801 Microbiology (3 credits)
Study of selected groups of microorganisms (algae, bacteria, and fungi). Topics include microbial morphology, taxonomy and metabolic activities, and the effect of microorganisms on man and on the earth. 3 hrs. lec., disc.
Prerequisite: BIOL 1002 or BIOL 1002H.
Level of Study: Undergraduate
Interdisciplinary Studies: Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204801)

BIOL 4802 Experimental Microbiology (3 credits)
Basic modern approaches to the laboratory investigation of microorganisms. A major part of the course is in-depth analysis of unknown microorganisms that students isolate from the environment.
Prerequisite: BIOL 4801. Consent required.
Level of Study: Undergraduate
Marquette Core Curriculum: Writing Intensive
Interdisciplinary Studies: Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204802)

BIOL 4806 Immunobiology (3 credits)
Cellular and molecular mechanisms of the immune response. Nature of antigens and antibodies and their interactions. Topics include: complement, immediate and delayed hypersensitivity, transplantation and tumor immunobiology, immunosuppression and immunological tolerance. 3 hrs. lec., disc.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204806)

BIOL 4931 Topics in Biology (1 credits)
Analysis of selected topics under faculty supervision. S/U grade assessment. A maximum of 3 cr. hrs. of BIOL 4931 will be counted towards major.
Prerequisite: Cons. of instr. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204931)

BIOL 4931H Honors Topics in Biology (1 credits)
Analysis of selected topics under faculty supervision. S/U grade assessment. A maximum of 3 cr. hrs. of BIOL 4931 can be counted towards major. As a Honors Program course, includes a more intensive research or project component.
Prerequisite: Cons. of instr.; admission to the BSCI Disciplinary Honors Program. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204931H)

BIOL 4953 Seminar in Creative Problem Solving (1-3 credits)
Designed to enhance the undergraduate research experience. Explores the creative process of artists and STEM faculty using art-based activities, instruction, and discussion. Practices and applies creative methodology to scientific research questions. S/U grade assessment.
Prerequisite: Concurrent enrollment in BIOL 4956 or BIOL 4956H; or cons. of instr.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204953)

BIOL 4956 Laboratory Research Project in Biological Sciences (1-3 credits)
Laboratory experience in experimental design and analysis of a selected research project with faculty guidance and supervision. A maximum of six cr. hrs. of BIOL 4995 and BIOL 4956 combined can be counted toward the major.
Prerequisite: Cons. of dept. ch. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204956)

BIOL 4956H Honors Laboratory Research Project in Biological Sciences (1-3 credits)
Laboratory experience in experimental design and analysis of a selected research project with faculty guidance and supervision. A maximum of six cr. hrs. of BIOL 4995 and BIOL 4956 combined can be counted toward the major. As a Honors Program course, includes a more intensive research or project component.
Prerequisite: Cons. of dept. ch.; admission to the BSCI Disciplinary Honors Program. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204956H)

BIOL 4987 Applying the Internship Experience (3 credits)
Weekly seminar normally taken following the student's completion of a full-time or part-time internship experience. Apply and integrate the theory and practice of biology education in a professional setting. Engage with career preparedness and professional development activities, while reflecting on and communicating the skills and knowledge gained during the internship experience.
Prerequisite: BIOL 3986 or BIOL 3986H, either may be taken concurrently; or BIOL 3987 or BIOL 3987H or BIOL 3988H; and cons. of internship dir. Consent required.
Level of Study: Undergraduate
Marquette Core Curriculum: Engage Social Systms & Values 2
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204987)

BIOL 4987H Honors Applying the Internship Experience (3 credits)
Weekly seminar normally taken following the student's completion of a full-time or part-time internship experience. Apply and integrate the theory and practice of biology education in a professional setting. Engage with career preparedness and professional development activities, while reflecting on and communicating the skills and knowledge gained during the internship experience.
Prerequisite: BIOL 3986 or BIOL 3986H, either may be taken concurrently; or BIOL 3988H, BIOL 3987 or BIOL 3987H; and cons. of internship dir.; admission to the BSCI Disciplinary Honors Program. Consent required.
Level of Study: Undergraduate
Marquette Core Curriculum: Engage Social Systms & Values 2
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204987H)

