# Biomedical Sciences (BISC)

**BISC 1001 Contemporary Issues in Biomedical Sciences (1 credits)**
Introduction to the field of biomedical sciences with a special emphasis on current topics in health and medicine, development of critical thinking skills, and professional development. S/U grading basis.
*Prerequisite:* BISC major with Freshman stndg.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%201001)

**BISC 1015 Principles of Human Anatomy and Physiology (5 credits)**
Principles of Human Anatomy and Physiology is an introduction to the structures and functions of the human body. Laboratory included. Does not apply towards the BISC minor and does not meet the needs of many health professional prerequisites.
*Prerequisite:* NURS major, MLSC major, or cons. of instr.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%201015)

**BISC 1030 Introduction to Dentistry (1 credits)**
An introduction to the diverse aspects of the dental profession, featuring guest speakers and hands-on laboratory techniques. S/U grade assessment.
*Prerequisite:* Cons. of dept. ch. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%201030)

**BISC 1035 Principles of Human Anatomy (4 credits)**
A study of the fundamental anatomical structure and organization of the organs and systems of the human body. Not to be taken for credit by students who have completed BISC 3135. Course does not apply to the BISC major, but does apply to the BISC minor.
*Prerequisite:* BIOL 1001.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%201035)

**BISC 1060 Chemistry for the Health Professions (3 credits)**
An introduction to general chemistry and organic chemistry stressing those aspects necessary for the health professions.
*Prerequisite:* NURS major.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%201060)

**BISC 2010 Path to Research (1 credits)**
Encourages highly motivated students to consider research as a career path by helping to facilitate research readiness and enhance quantitative and methodological skills while also dispelling misconceptions or stereotypes of research. Topics include the scientific method, scientific reasoning, experimental design (e.g., appropriate control groups and experiments), hypothesis testing, record keeping, data interpretation and analysis as well as in-depth discussions of ethical issues that can occur in research environments.
*Prerequisite:* Soph. stndg.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%202010)

**BISC 2015 Principles of Human Anatomy and Physiology 1 (3 credits)**
The first of a two-course human anatomy and physiology sequence. Provides an introduction to the structures and functions of the human body. Laboratory included.
*Prerequisite:* NURS major.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%202015)

**BISC 2016 Principles of Human Anatomy and Physiology 2 (3 credits)**
The second course in a two-course human anatomy and physiology sequence. Provides an introduction to the structures and functions of the human body. Laboratory included.
*Prerequisite:* BISC 2015 and NURS major; or MLSC major.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%202016)

**BISC 2020 Medical Terminology (1 credits)**
Studies medical terminology organized by body systems with a focus on prefixes, suffixes, word roots and their combining form.
*Prerequisite:* BISC 3135 and BISC major.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%202020)

**BISC 2050 Organic Chemistry for the Health Sciences (1 credits)**
An introduction to organic chemistry stressing those aspects necessary for biochemistry and health care.
*Prerequisite:* CHEM 1001 and CHEM 1002.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%202050)

**BISC 2070 Biochemistry for the Health Professions (3 credits)**
Survey course of carbohydrates, lipids, proteins, enzymes, bioenergetics, metabolism of carbohydrates, lipids, proteins, and nucleotides. Emphasis placed on health and disease.
*Prerequisite:* BISC 1060; or courses in general and organic chemistry; or cons. of instr.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%202070)

**BISC 3110 Nutritional Aspects of Health (3 credits)**
Basic principles and fundamentals of human nutrition. Nutrients are discussed in terms of sources, absorption, metabolism and utilization, deficiency, requirements, and assessment of status. Life cycle nutrition and nutrition in disease states. Intended audience: future health care professionals. Not to be taken for credit by students who have earned credit for HEAL 2045.
*Prerequisite:* Jr. stndg. and a course in biochemistry; or enrolled in the Biomedical Sciences Post-Bacc program; or cons. of instr.
*Level of Study:* Undergraduate
*Marquette Core Curriculum:* NSM Basic Needs & Justice
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%203110)

**BISC 3115 Human Microbiology (3 credits)**
A medical microbiology course focusing on the general biology of bacterial, viral, fungal and parasitic pathogens of human medical importance and the response of the human host. Important infectious diseases of humans are taught based on body system with an emphasis on etiology, pathogenesis, epidemiology, treatment and control. Basic identification procedures and microbial control (sterilization, disinfection, antibiotics, vaccination) are also addressed.
*Prerequisite:* BIOL 1002, and a biochemistry course, which may be taken concurrently; or cons. of instr.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%203115)

**BISC 3135 Clinical Human Anatomy (4 credits)**
A regional approach to human anatomy where all body systems are integrated. Correlations between structure and function are emphasized. Laboratory included.
*Prerequisite:* BIOL 1001 and BIOL 1002 and Soph. stndg.; or cons. of instr.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%203135)

**BISC 3136 Gross Anatomy for the Biomedical Sciences (2 credits)**
This undergraduate human gross anatomy laboratory course takes a regional approach to the dissection of human cadaveric material and includes all body structures/systems. Space reserved for Biomedical Sciences majors in good standing. Enrollment is limited based upon specimen availability.
*Prerequisite:* BISC 3135 and cons. of instr. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%203136)

**BISC 3150 General Pathology (3 credits)**
Overview of cellular degenerations, inflammation and neoplasia. Various organ systems and their primary disease states will then be presented. These systems include musculoskeletal, nervous, cardiovascular, pulmonary, reproductive, digestive, endocrine, and integument. Taught using lecture note handouts, Power Point, websites and examination objectives.
*Prerequisite:* BISC 3135 and BISC 4145, which may be taken concurrently; or enrolled in the Biomedical Sciences Post-Baccalaureate program; or cons. of instr.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%203150)

**BISC 3213 Biochemistry (4 credits)**
The chemistry of cells in health and disease. Structure and function of proteins, carbohydrates, lipids, and nucleic acids; enzyme function, cell signaling, cellular metabolism and biological information flow (molecular biology).
*Prerequisite:* CHEM 2111 or CHEM 2113, or enrolled in the Biomedical Sciences Pre-Dental Post-Baccalaureate program.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%203213)

**BISC 3859 Evolution (3 credits)**
Evolution consists of describing its history and analyzing its causes and mechanisms. Emphasizes the general principles of evolution, the hypotheses about the causes of evolutionary change that apply to the most organisms, and the major patterns of change that have characterized many different groups.
*Prerequisite:* BIOL 1001 and BIOL 1002, a biochemistry course, and cons. of instr. Consent required.
*Level of Study:* Undergraduate
*Marquette Core Curriculum:* NSM Crossing Boundaries
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%203859)

**BISC 3929 Reflective Analysis of Global Dental Brigade (0 credits)**
Taken in conjunction with a Global Dental Brigade trip. Ignatian pedagogical principles are used to reflect on the influence of race, class and gender in a practical setting. Uses the real world experience students gain from working with people in a different country to build and reflect on, gender, class and racial issues. The goal is to engage students through the use of their shared experience with another culture to direct them to reflect on these issues. Consistent with the ESSV2 requirement for the Marquette core, it helps students develop skills to engage with a spectrum of people, communities and systems of value. S/U grade assessment
*Prerequisite:* Participation in Global Dental Brigade prog. 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=BISC%203929)

**BISC 3954 U-RISE Entering Biomedical Research Seminar 1 (2 credits)**
Designed to enhance the independent research experience by equipping students with essential skills to thrive in a research environment. Explore mentor-mentee dynamics, develop a deep understanding of their lab's research focus, and engage in professional development activities such as crafting a CV and preparing for summer research opportunities. First of a four-course sequence.
*Prerequisite:* Accepted to the URISE program.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%203954)

