THE DEPARTMENT OF BIOLOGICAL AND PHYSICAL SCIENCES

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Sciences at MSU Billings

Biology, Chemistry, Physics, and Earth Science are core programs in the sciences at MSU Billings. Biology is the study of living organisms. Biologists study interactions among and within organisms in order to understand processes characteristic of life. Chemistry, Physics, and Earth Science are physical sciences exploring the composition, structure, properties, and interactions of matter. Chemistry is the study of differences and similarities of elements in order to understand how they interact to produce diverse molecules. Physics is the study of matter, energy, and the fundamental laws that govern their interactions. Earth Science is an integrative field that examines natural materials and processes to understand how Earth operates currently and in the geologic past.

Research

Science faculty at MSU Billings encourage undergraduate students to participate in research. Every student is given the opportunity to explore a research problem in the sciences under the guidance of a faculty sponsor. Faculty conduct research in cellular and molecular biology, genetics, microbiology, animal physiology, neurobiology, development biology, immunology, organic chemistry, analytical chemistry, topics in laser spectroscopy, plant physiology, plant systematics, geology, and ecology and evolution. Active involvement in research with faculty is an important part of student success in the sciences at MSU Billings.

Career Opportunities

Most students who graduate from MSU Billings in the sciences typically receive a Bachelor's degree in Biology or Chemistry. In some instances our graduates directly enter the job market. Our program in Medical Laboratory Science allows students to achieve national certification for a career in clinical/medical laboratory science. Students seeking jobs with private industry, state (e.g. Fish, Wildlife & Parks) or federal (e.g. FBI) agencies have also been successful. Alternatively, many of our graduates choose to continue their training beyond a four year undergraduate program. They have been accepted in professional programs in the health sciences (medical, dental, pharmacy & veterinary medicine) and major university graduate programs leading to a master's degree or Ph.D. in Biology, Chemistry and Physics.

Advising Information

Academic advising for all freshmen Health Professions and Science majors is initially provided through the Advising Center on campus. Science majors are then assigned a faculty advisor in the Sciences with expertise matched to their interest. Students meet with their faculty advisor each semester to review their progress and make any changes required for a complete and accurate plan of study to satisfy program requirements in a timely manner. Faculty advisors also work with students to explore internships, cooperative education placements and opportunities in research to enhance the student's academic program. In addition, faculty advisors provide assistance in selecting elective courses which support the student's interests, career plans and plan of study. Students are ultimately responsible for meeting degree requirements, and science faculty at MSU Billings believe very strongly that academic advising is a vital component to ensuring student success.

Biology

Biology programs available at MSU Billings include the Biology Major which is available as either a Bachelor of Science (BS) or Bachelor of Arts (BA) degree.

The biology major also has options and plans of study to allow students to specialize in an area of interest. The biology curriculum is designed to provide biology students with the opportunity for the best possible undergraduate education in biology. In addition to the transmission of factual information, the biology curriculum places emphasis on the development of critical thinking skills in contemporary areas of biology. This is accomplished through a combination of lecturing, experimental laboratory exercises, independent learning by data analysis, research and field projects, seminars, incorporation of extensive writing, library research, and use of computers in data analysis.

MSU Billings' program in biology begins with a two-year core curriculum emphasizing the broad scope of biology through coursework in biological principles, biological diversity, cell biology and genetics. Other required advanced courses and electives are taken in the junior and senior year. While building a solid foundation in biology, the program allows students to match their interests with professional requirements.

Students in biology at MSU Billings have an opportunity to focus on specific areas in biology through a variety of options and plans of study. Specialization in biology is possible with the choice of an appropriate plan of study and in consultation with the faculty advisors who can provide students with the best educational experience at MSU Billings.

All students in the Biology program also take a Capstone seminar course in their senior year. This course is designed to ensure a standard of excellence in knowledge of basic biological concepts, and integration of those concepts with other areas in Science.

A maximum of five semester credits of BIOB 490 BIOB 492, BIOB 494, BIOB 495, and BIOB 498 can be applied to the BA or BS degree as unrestricted biology electives. Excess credits earned in these courses may still be applied to graduation as unrestricted electives.

Medical Laboratory Science Program

Students wishing to become medical/clinical lab scientists may choose the Medical Laboratory Science option within the Biology Program.

To complete the final year of coursework for the MLS Option, students apply for admittance to a professional training program. The professional programs consist of 33-37 credits of clinical experience taken during the summer, fall, and winter semesters. Professional training programs are approved by the National Accrediting Agency for Clinical Laboratory Science (NAACLS (https://www.naacls.org/)). The following regional institutions have accredited professional training programs: MSU Bozeman; University of North Dakota, Grand Forks; Sacred Heart School of Medical Technology, Spokane, Washington; The Colorado Center for Medical Laboratory Sciences, Aurora. Upon completion of the professional program, students will be qualified to take the national board of certification exam administered by the American Society for Clinical Pathologists or the National Certification Agency.

