

“W” Number: _____
 Student Name: _____
 Advisor Name: _____

Catalog: 2021-2022 University of Wyoming Catalog
Program: Molecular Biology, B.S.

Molecular Biology, B.S.

To obtain a B.S. degree in molecular biology, a student, with the aid of a molecular biology adviser, designs a program of study that includes courses from the Molecular Biology General Science Core and Elective Requirements listed below. Additional course lists are provided as an aid in developing an individualized program of study in key Emphasis Areas such as Cell Biology and Molecular Genetics, Microbiology, and Preprofessional Health Sciences. Courses listed under the Emphasis Areas are optional, and the student and adviser will design a unique curriculum suited to the student's personal interests. Flexibility in course selection also permits students to fulfill various requirements for postgraduate and professional schools. Completion of a B.S. in Molecular Biology provides a student with the tools needed to open the door to exciting futures in science, medicine and agriculture.

We expect that our graduating students will have a strong foundation in basic science, biochemistry and molecular biology that will enable them to:

1. understand the basis of multiple molecular mechanisms central to gene expression;
2. utilize molecular and microbiological laboratory techniques in future jobs or programs and trouble-shoot experimental challenges;
3. apply for graduate programs in molecular biology, microbiology or other life sciences;
4. begin employment as a laboratory research assistant in academia or the medical or agricultural biotechnology industries;
5. utilize a background in biochemistry and cell and molecular biology to promote success in the basic science curriculum in medical or other health professional schools;
6. integrate a background in biochemistry and cell and molecular biology into career development in professions such as law, genetic counseling, or public health policy;
7. employ evidence-based scientific reasoning skills in evaluating the use of molecular genetics in the prevention, diagnosis and treatment of medical disorders.

Requirements for Molecular Biology Majors

General Requirements

- Total credits (college requirement): 120
- 3000-level or above credits (university requirement): 42
- Fulfillment of University Studies Program (consult adviser)
- Fulfillment of molecular biology general science, core and elective requirements listed below

MOLB Requirements

General Science Requirement

Course Name	Credits:	Term Taken	Grade	Gen Ed
LIFE1010 - General Biology	Credits: 4			
CHEM1020 - General Chemistry I	Credits: 4			
CHEM1030 - General Chemistry II	Credits: 4			
CHEM2420 - Organic Chemistry I	Credits: 4			
CHEM2440 - Organic Chemistry II	Credits: 4			
PHYS1110 - General Physics I	Credits: 4			
PHYS1120 - General Physics II	Credits: 4			
MATH2200 - Calculus I *	Credits: 4			
STAT2050 - Fundamentals of Statistics	Credits: 4			

Total: 36 Credits

*The alternative math courses MATH 1450 or MATH 1400 and MATH 1405 may be substituted with adviser approval.

MOLB Core Requirement

Course Name	Credits:	Term Taken	Grade	Gen Ed
MOLB2021 - General Microbiology	Credits: 4			
LIFE3050 - Genetics	Credits: 4			
MOLB3320 - Molecular Biological Methods	Credits: 4			
MOLB3610 - Principles of Biochemistry	Credits: 4			
OR				
CHEM4400 - Biological Chemistry	Credits: 3			

MOLB4600 - Advanced Biochemistry	Credits: 3			
MOLB4053 - Communications in Molecular Biology	Credits: 3			
MOLB4440 - Microbial Genetics	Credits: 3			
OR				
MOLB4450 - Cell and Developmental Genetics	Credits: 3			
MOLB4670 - Advanced Molecular Cell Biology	Credits: 3			
MOLB4051 - Departmental Seminar	Credits: 1			
OR				
MOLB4052 - Summer Seminar	Credits: 1			

Total: 28-29 Credits

MOLB Elective Requirement (6 credits)

Courses from the following list that were not used to fulfill the MOLB Core Requirement may be applied to the MOLB Elective Requirement; a maximum of 3 credits of MOLB 4010 may be counted toward the MOLB Elective Requirement.

Course Name	Credits:	Term Taken	Grade	Gen Ed
MOLB4010 - Laboratory Research in Molecular Biology	Credits: 1-3			
MOLB4100 - Clinical Biochemistry	Credits: 4			
MOLB4260 - Quantitative Microscopy	Credits: 1			
MOLB4400 - Immunology	Credits: 4			
MOLB4440 - Microbial Genetics	Credits: 3			
MOLB4450 - Cell and Developmental Genetics	Credits: 3			
MOLB4460 - Microbial Physiology and Metabolism	Credits: 3			
MOLB4540 - Microbial Diversity and Ecology	Credits: 4			
MOLB4680 - Signaling in Host-microbe Interaction	Credits: 3			

Total: 6 Credits

Molecular Biology Emphasis Areas

After discussing individual interests with a molecular biology adviser, a student should enroll in additional courses that will enhance preparation for a chosen career objective. Listed below are recommended courses that are not required but will further develop a student's skills and understanding in three Emphasis Areas.