**BISC 3955 U-RISE Entering Biomedical Research Seminar 2 (2 credits)**
Designed to enhance the independent research experience by focusing on developing confidence as a researcher and skills to be productive in the research environment. Develop a strong foundation in their research project's background and build self-efficacy as scientists, tackling challenges like imposter syndrome, stereotype threat, and handling rejection and failure. Students will be coached in science communication, focusing on crafting and delivering effective oral presentations. Second of a four-course sequence.
*Prerequisite:* Accepted to the URISE program.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%203955)

**BISC 3956 U-RISE Entering Biomedical Research Seminar 3 (2 credits)**
Designed to enhance the independent research experience by fostering independence as a researcher, by equipping students with the skills needed to thrive as autonomous scientists. Emphasis is on effective written communication within the research community, including fundamentals of grant writing. Guidance through the process of identifying and applying to PhD programs to pursue their professional goals, with support in crafting CVs and personal statements. Third of a four-course sequence.
*Prerequisite:* Accepted to the URISE program.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%203956)

**BISC 3957 U-RISE Entering Biomedical Research Seminar 4 (2 credits)**
Designed to enhance the independent research experience by focusing on skills needed to become an independent and autonomous researcher. Students receive coaching on how to interview for and select the right PhD program, as well as enhance their scientific communication abilities. A key aspect of the course is refining mentoring and leadership skills, enabling students to serve as role models for novice researchers. Fourth of a four-course sequence.
*Prerequisite:* Accepted to the URISE program.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%203957)

**BISC 3987 Internship in Biomedical Sciences-Work Period (0 credits)**
Working period of a summer co-op or intern experience in an approved biomedical sciences related field. Features educational activity and productive work related to health care delivery or industrial or administrative aspects of health care. S/U grade assessment.
*Prerequisite:* Cons. of BISC internship dir. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%203987)

**BISC 3989 Research Internship in Biomedical Sciences-Work Period (0 credits)**
Work period of summer, mentored research on a topic approved by Biomedical Sciences in an off-campus research laboratory. S/U grade assessment.
*Prerequisite:* Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%203989)

**BISC 4010 Neuroeconomics: The Neuroscience of Decision Making (3 credits)**
Designed for students who have an understanding of the fundamentals of neuroscience and would like to learn more about how specific brain processes contribute to the decision to follow a course of action. Topics include valuation, learning, emotion, social behavior and action selection.
*Prerequisite:* BISC 3850, BISC 4140 or PSYC 3601.
*Level of Study:* Undergraduate
*Marquette Core Curriculum:* NSM Cgntn, Lang, Mmry/Intlgnc
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204010)

**BISC 4020 Molecular Neuroscience (3 credits)**
Examines living brains at the most fundamental level – that of ions, molecules, membrane structures and cells. Touches upon the molecular machinery responsible for information processing by neuronal and non-neuronal brain cells. Focuses on the common motifs involved in intra and inter-cellular communication, including membrane excitability, electrochemical signal transduction, synaptic transmission and short and long-term storage of memories. Uses this information to gain insight into the mechanistic basis of a range of brain states.
*Prerequisite:* BIOL 1001 and Soph. stndg.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204020)

**BISC 4112 Head and Neck Anatomy (3 credits)**
Survey of neuroanatomy, sensory systems and speech, muscular and vascular systems, and osteology of the head and neck. An emphasis is placed on functional anatomy and significant clinical correlates. Laboratory included. Not to be taken for credit by students who are enrolled in or have earned credit for BISC 4113.
*Prerequisite:* BISC 3135 and BISC major; or cons. of instr.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204112)

**BISC 4113 Anatomy Teaching Practicum (3 credits)**
Applies active learning strategies and advanced anatomy knowledge to teach human gross anatomy in a laboratory setting to graduate or professional students as well as advanced undergraduate students. Students are evaluated on teaching and anatomy project presentation. Must have completed Anatomy Fellows Program in previous summer (BISC 9002).
*Prerequisite:* BISC major and BISC 9002 Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204113)

**BISC 4120 Pharmacology (3 credits)**
Covers the fundamentals of human pharmacology and the basic principles dictating drug action within the human body. Focuses on the therapeutic actions and clinical applications of various drug classes with emphasis on cellular mechanisms, physiological responses, adverse reactions and clinical indications, accompanied by general discussion on the pathological conditions for which common therapeutic agents are used.
*Prerequisite:* A course in biochemistry and BISC 4145; or enrolled in the Biomedical Sciences Post-Baccalaureate program; or cons. of instr.
*Level of Study:* Undergraduate
*Marquette Core Curriculum:* NSM Expanding Our Horizons
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204120)

**BISC 4140 Functional Neuroanatomy (3 credits)**
Examines the basic structure and function of the central nervous system from spinal cord to cerebral cortex. Material is presented within both clinical and basic contexts. Based on the understanding of the normal circuitry and function of the brain, students progress toward developing the preliminary skills to diagnose or explain clinically relevant neurological disorders. Laboratory included.
*Prerequisite:* BISC 3135.
*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=BISC%204140)

**BISC 4142 Science and Society (1 credits)**
A discussion-based course focused on topics that are determined collaboratively, but may include human sexuality, mental and physical health, human evolution, race and identity and violence. Students integrate the knowledge gained from past course work to critically read and evaluate popular, journalistic and scholarly writing on topics related to human biology.
*Prerequisite:* BISC Major, Jr. stndg.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204142)

**BISC 4142H Science and Society (1 credits)**
A discussion-based disciplinary honors course focused on topics that are determined collaboratively, but may include human sexuality, mental and physical health, human evolution, race and identity and violence. Students integrate the knowledge gained from past course work to critically read and evaluate popular, journalistic and scholarly writing on topics related to human biology. As an Honors Program course, includes a more intensive research or project component.
*Prerequisite:* Jr. stndg. and admission to BISC Disciplinary Honors Program.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204142H)

**BISC 4145 Human Physiology (4 credits)**
Human physiology including blood and circulation, muscular, neuronal and sensory systems, renal and respiratory systems, digestion, metabolism, reproduction, their control by the endocrine and central nervous systems, and clinical correlates.
*Prerequisite:* BISC 3135; and BISC 2070 or BISC 3213, which may be taken concurrently; and Jr. stndg.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204145)

**BISC 4146 Physiology In Depth: Contemporary Issues (1 credits)**
In depth treatment of selected topics in physiology with an emphasis on contemporary issues relevant to health and physiology.
*Prerequisite:* BISC 4145. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204146)

**BISC 4146H Honors Physiology In Depth: Contemporary Issues (1 credits)**
In depth treatment of selected topics in physiology with an emphasis on contemporary issues relevant to health and physiology. As an Honors Program course, includes a more intensive research or project component.
*Prerequisite:* BISC 4145 and admission to BISC Disciplinary Honors Program.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204146H)

**BISC 4147 Human Physiology Laboratory (1 credits)**
Uses virtual laboratory technology and a team-based learning approach to investigate fundamental concepts of human physiology. Clinical correlates are emphasized in a problem-based learning format.
*Prerequisite:* BISC 4145, which may be taken concurrently.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204147)

