

BIOLOGY MEDICAL LABORATORY SCIENCE OPTION BACHELOR OF SCIENCE DEGREE

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Describe the cellular basis of living organisms and illustrate the functions of cellular components.
- Describe the molecular basis of cellular function, including inheritance and genetics.
- Describe the chemical basis of life and the biochemical reactions that make it possible.
- Interpret data and use analytical skills to arrive at conclusions.
- Become eligible to obtain national certification as a Clinical Laboratory Scientist.

Students with a 2.5 GPA or higher can apply for a final year of professional training to earn a degree in Biology/Medical Laboratory Science Option from MSU Billings. Total credits required for graduation are 120. Students in this program will take an additional three semesters of courses through one of our affiliate institutions. With proper planning and advising, it is possible for students to begin their professional training after their junior year. These additional semesters are necessary because professional training programs approved by the National Accrediting Agency for Clinical Laboratory Science (NAACLS, www.nacls.org) are 12 months in duration.

All students desiring to become a certified Clinical Laboratory Scientist must take a national certification examination upon completion of the year of professional training.

Required Courses

Code	Title	Credits
General Education Requirements (https://catalog.msubitings.edu/undergraduate/general-education-requirements/)		31
Students should consult with an academic advisor before registering for General Education courses in order to minimize the number of courses needed to satisfy the requirements of the major. ¹		
Professional Medical Lab Training Core		37
Biology Requirements		
BIOB 160	Principles of Living Systems *	3
BIOB 161	Principles Living Systems Lab *	1
BIOB 260	Cellular & Molecular Biology	3
BIOB 261	Cellular & Molecular Biol Lab	1
BIOB 375	General Genetics	3
BIOB 376	General Genetics Lab	1
BIOB 410	Immunology	3
BIOB 499	Senior Thesis/Capstone	1
BIOH 301	Human Anatomy & Physiology I	3
BIOH 302	Human Anatomy & Phys I Lab	1
BIOH 311	Human Anatomy & Physiology II	3
BIOH 312	Human Anatomy & Phys II Lab	1
BIOH 405	Hematology	3

BIOH 406	Hematology Lab	1
BIOM 250	Microbiology for Hlth Sciences	3
BIOM 251	Microbiology Hlth Sciences Lab	1
BIOM 400	Medical Microbiology	3
BIOM 401	Medical Microbiology Lab	1
Subtotal		36
Chemistry Requirements²		
CHMY 141	College Chemistry I *	4
CHMY 142	College Chemistry I Lab *	1
CHMY 143	College Chemistry II	4
CHMY 144	College Chemistry II Lab	1
CHMY 211	Elements of Organic Chemistry	3
CHMY 212	Elements of Organic Chem Lab	1
BCH 380	Biochemistry	3
BCH 381	Biochemistry Lab	1
<i>Highly recommended but not required</i>		
CHMY 311	Analytical Chem-Quant Analysis	
CHMY 312	Analytical Chem Lab-Quant Anlsys	
Subtotal		18
Mathematics/Statistics Requirement		
STAT 216	Introduction to Statistics *	4
Physics Requirements		
PHSX 205	College Physics I *	3
PHSX 206	College Physics I Lab *	1
Total Minimum Credits		120

¹ The following General Education courses also satisfy requirements in the major: BIOB 160, BIOB 161, CHMY 141, and STAT 216.

² NOTE: Students wishing to obtain a minor in Chemistry will need to take CHMY 311, CHMY 312, CHMY 321, CHMY 322, CHMY 323, CHMY 324 instead of CHMY 211, CHMY 212.

* May satisfy General Education requirements.

Courses in the professional training core (BIOH 470, BIOH 471 Fall Semester, and BIOH 472 Spring Semester) will be taught at an affiliated institution, which include Montana State University-Bozeman; University of North Dakota, Grand Forks; Sacred Heart School of Medical Technology, Spokane, Washington; or the Colorado Center for Medical Laboratory Science, Aurora (msudenver.edu/ccmls/) (<https://msudenver.edu/ccmls/>). The training and credits from all four programs will allow students to fulfill the requirements needed to take the national examinations to become certified clinical laboratory scientists or medical technologists. All students enrolled at each training program site will remain MUS students at their respective institutions.

Certain courses in this program have prerequisites; students should check the course descriptions for required prerequisites.

Suggested Plan of Study

Code	Title	Credits
First Year		
Fall		
BIOB 160	Principles of Living Systems	4
& BIOB 161	and Principles Living Systems Lab	
CHMY 141	College Chemistry I	5
& CHMY 142	and College Chemistry I Lab	
General Education		6

Total		15
Spring		
CHMY 143 & CHMY 144	College Chemistry II and College Chemistry II Lab	5
BIOM 250 & BIOM 251	Microbiology for Hlth Sciences and Microbiology Hlth Sciences Lab	4
General Education		6
Total		15
Second Year		
Fall		
BIOB 260 & BIOB 261	Cellular & Molecular Biology and Cellular & Molecular Biol Lab	4
BIOH 301 & BIOH 302	Human Anatomy & Physiology I and Human Anatomy & Phys I Lab	4
STAT 216	Introduction to Statistics	4
General Education		3
Total		15
Spring		
CHMY 211 & CHMY 212	Elements of Organic Chemistry and Elements of Organic Chem Lab	4
BIOB 375 & BIOB 376	General Genetics and General Genetics Lab	4
BIOH 311 & BIOH 312	Human Anatomy & Physiology II and Human Anatomy & Phys II Lab	4
Total		12
Third Year		
Fall		
BCH 380 & BCH 381	Biochemistry and Biochemistry Lab	4
PHSX 205 & PHSX 206	College Physics I and College Physics I Lab	4
General Education		6
Total		14
Spring		
BIOB 410	Immunology	3
BIOB 499	Senior Thesis/Capstone	1
BIOH 405 & BIOH 406	Hematology and Hematology Lab	4
BIOM 400 & BIOM 401	Medical Microbiology and Medical Microbiology Lab	4
Total		12
Fourth Year		
Summer, Fall, Spring		
Professional Core		v37