BIOL 4995 Independent Study in Biology (1-3 credits)
Readings and analyses of published papers on selected topics in biology.
Prerequisite: Jr. or Sr. stndg., cons. of instr., and cons. of dept ch. A maximum of six (6) cr. hrs. of BIOL 4995 and BIOL 4956 combined can counted toward the major. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204995)

BIOL 4995H Honors Independent Study in Biology (1-3 credits)
Readings and analyses of published papers on selected topics in biology. As a Honors Program course, includes a more intensive research or project component. A maximum of six (6) cr. hrs. of BIOL 4995H and BIOL 4956H combined can be counted toward the major.
Prerequisite: Jr. or Sr. stndg., cons. of instr., and cons. of dept ch.; admission to the BSCI Disciplinary Honors Program. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%204995H)

BIOL 5102 Experimental Molecular Biology (3 credits)
Purification, characterization and molecular analysis of proteins, nucleic acids, lipids and other biomolecules with emphasis on standard techniques widely used in research laboratories. 1 hr. lec., 4 hrs. lab.
Prerequisite: BIOL 3101 or CHEM 4530 and BIOL 4532 or equiv.
Level of Study: Graduate
Marquette Core Curriculum: Writing Intensive
Interdisciplinary Studies: Bioinformatics
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%205102)

BIOL 5201 Genomics and Bioinformatics (3 credits)
The analysis of the structure, organization, function and evolution of prokaryotic and eukaryotic genomes. Students gain an understanding of how recent technological advances have revolutionized the field of genomics and of how large genomic datasets are generated, analyzed and visualized.
Level of Study: Graduate
Marquette Core Curriculum: NSM Expanding Our Horizons
Interdisciplinary Studies: Bioinformatics
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%205201)

BIOL 5401 Advanced Ecology (3 credits)
Attain in-depth understanding of the ecology of the natural world beyond the scope of introductory-level general ecology. Learn about patterns and processes of ecological populations and communities, the mechanisms believed to be responsible for these processes, and the emergent properties of ecosystems. Focus on major theories in ecology and the empirical investigations that support or refute these theories. Read classic papers that introduced or popularized major theories in ecology, as well as more recent empirical tests of those theories.
Level of Study: Graduate
Interdisciplinary Studies: Environmental Studies, Environmental Ethics
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%205401)

BIOL 5403 Tropical Ecology in Panama (3 credits)
Tropical Ecology is the study of the biotic and abiotic interactions that shape the origin, maintenance and consequences of species diversity in the tropics. The incredibly high species diversity found in tropical forests has intrigued biologists for centuries, including such luminaries as Darwin and Wallace and continues to engage biologists today. Explores a variety of different forest types within the Republic of Panama to gain an appreciation for the basic patterns and processes of tropical forests and the mechanisms believed to be responsible for them. Modeled after the Organization for Tropical Biology's Tropical Ecology Field Course.
Level of Study: Graduate
Marquette Core Curriculum: Writing Intensive
Interdisciplinary Studies: Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%205403)

BIOL 5404 Molecular Evolution (3 credits)
Covers introductory topics in molecular evolution based on readings from the literature. Topics include online sequence databases, sequence alignment, detecting natural selection, building phylogenetic trees, testing alternative phylogenetic hypotheses, molecular clocks, reconstructing ancestral sequences and gene duplication and loss. Students learn to use several software packages to perform these analyses.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%205404)