**BISC 4150 Outbreaks, Epidemics and Pandemics (3 credits)**
Through case studies, discussion, and group work, students develop an understanding of how infectious disease epidemics occur, what can be done to control them and why control efforts succeed or fail. By exploring the characteristics of pathogens and human hosts that contribute to disease spread, students gain the knowledge and skills to understand the implications of newly emerging pathogens and are able to advocate for what needs to be done to prevent outbreaks.
*Prerequisite:* BISC 3115 and Sr. stndg.
*Level of Study:* Undergraduate
*Marquette Core Curriculum:* NSM Crossing Boundaries
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204150)

**BISC 4151 Advanced Pathology (1 credits)**
In depth coverage of selected topics in pathology, with an emphasis on current topics that are in the news and relevant to health and disease.
*Prerequisite:* BISC 3150.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204151)

**BISC 4151H Honors Advanced Pathology (1 credits)**
In depth coverage of selected topics in pathology, with an emphasis on current topics that are in the news and relevant to health and disease. As an Honors Program course, includes a more intensive research or project component.
*Prerequisite:* BISC 3150 and admission to BISC Disciplinary Honors Program.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204151H)

**BISC 4153 Epidemiology (3 credits)**
An introduction to the basic concepts of epidemiology. The distribution and determinants of diseases in specified populations and the application to control of health problems. Emphasizes epidemiologic study designs for investigating associations between risk factors and disease outcomes. Epidemiological approaches evaluate health services, population health and policy. Applies to either the Health and Society cognate or the BISC major electives, but not both.
*Prerequisite:* BISC major and Jr. stndg.; or Public Health Equity minor and MLSC 2060; or cons. of instr.
*Level of Study:* Undergraduate
*Marquette Core Curriculum:* NSM Individuals & Communities
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204153)

**BISC 4155 Diseases of the Brain (3 credits)**
Examines pathological states involving the central nervous system to better understand brain function. Presents opportunities to develop critical thinking skills, utilize the scientific method and explore how research investigates the complexity of brain function, while developing a deeper understanding of the neurosciences. Explores how deficits in cognition and other aspects of brain function provides insight into normal brain function and what it means to be human, by focusing on diseases of the brain.
*Prerequisite:* BISC 3135 and BISC 4145; or cons. of instr.
*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=BISC%204155)

**BISC 4157 Global Health (3 credits)**
Disease knows no borders. The health of populations in one country can be affected by public health threats or events across the globe. Policy decisions made in a country regarding public health could impact the health of people beyond its borders. Globalization shapes public health challenges and has profound influence on the capacities of countries to respond to health threats that often lie outside the control of any nation and outside health sector. Simply, globalization on health and the transfer of health threats exist. Opportunities across national borders could be utilized to solve global health challenges. Learners are introduced to the world's vast diversity of determinants of health and disease. Learners have an opportunity to critically appraise health systems in different parts of the world. Learners analyze current and emerging global health priorities, including infectious diseases, poverty, conflicts and emergencies, health inequity, principles and impact of health systems reforms, and major global initiatives for disease prevention and health promotion. Explores an understanding of a global health system and its shortcomings, challenges and ways of addressing global public health challenges. Importantly, helps learners to develop skills in critical thinking and problem solving in relation to health issues that gross geographical boundaries. Can apply to either the Health and Society cognate, or the BISC major electives, but not both.
*Prerequisite:* Jr. stndg.; and MLSC 2060 or BISC 4153.
*Level of Study:* Undergraduate
*Marquette Core Curriculum:* NSM Crossing Boundaries
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204157)

**BISC 4160 Human Molecular Pathology and Clinical Therapeutics (3 credits)**
Presents an overview of the cellular and molecular mechanisms of major human diseases. Pathologies examined include metabolic (Obesity, Diabetes, cardiovascular), neoplastic cancer, neurodegenerative (Alzheimer, Parkinson, Huntington, ALS), and neuropsychiatric (Depression, Schizophrenia, Autism, Stress) diseases. Explores the mechanism of action of clinical interventions and FDA-approved therapeutics. Provides the opportunity to develop critical thinking skills by integrating multi-faceted information about human pathologies. It is a great primer for pre-professional students.
*Prerequisite:* A course in biochemistry, which may be taken concurrently.
*Level of Study:* Undergraduate
*Marquette Core Curriculum:* NSM Expanding Our Horizons
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204160)

**BISC 4165 Microbiology Laboratory (1 credits)**
Introduction to various topics of microbiology laboratory including the isolation, cultivation, enumeration and characterization of bacteria of human medical importance. Students develop proficiency in aseptic transfer of organisms, gram staining, culturing on differential and selective media, biochemical testing and aseptic technique. Students use a light microscope to examine clinically relevant samples of pathogenic bacteria, fungi, protozoa and helminths. Specialized techniques include: antibiotic susceptibility testing, anaerobic cultivation, preparation and staining of fungi and immunological assays. Lab fee.
*Prerequisite:* BISC 3115.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204165)

**BISC 4170 Biology, Moral Behavior and Policy (3 credits)**
A multidisciplinary approach to moral decision making as it relates to public policy in healthcare. Examines the foundation of moral behavior and advances to the neural substrates of decision making with an emphasis on the learning, reward processing, and emotional systems that control behavior. Also incorporates discussions of specific ethical issues in biomedical sciences, paying particular attention to the nature of the dilemma and the voices guiding public policy. BISC 4170 can apply to either the Health and Society cognate, or the BISC major electives, but not both.
*Prerequisite:* BISC 3135.
*Level of Study:* Undergraduate
*Marquette Core Curriculum:* NSM Individuals & Communities
*Interdisciplinary Studies:* Cognitive Science
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204170)

**BISC 4173 Principles of Human Embryology (3 credits)**
System by system approach to the understanding of the sequence of human embryonic and fetal development. Covers early events, including gametogenesis, implantation and placentation, to give a foundation for discussing the development of major organ systems. Discusses the underlying causes of morphological errors in development which lead to congenital malformations. Stresses the effects of harmful (teratogenic) substances early in the developmental period. Provides a basic understanding of early inductive influences on major organ systems.
*Prerequisite:* BIOL 1002, BISC 3135, and Jr. stndg.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204173)

**BISC 4210 Biology of Aging (3 credits)**
Explore clinical, behavioral, genetic and cellular aspects of human aging. Maintains a focus on how aging occurs at the molecular, cellular and systems level using preclinical work in model organisms and how this contributes to decline in physiological processes and emergence of diseases commonly associated with aging as well as those that are not (schizophrenia, depression, addiction). Additional focus is placed on clinical aspects of aging, including patient care and current/novel anti-aging therapies being utilized in the clinic.
*Prerequisite:* BISC 4145.
*Level of Study:* Undergraduate
*Marquette Core Curriculum:* NSM Expanding Our Horizons
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204210)

**BISC 4214 Advanced Biochemistry (1 credits)**
Biochemistry is the body of knowledge upon which much of medical science is built. A living cell requires three things in order to maintain and propagate life: precursors, energy and information. Designed around the in depth examination of structure and function of selected precursors; how they are used to generate energy, store energy, or build more complex biomolecules; and how the information molecules control these processes. The topics covered depend on current health news and student interest.
*Prerequisite:* BISC 3213. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204214)

**BISC 4214H Honors Advanced Biochemistry (1 credits)**
Biochemistry is the body of knowledge upon which much of medical science is built. A living cell requires three things in order to maintain and propagate life: precursors, energy and information. Designed around the in depth examination of structure and function of selected precursors; how they are used to generate energy, store energy, or build more complex biomolecules; and how the information molecules control these processes. The topics covered depend on current health news and student interest. As an Honors Program course, includes a more intensive research or project component.
*Prerequisite:* BISC 3213 and admission to BISC Disciplinary Honors Program.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204214H)