Cell Biology and Molecular Genetics

Course Name	Credits:	Term Taken	Grade	Gen Ed
MOLB4010 - Laboratory Research in Molecular Biology	Credits: 1-3			
MOLB4260 - Quantitative Microscopy	Credits: 1			
MOLB4440 - Microbial Genetics	Credits: 3			
MOLB4450 - Cell and Developmental Genetics	Credits: 3			
MOLB4610 - Biochemistry 2: Molecular Mechanisms	Credits: 3			
MOLB4680 - Signaling in Host-microbe Interaction	Credits: 3			
ZOO4280 - Introduction to Neuroscience	Credits: 3			
ZOO4340 - Developmental Biology and Embryology	Credits: 4			

Microbiology

Course Name	Credits:	Term Taken	Grade	Gen Ed
MICR2220 - Pathogenic Microbiology	Credits: 3			
MICR4130 - Mammalian Pathobiology	Credits: 3			
MICR4220 - Molecular Mechanisms of Bacterial Pathogenesis	Credits: 3			
MICR4360 - Medical Entomology and Parasitology	Credits: 4			
MOLB4010 - Laboratory Research in Molecular Biology	Credits: 1-3			
MOLB4400 - Immunology	Credits: 4			
MOLB4440 - Microbial Genetics	Credits: 3			
MOLB4460 - Microbial Physiology and Metabolism	Credits: 3			
MOLB4540 - Microbial Diversity and Ecology	Credits: 4			
MOLB4680 - Signaling in Host-microbe Interaction	Credits: 3			
MICR4710 - Medical Virology	Credits: 3			

Preprofessional Health Sciences

Course Name	Credits:	Term Taken	Grade	Gen Ed
MOLB4010 - Laboratory Research in Molecular Biology	Credits: 1-3			
MOLB4100 - Clinical Biochemistry	Credits: 4			
MOLB4400 - Immunology	Credits: 4			
MOLB4450 - Cell and Developmental Genetics	Credits: 3			
MOLB4610 - Biochemistry 2: Molecular Mechanisms	Credits: 3			
MICR2220 - Pathogenic Microbiology	Credits: 3			
MICR4710 - Medical Virology	Credits: 3			
PHCY3450 - Foundational Pathophysiology	Credits: 4			
PSYC1000 - General Psychology	Credits: 3			
PSYC2210 - Drugs and Behavior	Credits: 3			
OR				
PSYC2340 - Abnormal Psychology	Credits: 3			
SOC1000 - Sociological Principles	Credits: 3			
SOC3550 - Medical Sociology	Credits: 3			
KIN2040 - Human Anatomy	Credits: 3			
KIN2041 - Human Anatomy Laboratory	Credits: 1			
ZOO3115 - Human Systems Physiology	Credits: 4			
ZOO4125 - Integrative Physiology	Credits: 5			
ZOO4280 - Introduction to Neuroscience	Credits: 3			
ZOO4340 - Developmental Biology and Embryology	Credits: 4			

Recommended Course Sequence

In order to fulfill course prerequisites in a timely manner, the following sequence of courses is recommended. This plan does not list other university requirements, electives, study abroad or undergraduate research opportunities, as these may be placed in many different locations in a student's overall academic plan. Transfer students who have completed 2 years at Wyoming Community colleges or at other universities are encouraged to take MOLB 3610 in the summer semester preceding the fall semester of their junior year or in the fall semester of their junior year at the latest, MOLB 3320 in spring semester junior year, and MOLB 4600 in fall semester senior year. Students interested in taking full advantage of the educational and undergraduate research opportunities in the Department of Molecular Biology may opt to complete their undergraduate degree in five years.

Freshman Year: Fall

Course Name	Credits:	Term Taken	Grade	Gen Ed
LIFE1010 - General Biology	Credits: 4			
CHEM1020 - General Chemistry I	Credits: 4			
MATH2200 - Calculus I	Credits: 4			
MOLB1101 - First-Year Seminar: Genetic Engineering and Synthetic Biology	Credits: 3			
OR other USP First-Year Seminar				

Freshman Year: Spring

Course Name	Credits:	Term Taken	Grade	Gen Ed
MOLB2021 - General Microbiology	Credits: 4			
CHEM1030 - General Chemistry II	Credits: 4			
• USP COM1 Credits: 3				
STAT2050 - Fundamentals of Statistics	Credits: 4			

Sophomore Year: Fall

Course Name	Credits:	Term Taken	Grade	Gen Ed
CHEM2420 - Organic Chemistry I	Credits: 4			
• USP COM2 Credits: 3				
LIFE3050 - Genetics	Credits: 4			

Sophomore Year: Spring

Course Name	Credits:	Term Taken	Grade	Gen Ed
CHEM2440 - Organic Chemistry II	Credits: 4			

MOLB3320 - Molecular Biological Methods	Credits: 4			
MOLB3610 - Principles of Biochemistry	Credits: 4			
Junior Year: Fall				
Course Name	Credits:	Term Taken	Grade	Gen Ed
MOLB4600 - Advanced Biochemistry	Credits: 3			
PHYS1110 - General Physics I	Credits: 4			
Junior Year: Spring				
Course Name	Credits:	Term Taken	Grade	Gen Ed
PHYS1120 - General Physics II	Credits: 4			
MOLB4440 - Microbial Genetics	Credits: 3			
OR MOLB 4450 Cell and Developmental Genetics Credits: 3				
MOLB4053 - Communications in Molecular Biology	Credits: 3			
• MOLB 4000-level elective Credits: 3 or 4				
Senior Year: Fall				
Course Name	Credits:	Term Taken	Grade	Gen Ed
MOLB4670 - Advanced Molecular Cell Biology	Credits: 3			
• MOLB 4000-level elective Credits: 3 or 4				
Senior Year: Spring				
Course Name	Credits:	Term Taken	Grade	Gen Ed
MOLB4051 - Departmental Seminar	Credits: 1			
• MOLB 4000-level credits or other 4000-level credits				
Notes:				