BIOL 5410 Conservation Biology (3 credits)
The goals of conservation biology are to understand the causes and consequences of biodiversity loss – from genes to populations to species to ecosystems – and to develop tools and techniques to conserve biodiversity. Reviews what is known about the causes and consequences of current biodiversity loss, established and emerging strategies and tools to conserve biodiversity, and the ecological and evolutionary theory underlying these strategies. Includes population-modeling approaches such as population viability analysis, life-history tables, and sustainable harvest models, and conservation techniques such as species recovery plans, reserve design, habitat suitability models, seed banks, and restoration ecology. Focuses on the implications of biodiversity for ecosystem function and services, as well as the implications of conservation for policy, economics, and society. Builds essential skills for a career in biology, natural-resource management or conservation, including critical review of evidence and scientific literature, quantitative and conceptual modeling and practical decision making.
Level of Study: Graduate
Marquette Core Curriculum: NSM Expanding Our Horizons
Interdisciplinary Studies: Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%205410)

BIOL 5501 Cellular Neurobiology (3 credits)
General principles of the organization and function of the vertebrate nervous system. Topics include the cellular and molecular mechanisms of cell excitability, synaptic transmission, and how neuromodulators regulate these functions in neuronal networks; mechanisms of learning and memory at the synaptic level; sensory systems from transduction to higher-order processing; and motor systems from the neuromuscular junction to voluntary movement to provide an integrative understanding of the nervous system. A functional approach to neuroanatomy are integrated throughout the course. 3 hrs. lec., disc.
Level of Study: Graduate
Marquette Core Curriculum: NSM Cgntn, Lang, Mmry/Intlgnc
Interdisciplinary Studies: Cognitive Science
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%205501)

BIOL 5532 Biochemistry 2: Bioenergetics and Metabolism (3 credits)
An exploration of the thermodynamic, cellular and molecular features contributing to the organization and regulation of major metabolic pathways in plants and animals. Major topics focus on the thermodynamic and mechanistic principles governing pathways associated with carbohydrate, nucleic acid, lipid and amino acid metabolism. The integration, regulation and origins of these metabolic systems are explored in the context of biotechnology and disease.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%205532)

BIOL 5703 Exercise Physiology (3 credits)
Study of the effects of acute and chronic exercise on selected organ systems. Particular emphasis is placed on muscle, cardiovascular, respiratory and environmental physiology.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%205703)

BIOL 5802 Experimental Microbiology (3 credits)
Basic modern approaches to the laboratory investigation of microorganisms. A major part of the course is in-depth analysis of unknown microorganisms that students isolate from the environment.
Prerequisite: Consent required.
Level of Study: Graduate
Marquette Core Curriculum: Writing Intensive
Interdisciplinary Studies: Environmental Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%205802)

BIOL 5806 Immunobiology (3 credits)
Cellular and molecular mechanisms of the immune response. Nature of antigens and antibodies and their interactions. Special topics include complement, immediate and delayed hypersensitivity, transplantation and tumor immunobiology, immunosuppression, and immunological tolerance. 3 hrs. lec., disc.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%205806)

BIOL 6001 Radioisotope Safety (2 credits)
Ionizing radiation: proper safety procedures in the independent use of radioisotopes and current regulatory guidelines and licensing procedures.
Prerequisite: BIOL 1002 and CHEM 1002; or BIOL 1009 and CHEM 1002; or cons. of dept. ch.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%206001)

BIOL 6096 Laboratory Rotations in Biology (1-3 credits)
Informal lab rotation of first-year graduate students based on mutual preferences of the student and faculty member including lab group meetings, literature research, bench work, presentation of findings and/or research plan to lab members. S/U grade assessment.
Prerequisite: Cons. of dept. ch. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%206096)

BIOL 6097 Laboratory Research in Biology (1-3 credits)
Independent research of second year graduate students based on their dissertation/thesis research laboratories, including lab group meetings, literature research, bench work and presentation of findings. S/U grade assessment.
Prerequisite: BIOL 6096 and cons. of dept. ch. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%206097)

BIOL 6952 Department Colloquium (0 credits)
Scholarly reports on selected topics in modern biology by visiting and resident investigators and graduate students. Registration and attendance required of all full-time graduate students in biology. S/U grade assessment.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%206952)

BIOL 6995 Independent Study in Biological Sciences (1-3 credits)
Faculty-supervised, independent study/research of a specific area or topic in biology.
Prerequisite: Cons. of instr. and cons. of dept. ch. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%206995)