**BISC 4275 Modern Plagues: Stress, Trauma and Addiction (3 credits)**
Examines the biological underpinnings and consequences of stress, post-traumatic stress disorder and addiction and explores their interrelationships and societal impacts.
*Prerequisite:* BISC 4145 and cons. of instr. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204275)

**BISC 4325 Endocrinology (3 credits)**
Introduction to the field of endocrinology. Focuses on understanding the endocrine system, principles of hormone regulation, hormone signaling mechanisms and endocrine disorders. Topics include reproduction, stress responses, metabolic function, growth and homeostasis.
*Prerequisite:* BISC 4145 or BIOL 4701.
*Level of Study:* Undergraduate
*Marquette Core Curriculum:* NSM Basic Needs & Justice, Writing Intensive
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204325)

**BISC 4340 Human and Applied Medical Genetics (3 credits)**
Provides an overview of genetic principles that are relevant to human health and disease. Topics include: packaging and sequence architecture of the human genome, Human Genome Project, patterns of Mendelian inheritance in humans, development, genetic alterations and metabolic disease hemoglobinopathies, immunogenetics, genetic testing and gene therapy. Consists of didactic lectures with interspersed clinical cases. Intended for students interested in a career in medical professions.
*Prerequisite:* A course in biochemistry: BISC 2070, BISC 3213, BIOL 3101 or CHEM 4530.
*Level of Study:* Undergraduate
*Marquette Core Curriculum:* NSM Expanding Our Horizons
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204340)

**BISC 4341 Advanced Cellular Genetics and Cancer (1 credits)**
A discussion-based focus on current advances in cellular genetics and cancer research. Students discuss current articles from the news or the primary literature related to the class topics. Includes a lecture component to provide background information for each topic.
*Prerequisite:* BISC 4340.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204341)

**BISC 4341H Honors Advanced Cellular Genetics and Cancer (1 credits)**
A discussion-based focus on current advances in cellular genetics and cancer research. Students discuss current articles from the news or the primary literature related to the class topics. Includes a lecture component to provide background information for each topic. As an Honors Program course, includes a more intensive research or project component.
*Prerequisite:* BISC 4340 and admission to BISC Disciplinary Honors Program.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204341H)

**BISC 4342 Epigenetics and Human Disease (3 credits)**
Focuses on epigenetic processes in humans and the epigenetic basis of human diseases. Provides a foundation for biomedical science and biology students, particularly pre-med and pre-health students.
*Prerequisite:* A course in biochemistry, which may be taken concurrently.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204342)

**BISC 4381 Politics of U.S. Health Care (3 credits)**
Examines the American health care system, health care policies, and underlying politics. Provides an overview of the organization and financing of health care in the United States. Examines the impact of the political system, political parties and interest groups, and values on the health care system and health policies at national and state levels. Covers health care reform politics, including the Democrats' 2010 Affordable Care Act and Republican reform alternatives. Also focuses on the social determinants of health and policies for vulnerable populations. Applies toward the Health and Society cognate. Same as POSC 4381.
*Prerequisite:* Jr. stndg.
*Level of Study:* Undergraduate
*Interdisciplinary Studies:* Culture, Health and Illness, Peace Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204381)

**BISC 4460 Practical Cases in Medicine (3 credits)**
Provides an exciting opportunity to explore real-life, medical scenarios where students can apply the science they have learned throughout their undergraduate education to diagnose and develop treatment options. For each clinical case, students also examine how socio-cultural factors determine health outcomes. This experience is reinforced with service learning. Due to the medical nature of the clinical cases utilized in the course, preference is given to pre-medical and pre-physician assistant students.
*Prerequisite:* BISC 4145 and cons. of instr. Consent required.
*Level of Study:* Undergraduate
*Marquette Core Curriculum:* Engage Social Systms & Values 2, NSM Basic Needs & Justice
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204460)

**BISC 4461 Comparative Health Politics and Policy (3 credits)**
Explores through comparative analysis the ways in which different nations address the goals of equitable access, affordability and quality in health care. Considers the similarities and differences in health policy challenges facing rich and developing nations. Employs comparative analysis of different models of health care provisions and financing, and examines the underlying politics of health care systems and policies in different countries. Same as POSC 4461/5461.
*Prerequisite:* Jr. stndg.; or enrolled in the Biomedical Sciences Post-Baccalaureate program. Consent required.
*Level of Study:* Undergraduate
*Interdisciplinary Studies:* Culture, Health and Illness, Peace Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204461)

**BISC 4514 Human Microanatomy (4 credits)**
A study of the microscopic structure of cells, tissues and organs of the human body. Emphasizes structure-function relationships to build a foundation for physiology and pathology. Includes a laboratory to aid in the identification and understanding of the tissues and organs of the body using a virtual microscope. Incorporates case studies to help develop critical thinking and connect basic microanatomical knowledge to real-world applications.
*Prerequisite:* BIOL 1001 and BISC 3135; or cons. of instr.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204514)

**BISC 4850 Systems Neuroscience (3 credits)**
Broad overview of neural systems supporting perception, learning and behavior. Highly integrative with various thematic content, including functional organization of the nervous system, sensory and motor systems, neural encoding, motivation, emotion, learning and memory. Discusses the application of each topic to mental health.
*Prerequisite:* BIOL 1001 and Jr. stndg.
*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=BISC%204850)

**BISC 4851 Advanced Systems Neuroscience (1 credits)**
Discusses current topics in neuroscience research to develop an appreciation for how neuroscientists unlock the mysteries of the brain to better understand human health and disease.
*Prerequisite:* BISC 3850.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204851)

**BISC 4851H Honors Advanced Systems Neuroscience (1 credits)**
Discusses current topics in neuroscience research to develop an appreciation for how neuroscientists unlock the mysteries of the brain to better understand human health and disease. As an Honors Program course, includes a more intensive research or project component.
*Prerequisite:* BISC 3850 and admission to BISC Disciplinary Honors Program. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204851H)

**BISC 4931 Topics in Biomedical Sciences (1-3 credits)**
Selected topics in biomedical sciences. Specific topics will be designated in the Schedule of Classes.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204931)

**BISC 4931H Honors Topics in Biomedical Science (1-3 credits)**
Selected topics in biomedical sciences. Specific topics will be designated in the Schedule of Classes.
*Prerequisite:* Cons. of dept. ch. and admission to BISC Disciplinary Honors Program.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204931H)

**BISC 4953 Readings in Human Anatomy (1 credits)**
Explores and discusses primary literature in human gross anatomy and related fields. Students choose primary literature of interest and class sessions consist in student-lead discussions of weekly readings. Assignments include reflective writing and presentations.
*Prerequisite:* BISC 3136 or BISC 3112, which may be taken concurrently.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204953)

**BISC 4953H Honors Readings in Human Anatomy (1 credits)**
Explores and discusses primary literature in human gross anatomy and related fields. Students choose primary literature of interest and class sessions consist in student-lead discussions of weekly readings. Assignments include reflective writing and presentations. As an Honors Program course, includes a more intensive research or project component.
*Prerequisite:* BISC 3136 or BISC 3112, which may be taken concurrently, and admission to BISC Disciplinary Honors Program.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204953H)