For additional information, contact Dr. David Butler at (406) 657-2031 or dbutler@msubillings.edu. (rdillman@msubillings.edu)

Chemistry

Chemistry programs at MSU Billings include the Chemistry Major and the Chemistry Minor.

Students taking the first two years in a chemistry program will have a well-rounded background in organic and inorganic chemistry. Students majoring in chemistry will receive additional training in physical chemistry, quantitative chemistry, instrumentation, biochemistry, and advanced organic or inorganic chemistry.

The chemistry program is designed to be flexible enough to meet individual interests of students and comprehensive enough to be competitive nationally. A chemistry major can expect to find employment in private, state, or federal laboratories ranging from research and development to quality control. Selection of elective courses in other fields such as biology, geology, business or health sciences can open up a variety of career options. Graduate education is encouraged as an avenue to expand career opportunities.

Pre-Medical Sciences

Students interested in professional programs in medical sciences such as medicine, dentistry, veterinary medicine, physician assistant, or pharmacy must first complete a Bachelor's degree. While most of these professional programs do not require a specific major, they do require specific prerequisite coursework for their applicants. As applicants to these programs must have a strong academic background in biology and chemistry, most MSU Billings students seeking admission to these programs will pursue a Bachelor of Science Degree in Biology, or a Bachelor of Science Degree in Chemistry.

Medical science programs seek well rounded students. Individual plans of study can be designed in consultation with a faculty advisor to provide the student with the maximum opportunity for pursuing goals. Students seeking admission to a medical science program usually apply to an appropriate professional school before graduation from MSU Billings. Biology and Chemistry faculty advisors can assist and advise the student in arranging these applications.

Broadfield Science

The Broadfield Science program offers students a broad-based foundation in the sciences through coursework in Biology, Chemistry, Earth Science, and Physics. Students pursuing this degree will also complete a concentration in either Environmental Science, Earth Science, or Botany. The program provides graduates with the knowledge and skills necessary to qualify for positions requiring a broad-based foundation in all sciences.

The Broadfield Science Degree with Teaching Endorsement is especially attractive to students interested in teaching science because they will have a strong foundation in biology, chemistry, earth science, and physics. With additional Professional Core requirements met for teacher licensure, students completing this program would be regarded as "highly qualified" according to national standards, and thus qualify for Grade 5-12 teaching opportunities in broadfield science.

Earth Science

Earth Science is an important part of the Broadfield Science program.

The Earth Science curriculum provides opportunities to study landscapes and the natural materials and processes that made them. This includes rocks and minerals, earth history and fossils, sedimentation, weather and climate (past and ancient), earth structures, and natural hazards. MSUB's location provides ample opportunities for place-based learning and student-led independent research in the lab, using GIS software, or in the field. Students completing this curriculum may find employment in the geological, engineering, and environmental areas, as interpreters with park systems, nature centers, and museums, or as field science technicians.

Physics

Physics is an important part of the Broadfield Science program, as well as the Biology and Chemistry programs.

Physics is the study of matter, energy, and their interactions; this includes all physical structures and phenomena. Experiments and observations in physics have shown that the operation of the universe at all levels is based on a few fundamental laws. The study of physics is the study of these laws and their applications.

- Biology Bachelor of Arts Degree (https://catalog.msubillings.edu/undergraduate/college-health-professions-science/department-biological-physical-sciences/ba-biology/)
- Biology Bachelor of Science Degree (https://catalog.msubillings.edu/undergraduate/college-health-professions-science/department-biological-physical-sciences/bs-biology/)
    - Medical Laboratory Science Option (https://catalog.msubillings.edu/undergraduate/college-health-professions-science/department-biological-physical-sciences/bs-biology-medical-laboratory-science-option/)
- Chemistry Bachelor of Science Degree (https://catalog.msubillings.edu/undergraduate/college-health-professions-science/department-biological-physical-sciences/bs-chemistry/)
- Broadfield Science Bachelor of Science Degree (https://catalog.msubillings.edu/undergraduate/college-health-professions-science/department-biological-physical-sciences/bs-broadfield-science/)
    - Teaching Licensure Option (https://catalog.msubillings.edu/undergraduate/college-health-professions-science/department-biological-physical-sciences/bs-broadfield-science-teaching-licensure-option/)
- Chemistry Minor (https://catalog.msubillings.edu/undergraduate/college-health-professions-science/department-biological-physical-sciences/minor-chemistry/)
- Earth Science Minor *Program placed on moratorium* (https://catalog.msubillings.edu/undergraduate/college-health-professions-science/department-biological-physical-sciences/minor-earth-science/)