BIOL 6999 Master's Thesis (1-6 credits)
S/U grade assessment.
Prerequisite: Cons. of dept. ch. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%206999)

BIOL 8004 Strong Inference and Experimental Design (3 credits)
Designed to teach the central components of the scientific method with an emphasis on hypothesis development (strong inference), experimental design, data analysis and data presentation.
Prerequisite: Enrolled in the BSCI-PHD program; or cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208004)

BIOL 8005 Scientific Writing (3 credits)
Designed to teach basics of clear and effective scientific writing with emphasis on preparing and evaluating research manuscripts and proposals. Students learn editing techniques through deconstructing and revising others' work.
Prerequisite: Enrolled in the BSCI-PHD program; or cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208005)

BIOL 8007 Biometry (3 credits)
Focuses on formalizing experimental design into a quantitative framework. Presented in a modern computational approach, emphasis is placed on model fitting, effect size estimation, and uncertainty, rather than strictly assessing 'significance' by means of p-values.
Prerequisite: Enrolled in the BSCI-PHD program and BIOL 8004; or cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208007)

BIOL 8101 Protein Structure and Function (2 credits)
Advanced protein biochemistry stressing methodology and primary literature. Topics include: structural and chemical properties of amino acids, peptides and proteins; protein folding and assembly; protein-protein and protein-ligand interactions; enzyme kinetics and regulation; and the determination of protein structure. Uses examples from glycolytic and gluconeogenic metabolic pathways to highlight the structural basis for catalysis and regulation.
Prerequisite: BIOL 3101 or equiv.; or cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208101)

BIOL 8102 Biochemistry and Function of Nucleic Acids (2 credits)
The biochemistry of RNA and DNA with emphasis on biological function and evolution. Specific topics include: nucleic acid structure, biophysical properties, biosynthesis, and molecular function.
Prerequisite: BIOL 3101 or cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208102)

BIOL 8110 Proteostasis (3 credits)
Designed to follow proteins from birth at the ribosome, through life as a functional component of the cell, and into degradation at the end of the life-cycle.
Prerequisite: Enrolled in the BSCI-PHD program and BIOL 3101 or equiv.; or cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208110)

BIOL 8201 Epigenetics (3 credits)
Focuses on the molecular biology of epigenetic gene expression states of eukaryotic model organisms and introduces molecular and genetic approaches to the analysis of epigenetic problems. In particular, the course addresses DNA methylation, RNA interference, chromatin structure, transposable elements and gene silencing.
Prerequisite: Enrolled in the BSCI-PHD program and BIOL 3201 and BIOL 3301 or equiv.; or cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208201)

BIOL 8202 Principles of Eukaryotic Genetics (2 credits)
Genetics of eukaryotic model organisms with a focus on genetic approaches to the analysis of contemporary biological problems. Eukaryotic chromosome structure and function.
Prerequisite: BIOL 3201 or equiv.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208202)

BIOL 8301 Imaging and Cytoskeletons (2 credits)
Discusses the principles of cytoskeleton and molecular motors and modern imaging tools developed for the studies of cellular mechanisms.
Prerequisite: BIOL 2301 or equiv.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208301)

BIOL 8302 Proteins in Eukaryotic Cells (3 credits)
An in-depth analysis of the role of proteins in eukaryotic cells. Discusses, in detail, mechanisms of protein translocation across biological membranes and the genetic and biochemical analysis of protein sorting to diverse organelles.
Prerequisite: BIOL 3301 or equiv. Consent required. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208302)

BIOL 8603 Cell and Molecular Biology of Early Development (3 credits)
Study of the cellular and molecular mechanisms underlying the specification of cell fate in a variety of model organisms including fruit flies, nematodes, mice and zebra fish. Emphasizes genetic, biochemical and molecular techniques used in studying these complex systems.
Prerequisite: Enrolled in BSCI-PHD; and BIOL 3301 or equiv. or BIOL 4601 or equiv.; or cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208603)