**BISC 4964 AI and Machine Learning Practicum in Neuroscience (1-3 credits)**
Internship-style opportunity where students learn and apply modern machine learning and artificial intelligence techniques in neuroscience. Students are expected to be either already familiar with basics of Python or other equivalent programming language, or be willing to rapidly learn under researcher guidance.
*Prerequisite:* BIOL 1001, COSC 1010 and cons. of instr. Recommended: COSC 1000 or familiarity with basics of Python or equiv. programming language. Highly recommended: COSC 1020. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204964)

**BISC 4986 Internship in Biomedical Sciences (1-3 credits)**
Co-op or intern experience in the biomedical industry. Features educational activity and productive work related to health care delivery or industrial or administrative aspects of health care. S/U grade assessment. Limited to a maximum of 6 credits with a maximum 3 credits applied towards the BISC major.
*Prerequisite:* Cons. of internship dir. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204986)

**BISC 4987 Internship in Biomedical Sciences-Grading Period (1-3 credits)**
Grading period of a summer co-op or intern experience in an approved biomedical sciences related field. S/U grade assessment. Limited to a maximum of 6 credits with a maximum of 3 credits applied toward the BISC major.
*Prerequisite:* Cons. of BISC internship director. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204987)

**BISC 4988 Research Internship in Biomedical Sciences (1-3 credits)**
Mentored research on a topic approved by Biomedical Sciences in an off-campus research laboratory. Can be taken for a maximum total of 6 credits, maximum of 3 credits can be applied toward BISC major. S/U grade assessment.
*Prerequisite:* Cons. of dept. ch. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204988)

**BISC 4989 Research Internship in Biomedical Sciences-Grading Period (1-3 credits)**
Grading period of summer, mentored research on a topic approved by Biomedical Sciences in an off-campus research laboratory. Limited to a maximum of 6 credits with a maximum of 3 credits applied toward the BISC major. S/U grade assessment.
*Prerequisite:* Cons. of dept. ch. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204989)

**BISC 4991H Honors Community Engagement in Biomedical Sciences (1-3 credits)**
Students are expected to not just be involved in community engagement, but to develop a new community engagement program. At the end of the term students give a PowerPoint presentation to the biomedical sciences faculty. A paper may be required by the faculty mentor. As an Honors Program course, includes a more intensive research or project component. Can be taken for a maximum total of 6 credits, maximum of 3 credits can be applied towards BISC major.
*Prerequisite:* Admission to BISC Disciplinary Honors Program. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204991H)

**BISC 4995 Independent Study in Biomedical Sciences (1-6 credits)**
Research on a selected topic under the direction of a faculty member of the Department of Biomedical Sciences. Can be taken for a maximum total of 6 credits, maximum of 3 credits can be applied towards BISC major.
*Prerequisite:* Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204995)

**BISC 4995H Honors Independent Study in Biomedical Sciences (1-6 credits)**
Research on a selected topic under the direction of a faculty member of the Department of Biomedical Sciences. Can be taken for a maximum total of 6 credits, maximum of 3 credits can be applied towards BISC major. As an Honors Program course, includes a more intensive research or project component.
*Prerequisite:* Admission to BISC Disciplinary Honors Program. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204995H)

**BISC 4997H Capstone for Disciplinary Honors Program in Biomedical Sciences (1 credits)**
Designed to assist the student in reflecting on the entirety of their honors experience and generating a comprehensive presentation of that experience. As an Honors Program course, includes a more intensive research or project component.
*Prerequisite:* Admission to BISC Disciplinary Honors Program.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%204997H)

**BISC 5010 Neuroeconomics: The Neuroscience of Decision Making (3 credits)**
Designed for students who have an understanding of the fundamentals of neuroscience and would like to learn more about how specific brain processes contribute to the decision to follow a course of action. Topics include valuation, learning, emotion, social behavior and action selection.
*Prerequisite:* Admitted to the BISC-MS program; or cons. of instr.
*Level of Study:* Graduate
*Marquette Core Curriculum:* NSM Cgntn, Lang, Mmry/Intlgnc
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%205010)

**BISC 5020 Molecular Neuroscience (3 credits)**
Examines living brains at the most fundamental level – that of ions, molecules, membrane structures and cells. Touches upon the molecular machinery responsible for information processing by neuronal and non-neuronal brain cells. Focuses on the common motifs involved in intra and inter-cellular communication, including membrane excitability, electrochemical signal transduction, synaptic transmission and short and long-term storage of memories. Uses this information to gain insight into the mechanistic basis of a range of brain states.
*Prerequisite:* Admitted to the BISC-MS program; or cons. of instr.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%205020)

**BISC 5112 Head and Neck Anatomy (3 credits)**
Survey of neuroanatomy, sensory systems and speech, muscular and vascular systems, and osteology of the head and neck. An emphasis is placed on functional anatomy and significant clinical correlates. Laboratory included. Not to be taken for credit by students who are enrolled in or have earned credit for BISC 4113.
*Prerequisite:* Admitted to the BISC-MS program.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%205112)

**BISC 5135 Clinical Human Anatomy (4 credits)**
A regional approach to human anatomy where all body systems are integrated. Emphasizes correlations between structure and function. Laboratory included.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%205135)

**BISC 5140 Functional Neuroanatomy (3 credits)**
Examines the basic structure and function of the central nervous system from spinal cord to cerebral cortex. Material is presented within both clinical and basic contexts. Based on the understanding of the normal circuitry and function of the brain, students progress toward developing the preliminary skills to diagnose or explain clinically relevant neurological disorders. Laboratory included.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program or NRSC doctoral program.
*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=BISC%205140)

**BISC 5145 Human Physiology (4 credits)**
Human physiology including blood and circulation, muscular, neuronal and sensory systems, renal and respiratory systems, digestion, metabolism, reproduction, their control by the endocrine and central nervous systems, and clinical correlates.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%205145)

**BISC 5155 Diseases of the Brain (3 credits)**
Examines pathological states involving the central nervous system to better understand brain function. Presents opportunities to develop critical thinking skills, utilize the scientific method and explore how research investigates the complexity of brain function, while developing a deeper understanding of the neurosciences. Explores how deficits in cognition and other aspects of brain function provides insight into normal brain function and what it means to be human, by focusing on diseases of the brain.
*Prerequisite:* Enrollment in the NRSC doctoral program; or cons. of instr.
*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=BISC%205155)

**BISC 5160 Human Molecular Pathology and Clinical Therapeutics (3 credits)**
Presents an overview of the cellular and molecular mechanisms of major human diseases. Pathologies examined include metabolic (Obesity, Diabetes, cardiovascular), neoplastic cancer, neurodegenerative (Alzheimer, Parkinson, Huntington, ALS), and neuropsychiatric (Depression, Schizophrenia, Autism, Stress) diseases. Explores the mechanism of action of clinical interventions and FDA-approved therapeutics. Provides the opportunity to develop critical thinking skills by integrating multi-faceted information about human pathologies. It is a great primer for pre-professional students.
*Level of Study:* Graduate
*Marquette Core Curriculum:* NSM Expanding Our Horizons
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%205160)

**BISC 5170 Biology, Moral Behavior and Policy (3 credits)**
A multidisciplinary approach to moral decision making as it relates to public policy in healthcare. Examines the foundation of moral behavior and advances to the neural substrates of decision making with an emphasis on the learning, reward processing, and emotional systems that control behavior. Also incorporates discussions of specific ethical issues in biomedical sciences, paying particular attention to the nature of the dilemma and the voices guiding public policy. BISC 4170 can apply to either the Health and Society cognate, or the BISC major electives, but not both.
*Prerequisite:* Admitted to the BISC-MS program; or cons. of instr.
*Level of Study:* Graduate
*Marquette Core Curriculum:* NSM Individuals & Communities
*Interdisciplinary Studies:* Cognitive Science
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%205170)

**BISC 5173 Principles of Human Embryology (3 credits)**
System by system approach to the understanding of the sequence of human embryonic and fetal development. Covers early events, including gametogenesis, implantation and placentation, to give a foundation for discussing the development of major organ systems. Discusses the underlying causes of morphological errors in development which lead to congenital malformations. Stresses the effects of harmful (teratogenic) substances early in the developmental period. Provides a basic understanding of early inductive influences on major organ systems.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%205173)

**BISC 5325 Endocrinology (3 credits)**
Introduction to the field of endocrinology. Focuses on understanding the endocrine system, principles of hormone regulation, hormone signaling mechanisms and endocrine disorders. Topics include reproduction, stress responses, metabolic function, growth and homeostasis.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program or NRSC doctoral program.
*Level of Study:* Graduate
*Marquette Core Curriculum:* NSM Basic Needs & Justice, Writing Intensive
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%205325)

**BISC 5340 Human and Applied Medical Genetics (3 credits)**
Provides an overview of genetic principles that are relevant to human health and disease. Topics include: packaging and sequence architecture of the human genome, Human Genome Project, patterns of Mendelian inheritance in humans, development, genetic alterations and metabolic disease hemoglobinopathies, immunogenetics, genetic testing and gene therapy. Consists of didactic lectures with interspersed clinical cases. Intended for students interested in a career in medical professions.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Graduate
*Marquette Core Curriculum:* NSM Expanding Our Horizons
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%205340)

**BISC 5341 Advanced Cellular Genetics and Cancer (1 credits)**
A discussion-based focus on current advances in cellular genetics and cancer research. Students discuss current articles from the news or the primary literature related to the class topics. Includes a lecture component to provide background information for each topic.
*Prerequisite:* Admitted to the BISC-MS program.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%205341)

**BISC 5342 Epigenetics and Human Disease (3 credits)**
Focuses on epigenetic processes in humans and the epigenetic basis of human diseases. Provides a foundation for biomedical science and biology students, particularly pre-med and pre-health students.
*Prerequisite:* Admitted to the BISC-MS program.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%205342)

**BISC 5850 Systems Neuroscience (3 credits)**
Broad overview of neural systems supporting perception, learning and behavior. Highly integrative with various thematic content, including functional organization of the nervous system, sensory and motor systems, neural encoding, motivation, emotion, learning and memory. Discusses the application of each topic to mental health.
*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=BISC%205850)

**BISC 5964 AI and Machine Learning Practicum in Neuroscience (1-3 credits)**
Internship-style opportunity where students learn and apply modern machine learning and artificial intelligence techniques in neuroscience. Students are expected to be either already familiar with basics of Python or other equivalent programming language, or be willing to rapidly learn under researcher guidance.
*Prerequisite:* Consent required.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%205964)

**BISC 6005 Professional Development 1 (0 credits)**
Addresses the professional skills for students to become successful in the workplace. Includes career discernment, resume/CV construction, interviewing skills and communication skills. S/U grade assessment.
*Prerequisite:* Admitted to the BISC-MS prog.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206005)

**BISC 6006 Professional Development 2 (0 credits)**
Addresses the professional skills for students to become successful in the workplace. Includes career discernment, resume/CV construction, interviewing skills and communication skills. S/U grade assessment.
*Prerequisite:* Admitted to the BISC-MS prog.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206006)

**BISC 6007 Professional Development 3 (0 credits)**
Addresses the professional skills for students to become successful in the workplace. Includes career discernment, resume/CV construction, interviewing skills and communication skills. S/U grade assessment.
*Prerequisite:* Admitted to the BISC-MS prog.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206007)

**BISC 6010 Laboratory Fundamentals (2 credits)**
Explores the essential principles required for a biomedical sciences laboratory setting. Studies fundamental laboratory principles, proper lab hygiene, safety protocols, and regulatory compliance within a research or biotech laboratory environment through hands-on experiences. Emphasizes bench techniques for foundational molecular and cellular assays. Covers data management and documentation methods required to ensure rigorous and reproducible scientific experiments from design to implementation to analysis.
*Prerequisite:* Enrolled in the BISC-MS prog.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206010)

**BISC 6030 Programming for Research (3 credits)**
Introductory level of programming skills in Python and R. Students apply these skills to problems in biomedical research and health science services.
*Prerequisite:* Admitted to the BISC-MS prog.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206030)

**BISC 6035 Advanced Statistics and Research Methods (3 credits)**
The conceptual bases underlying descriptive and inferential statistics and application to construct and test hypotheses using sound research methods.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206035)

**BISC 6040 Advanced Lab Techniques 1 (2-3 credits)**
Develops skills and competencies needed for a career in biomedical research. Builds on the essential principles of proper lab hygiene, safety protocols and regulatory compliance, along with data management and documentation strategies. Provides experience and understanding on more advanced techniques including histology, cell culture, immunohistochemistry, fluorescent imaging, western blotting and molecular genetics, as well as the proper and ethical usage of small animals in biomedical research.
*Prerequisite:* Enrolled in the BISC-MS prog. or NRSC prog.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206040)

**BISC 6041 Advanced Lab Techniques 2 (2-3 credits)**
Continues the exploration of advanced techniques found in a modern neuroscience research lab. Examines the theory behind each technique and develops competency at the bench. Advanced techniques explored may include electrophysiology, HPLC, fluorescence-based cell sorting, 2-photon microscopy, and in-vivo neural circuit manipulation strategies
*Prerequisite:* BISC 6040 and enrolled in the BISC-MS prog. or NRSC prog.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206041)

**BISC 6050 Discovery to Translation and Beyond (3 credits)**
Overview of the biomedical sciences discovery to translation process. Placing biomedical innovations in a societal context, the role of the drug discovery process, intellectual property and the multi-modal types of therapeutics development is discussed. The approach focuses on how the pharmaceutical industry conducts discovery to translation R&D.
*Prerequisite:* Enrolled in BISC-MS program.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206050)

**BISC 6060 Biotech Entrepreneurship: The Business of Doing Science (3 credits)**
Overview of the biotechnology commercialization process. Placing biotech innovations in a societal context, the role of intellectual property, government policies and regulations, marketplace economics and ethical debates on the development and commercialization of new life science technologies is discussed. The approach focuses on both large enterprise models as well as smaller entrepreneurial approaches to technology commercialization and the principles needed to translate research from a lab bench to the marketplace.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206060)

**BISC 6097 Laboratory Research in Neuroscience (1 credits)**
Independent research of second year graduate students based on their dissertation research laboratory; includes lab group meetings, literature research, bench work and presentation of findings.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206097)

**BISC 6140 Advanced Studies in Human Gross Anatomy (5 credits)**
In-depth study of the limbs, back, thorax, abdomen, pelvis, head and neck regions of the human body through both dissections and interactive didactic modules.
*Prerequisite:* College anatomy course; enrolled in BISC-MS program.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206140)

**BISC 6931 Topics in Biomedical Sciences (1-3 credits)**
Selected topics in biomedical sciences. Specific topics will be designated in the Schedule of Classes.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206931)

**BISC 6956 Scientific Pedagogy Seminar (2 credits)**
Provides basic skills in pedagogy for instruction in upper-level science courses. Includes syllabus design, assessment methods and student engagement, as well as creative curriculum design.
*Prerequisite:* Admitted to the BISC-MS prog.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206956)