BIOL 8701 Advanced Physiology and Organ Systems (3 credits)
Focuses on organ systems and how organs contribute to the overall physiology of organisms. Topics include homeostatic control and disease states.
Prerequisite: Enrolled in BSCI-PHD; and BIOL 4701 or equiv.; or cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208701)

BIOL 8704 Cellular Homeostasis (2 credits)
Detailed study of the proteins and pathways involved in the maintenance of cell volume, pH, and ionic balance, including the analysis of the function of plasma membrane transporter and channel proteins. The emphasis will be on eukaryotic cells, but prokaryotic cells will also be covered.
Prerequisite: BIOL 2301 or equiv., or cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208704)

BIOL 8801 Prokaryotic Molecular Genetics (2 credits)
Basic principles of bacterial genetics and regulation of gene expression. Points of emphasis: 1) how genetics and regulation shape and are shaped by the biology of the organism, 2) principles that are important to all biologists, including the manipulation of bacteria in genetic cloning and protein production, 3) application of genetics to elucidate cell physiology and biochemistry.
Prerequisite: BIOL 3101 or BIOL 4801 or BIOL 8102 or an equiv. of any of these; or cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208801)

BIOL 8802 Microbiomes in Health and the Environment (3 credits)
Exploration of the ways bacteria, archaea and viruses influence all ecosystems on the planet, from extreme environments to human bodies.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208802)

BIOL 8803 Microbial Diversity and Ecology (2-3 credits)
Study of microbial phylogenic and physiological diversity underlying the ecological interactions in natural communities. Emphasizes quantitative molecular techniques and sequencing used in studying microbial communities in the environment. Develops critical thinking and writing skills in determining research objectives and testing hypotheses. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208803)

BIOL 8931 Topics in Biology (1-3 credits)
Subject matter variable as determined by needs of biological sciences graduate students. Students may enroll more than once as subject matter changes.
Prerequisite: Cons. of dept. ch. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208931)

BIOL 8953 Seminar in Biochemistry and Genetics (1 credits)
Topics of current interest in biochemistry and genetics.
Prerequisite: Cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208953)

BIOL 8954 Seminar in Plant Molecular Biology (1 credits)
Topics of current interest in plant molecular biology.
Prerequisite: Cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208954)

BIOL 8955 Seminar in Neuroscience (1 credits)
Topics of current interest in neuroscience.
Prerequisite: Cons. of instr. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208955)

BIOL 8956 Seminar in Cell and Developmental Biology (1 credits)
Topics of current interest in cell and developmental biology.
Prerequisite: Cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208956)

BIOL 8957 Seminar in Physiology (1 credits)
Topics of current interest in physiology.
Prerequisite: Cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208957)

BIOL 8958 Seminar in Ecology and Evolutionary Biology (1 credits)
Topics of current interest in ecology and evolutionary biology.
Prerequisite: Cons. of instr.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208958)

BIOL 8959 Seminar in Microbiology (1 credits)
Topics of current interest in microbiology.
Prerequisite: Cons. of instr. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208959)

BIOL 8995 Independent Study in Biological Sciences (1-3 credits)
Faculty-supervised, independent study/research of a specific area or topic in biology.
Prerequisite: Cons. of instr. and cons. of dept. ch. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208995)

BIOL 8999 Doctoral Dissertation (1-12 credits)
S/U grade assessment.
Prerequisite: Cons. of dept. ch. Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%208999)

BIOL 9002H Honors Student Study/Research Placeholder in Biology (0 credits)
Used to enroll a honors student who is not enrolled in the term, but is on campus for an educational experience other than academic credit, such as work in a lab or clinic. Used for tracking purposes only. SNC/UNC grade assessment.
Prerequisite: Cons. of dept. ch. Consent required.
Level of Study: Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209002H)

BIOL 9970 Graduate Standing Continuation: Less than Half-Time (0 credits)
Fee. S/U grade assessment. Designated as less than half-time status only, cannot be used in conjunction with other courses, and does not qualify students for financial aid or loan deferment.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209970)

BIOL 9974 Graduate Fellowship: Full-Time (0 credits)
Fee. S/U grade assessment. Designated as full-time status. If a student is already registered in other courses full time, this continuation course is not needed.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209974)

BIOL 9975 Graduate Assistant Teaching: Full-Time (0 credits)
Fee. S/U grade assessment. Designated as full-time status. If a student is already registered in other courses full time, this continuation course is not needed.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209975)

BIOL 9976 Graduate Assistant Research: Full-Time (0 credits)
Fee. S/U grade assessment. Designated as full-time status. If a student is already registered in other courses full time, this continuation course is not needed.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209976)

BIOL 9984 Master's Comprehensive Examination Preparation: Less than Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of less than half-time status. Requires that the student is working less than 12 hours per week toward their master's comprehensive exam.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209984)

BIOL 9985 Master's Comprehensive Examination Preparation: Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of half-time status. Requires that the student is working more than 12 to less than 20 hours per week toward their master's comprehensive exam. May be taken in conjunction with credit-bearing or other non-credit courses to result in the status indicated, as deemed appropriate by the department.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209985)

BIOL 9986 Master's Comprehensive Examination Preparation: Full-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of full-time status. Requires that the student is working 20 hours or more per week toward their master's comprehensive exam. May be taken in conjunction with credit-bearing or other non-credit courses to result in the status indicated, as deemed appropriate by the department.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209986)

BIOL 9987 Doctoral Qualifying Examination Preparation: Less than Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of less than half-time status. Requires that the student is working less than 12 hours per week toward their doctoral qualifying exam.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209987)

BIOL 9988 Doctoral Qualifying Examination Preparation: Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of half-time status. Requires that the student is working more than 12 to less than 20 hours per week toward their doctoral qualifying exam. May be taken in conjunction with credit-bearing or other non-credit courses to result in the status indicated, as deemed appropriate by the department.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209988)

BIOL 9989 Doctoral Qualifying Examination Preparation: Full-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of full-time status. Requires that the student is working 20 hours or more per week toward their doctoral qualifying exam. May be taken in conjunction with credit-bearing or other non-credit courses to result in the status indicated, as deemed appropriate by the department.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209989)

BIOL 9995 Master's Thesis Continuation: Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of half-time status. Requires that the student is working more than 12 to less than 20 hours per week on their master's thesis. All six thesis credits required for the degree should be completed before registering for non-credit Master's Thesis Continuation.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209995)

BIOL 9996 Master's Thesis Continuation: Full-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of full-time status. Requires that the student is working 20 hours or more per week on their master's thesis. All six thesis credits required for the degree should be completed before registering for non-credit Master's Thesis Continuation.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209996)

BIOL 9998 Doctoral Dissertation Continuation: Half-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of half-time status. Requires that the student is working more than 12 to less than 20 hours per week on their doctoral dissertation. All 12 dissertation credits required for the degree should be completed before registering for non-credit Doctoral Dissertation Continuation.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209998)

BIOL 9999 Doctoral Dissertation Continuation: Full-Time (0 credits)
Fee. S/U grade assessment. Allows a student to be considered the equivalent of full-time status. Requires that the student is working 20 hours or more per week on their doctoral dissertation. All 12 dissertation credits required for the degree should be completed before registering for non-credit Doctoral Dissertation Continuation.
Prerequisite: Consent required.
Level of Study: Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOL%209999)

BIOLI 4403 Tropical Ecology in Panama (3 credits)
Tropical Ecology is the study of the biotic and abiotic interactions that shape the origin, maintenance and consequences of species diversity in the tropics. The incredibly high species diversity found in tropical forests has intrigued biologists for centuries, including such luminaries as Darwin and Wallace and continues to engage biologists today. Explores a variety of different forest types within the Republic of Panama to gain an appreciation for the basic patterns and processes of tropical forests and the mechanisms believed to be responsible for them. Modeled after the Organization for Tropical Biology's Tropical Ecology Field Course.
Prerequisite: BIOL 3400 or cons. of instr.
Level of Study: Undergraduate
Marquette Core Curriculum: Writing Intensive
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BIOLI%204403)