**BISC 6964 Career Practicum (2 credits)**
Prepares the student with hands-on career-enabling skills and experiences depending on the focus the student chooses. Includes a career skill seminar (laboratory focus: laboratory techniques and management; instructional focus: science pedagogy and instruction), a career practicum (laboratory focus: collaboratory or faculty research lab or industry lab; instructional focus: mentored experience in classroom learning).
*Prerequisite:* Enrolled in BISC-MS program.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206964)

**BISC 6995 Independent Study in Biomedical Sciences (1-6 credits)**
Research on a selected topic under the direction of a faculty member of the Department of Biomedical Sciences.
*Prerequisite:* Cons. of dept. ch. Consent required.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206995)

**BISC 6998 Scholarly Project (3 credits)**
Identification of a gap of knowledge and formulate, implement and present a scholarly or a laboratory research-based project that results in a tangible product which contributes to and enhances biomedical sciences knowledge, biomedical laboratory advancement and/or pedagogy.
*Prerequisite:* Enrolled in BISC-MS program.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%206998)

**BISC 7001 Principles of Dentistry (1 credits)**
Surveys the dental profession from the perspectives of participating clinicians, residents and students. Included is an introduction to clinical specialties, procedures, practice settings, as well as alternatives to clinical practice.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207001)

**BISC 7002 Dental Health and Society (1 credits)**
An introduction to the field of dentistry with an emphasis on how it can impact an individual's overall health and address dental health disparities in the country.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207002)

**BISC 7005 Professional Development 1 (0 credits)**
Designed to focus on and improve the skills necessary for a successful application to dental school or other graduate/career path upon completion of the program. Focuses on the application building aspect within career development. S/U grade assessment.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207005)

**BISC 7006 Professional Development 2 (0 credits)**
Designed to focus on and improve the skills necessary for a successful application to dental school or other graduate/career path upon completion of the program. Focuses on the interview skill aspect of career development. S/U grade assessment.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207006)

**BISC 7007 Professional Development 3 (0 credits)**
Designed to focus on and improve the skills necessary for a successful application to dental school or other graduate/career path upon completion of the program. Focuses on the transition from the post-baccalaureate program to the student's future goals. S/U grade assessment.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207007)

**BISC 7021 Medical and Dental Terminology (1 credits)**
Provides a foundation for the understanding and use of common terminology in the medical field, with particular emphasis on dentistry. Designed to introduce basic prefixes, suffixes, and word roots, and their combining forms, as well as advanced clinical terminology specific to the dental profession.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207021)

**BISC 7130 Human Gross Anatomy (5 credits)**
A human gross anatomy course including lecture and a cadaver dissection laboratory. Anatomy of the limbs, back, thorax, abdomen, pelvis, and head and neck is approached on a regional basis. Lectures emphasize regional anatomical relationships, functional aspects of the systems, and provide a guide to the dissections. Additional lab fee applies.
*Prerequisite:* PHTH, PHAS or OCTH major.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207130)

**BISC 7150 Outbreaks, Epidemics and Pandemics (3 credits)**
Through case studies, discussion, and group work, students develop an understanding of how infectious disease epidemics occur, what can be done to control them and why control efforts succeed or fail. By exploring the characteristics of pathogens and human hosts that contribute to disease spread, students gain the knowledge and skills to understand the implications of newly emerging pathogens and are able to advocate for what needs to be done to prevent outbreaks.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Health Sciences Professional
*Marquette Core Curriculum:* NSM Crossing Boundaries
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207150)

**BISC 7153 Epidemiology (3 credits)**
An introduction to the basic concepts of epidemiology. The distribution and determinants of diseases in specified populations and the application to control of health problems. Emphasizes epidemiologic study designs for investigating associations between risk factors and disease outcomes. Epidemiological approaches evaluate health services, population health and policy. Applies to either the Health and Society cognate or the BISC major electives, but not both.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Health Sciences Professional
*Marquette Core Curriculum:* NSM Individuals & Communities
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207153)

**BISC 7157 Global Health (3 credits)**
Disease knows no borders. The health of populations in one country can be affected by public health threats or events across the globe. Policy decisions made in a country regarding public health could impact the health of people beyond its borders. Globalization shapes public health challenges and has profound influence on the capacities of countries to respond to health threats that often lie outside the control of any nation and outside health sector. Simply, globalization on health and the transfer of health threats exist. Opportunities across national borders could be utilized to solve global health challenges. Learners are introduced to the world's vast diversity of determinants of health and disease. Learners have an opportunity to critically appraise health systems in different parts of the world. Learners analyze current and emerging global health priorities, including infectious diseases, poverty, conflicts and emergencies, health inequity, principles and impact of health systems reforms, and major global initiatives for disease prevention and health promotion. Explores an understanding of a global health system and its shortcomings, challenges and ways of addressing global public health challenges. Importantly, helps learners to develop skills in critical thinking and problem solving in relation to health issues that gross geographical boundaries. Can apply to either the Health and Society cognate, or the BISC major electives, but not both.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Health Sciences Professional
*Marquette Core Curriculum:* NSM Crossing Boundaries
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207157)

**BISC 7160 Foundations in Public Health (3 credits)**
Exploration of select public health issues with an emphasis on dental health disparities. Service learning experiences are incorporated to further the student's integration of public health issues with the dental profession.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Health Sciences Professional
*Marquette Core Curriculum:* NSM Expanding Our Horizons
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207160)

**BISC 7180 Clinical Neuroanatomy (3 credits)**
Fundamental neurocranial anatomical information essential to the practice of medicine. Students develop a 3-dimensional understanding of neurocranial structures, and their relationships, with an emphasis on critical thinking through clinical problem solving.
*Prerequisite:* PHAS major or cons. of instr.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207180)

**BISC 7213 Clinical Biochemistry (4 credits)**
Examines biochemistry of human cells. Examines the chemistry of amino acids, proteins, carbohydrates, lipids, and nucleic acids. Explores the metabolism and metabolic regulation or these molecules, as well as changes in disease states. When necessary, compares and contrasts human biochemistry with that of bacterial cells.
*Prerequisite:* General and organic chemistry and enrolled in the BISC pre-dental enhancement program. Consent required.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207213)

**BISC 7215 Clinical Microbiology with Lab (4 credits)**
Focuses on the general biology of bacterial, viral, fungal and parasitic pathogens of human medical importance and the response of the human host. Laboratory sessions reinforce content from lectures and introduce students to laboratory skills including isolation, cultivation, enumeration, and characterization of bacteria of human medical importance. Utilizes Brightfield microscopy. Specialized techniques include antibiotic susceptibility testing, anaerobic cultivation, biochemical tests and immunological assays.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207215)

**BISC 7220 Medical Pharmacology (3 credits)**
Fundamentals of human pharmacology and basic principles dictating drug actions within the human body, with emphasis on applications in general medicine. Focuses on the therapeutic actions and clinical applications of various drug classes. Topics include cellular mechanisms, physiological responses, adverse reactions, drug-drug interactions, and clinical indications, accompanied by discussion on the pathological conditions for which common therapeutic agents are used. Applications of pharmacology commonly encountered by physician assistants are presented and are reinforced through interactive clinically-correlated lectures presented by practicing physicians and physician assistants.
*Prerequisite:* PHAS major.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207220)

**BISC 7230 Medical Anatomy (6 credits)**
The study of human gross anatomy, including a cadaver dissection laboratory. Anatomy of the limbs, back, thorax, abdomen, pelvis, and head and neck is approached on a regional basis, with a special focus on fundamental neuroanatomical information in a clinical context. Lectures emphasize regional anatomical relationships and functional aspects of the systems and provide a guide to the dissections. The ultimate objective is to attain a detailed understanding of structure-function relationships in the human body that underlie the practice of medicine.
*Prerequisite:* PHAS major.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207230)

**BISC 7235 Principles of Dental Gross Anatomy (3 credits)**
Provides students with a foundation in human anatomy, with focus on regions most relevant to dental medicine. Emphasizes correlations between structure, function, and clinical application. Includes laboratory.
*Prerequisite:* Enrolled in the BISC pre-dental enhancement program.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207235)

**BISC 7410 Microbiology (4 credits)**
Provides dental students with the foundational knowledge of infectious agents of human medical importance and how the body responds to those pathogens. Provides a general overview of microbiology including characteristics of microorganisms, bacterial genetics and metabolism. Studies methods to control the growth of these microorganisms, both within a human host (antimicrobial drugs), and in the environment (sterilization and disinfection; OSHA's Bloodborne Pathogen Standard). Explores the host immune response to infections. Students discuss the causative agents and pathogenesis of infectious diseases along with the diagnosis, prevention and treatment of these diseases. Addresses bacterial, viral, fungal and parasitic diseases of human clinical importance.
*Prerequisite:* School of Dentistry only.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207410)

**BISC 7461 Comparative Health Politics and Policy (3 credits)**
Explores through comparative analysis the ways in which different nations address the goals of equitable access, affordability and quality in health care. Considers the similarities and differences in health policy challenges facing rich and developing nations. Employs comparative analysis of different models of health care provisions and financing, and examines the underlying politics of health care systems and policies in different countries. Same as POSC 4461/5461.
*Prerequisite:* Cons. of dept. ch. Consent required.
*Level of Study:* Health Sciences Professional
*Interdisciplinary Studies:* Culture, Health and Illness, Peace Studies
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207461)

**BISC 7514 Human Microanatomy (4 credits)**
A study of the microscopic structure of cells, tissues and organs of the human body. Emphasizes structure-function relationships to build a foundation for physiology and pathology. Includes a laboratory to aid in the identification and understanding of the tissues and organs of the body using a virtual microscope. Incorporates case studies to help develop critical thinking and connect basic microanatomical knowledge to real-world applications.
*Prerequisite:* School of Dentistry only.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207514)

**BISC 7515 Biomedical Systems 1 (3 credits)**
Provides an introduction to human anatomy of the head and neck region. Topics include the skull, temporomandibular joint, muscles of mastication and facial expression and an overview of the orbital and cervical regions. Structural and functional relationships between the cranial nerves and central neuroanatomical pathways are presented along with selected clinical correlations. Begins to build the foundational knowledge of the biomedical systems that is necessary for dental students as they start patient rounds during the first semester.
*Prerequisite:* School of Dentistry.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207515)

**BISC 7516 Biomedical Systems 2 (4 credits)**
A human gross anatomy course for dental students that integrates lecture with a cadaver dissection laboratory. Follows the neurocranial anatomy course with expanded topics and detailed dissections of the head and neck regions. Lectures and dissections of the thorax, abdomen and pelvis, along with lectures on the upper and lower extremities are included. Part of a biomedical systems course sequence integrating anatomy, physiology, pathology, and dental clinical correlates. Additional lab fee applies.
*Prerequisite:* School of Dentistry only.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207516)

**BISC 7517 Biomedical Systems 3 (4 credits)**
Module 3 of a systems-based course integrating anatomy, physiology and pathology including dental clinical correlates.
*Prerequisite:* School of Dentistry only.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207517)

**BISC 7518 Biomedical Systems 4 (4 credits)**
Module 4 of a systems-based course integrating anatomy, physiology and pathology including dental clinical correlates.
*Prerequisite:* School of Dentistry only.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207518)

**BISC 7520 Dental Pharmacology (4 credits)**
Fundamentals of human pharmacology and basic principles dictating drug actions within the human body with emphasis on applications in dentistry. Focuses on the therapeutic actions and clinical applications of various drug classes. Topics include: cellular mechanisms, physiological responses, adverse reactions, drug-drug interactions, and clinical indications, accompanied by discussion on the pathological conditions for which common therapeutic agents are used. Applications of pharmacology commonly encountered by dentists are presented and are reinforced through interactive clinically correlated lectures presented by dental professionals.
*Prerequisite:* School of Dentistry only. Consent required.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207520)

**BISC 7550 Remediation (0-6 credits)**
Variable credits. Variable titles.0 credit will be SNC/UNC grade assessment; 1-6 credits will be graded.
*Prerequisite:* Cons. of dept. ch. only. Consent required.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207550)

**BISC 7931 Topics in Biomedical Sciences (1-3 credits)**
Selected topics in biomedical sciences. Specific topics will be designated in the Schedule of Classes.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207931)

**BISC 7995 Independent Study in Biomedical Sciences (1-6 credits)**
Research on a selected topic under the direction of a faculty member of the Department of Biomedical Sciences. Can be taken for a maximum total of 6 credits, maximum of 3 credits can be applied towards BISC major. Consent required.
*Level of Study:* Health Sciences Professional
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%207995)

**BISC 8003 Individual Development Plan (1 credits)**
Guidance of students toward identifying their current interests to facilitate future career paths, as well as develop a graduate career plan based on necessary skills and expertise. Same as NRSC 8003; credit is not awarded for both.
*Prerequisite:* Cons. of instr. Consent required.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%208003)

**BISC 8004 Science Writing and Ethics 1 (1 credits)**
An introduction of scientific writing skills necessary for a successful career in science. Same as NRSC 8004; credit is not awarded for both.
*Prerequisite:* BISC 8003 or NRSC 8003.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%208004)

**BISC 8005 Science Writing and Ethics 2 (1 credits)**
Advanced writing skills necessary for grant writing. Same as NRSC 8005; credit is not awarded for both.
*Prerequisite:* BISC 8004 or NRSC 8004.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%208005)

**BISC 8096 First Year Lab Rotations (1 credits)**
Introductory lab rotations for first-year graduate students based on mutual preferences of the student and faculty member. May include lab group meetings, literature search, bench work, presentation of findings and/or research plans to lab members. Same as NRSC 8096; credit is not awarded for both.
*Prerequisite:* Cons. of instr. Consent required.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%208096)

**BISC 8101 Biology of Cellular Signal Transduction (2 credits)**
Focuses on the mechanisms by which cells detect and respond to extracellular signals including neurotransmitters, hormones and growth factors. Discusses fundamental principles and key examples of cellular signal processing. Centered on the discussion of review articles and key papers from primary literature. Consent required.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%208101)

**BISC 8931 Topics in Biomedical Sciences (1-3 credits)**
Subject matter varies as determined by needs of neuroscience graduate students. May be repeated, as subject matter changes. Same as NRSC 8931; credit is not awarded for both.
*Prerequisite:* Cons. of instr. Consent required.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%208931)

**BISC 8953 Seminar in Neuroscience (1 credits)**
Topics of current interest in neuroscience. Same as NRSC 8953; credit is not awarded for both.
*Prerequisite:* Cons. of instr. Consent required.
*Level of Study:* Graduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%208953)

**BISC 9002H Honors Student Study/Research Placeholder in Biomedical Sciences (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 dpt. ch. Consent required.
*Level of Study:* Undergraduate
Schedule of Classes (https://bulletin.marquette.edu/class-search/?details&code=BISC%209002H)