

# MOLECULAR BIOLOGY INTERDISCIPLINARY MINOR

Molecular and Radiological Biosciences Building, Room 111  
(970) 491-5602

[bmb.colostate.edu/undergraduate-students/](https://bmb.colostate.edu/undergraduate-students/) (<https://www.bmb.colostate.edu/undergraduate-students/>)

Coordinated by a Faculty Advisory Board

Erwin Chargaff referred to molecular biology as “the practice of biochemistry without a license” due to the fact that most early molecular biologists were trained as chemists or physicists. This also serves to emphasize that molecular biology is an interdisciplinary field, primarily the study of macromolecular structure and of the replication and expression of the information in our hereditary material (DNA). Jacques Monod defined molecular biology as “the recognition that the essential properties of living beings could be interpreted in terms of the structures of their macromolecules.”

Molecular biology is becoming increasingly recognized as a significant area of study, particularly for students interested in the rapidly emerging field of biotechnology. The course requirements for this program complement extant life science degree programs on campus. The Molecular Biology Interdisciplinary Minor—noted on the transcript—will provide recognition that the student has completed a body of course work that provides both breadth and depth in this area. This program provides students with a strong, well-balanced background in the biological, physical, and mathematical sciences. It is ideally suited for undergraduates who wish to pursue advanced degrees in biochemistry, microbiology, molecular biology, or related life sciences; for pre-professional students in health-related fields; and for students interested in employment in the biotechnology industry. The program includes study of macromolecular structure and function; cellular biochemistry; metabolism; gene expression, DNA structure, replication, and repair; cell organization, communication, growth, aging, and death. Courses in physics, organic chemistry, statistical measurements, and research methods are required. Independent study, internships, or advanced research-oriented laboratory classes are taken during the junior and senior years to provide opportunities for experiential learning and working closely with an interdisciplinary group of faculty.

Students interested in participating in this program should contact the Department of Biochemistry and Molecular Biology (<http://www.bmb.colostate.edu/>) (in the Molecular and Radiological Biosciences Building, Room 111, (970) 491-5602).

## Requirements Effective Fall 2023

Students must satisfactorily complete the total credits required for the minor. Minors and interdisciplinary minors require 12 or more upper-division (300- to 400-level) credits.

Additional coursework may be required due to prerequisites.

Code	Title	Credits
<b>Mathematics Core</b>		
MATH 155	Calculus for Biological Scientists I (GT-MA1)	4

or MATH 160	Calculus for Physical Scientists I (GT-MA1)	
STAT 301	Introduction to Applied Statistical Methods	3
or STAT 307	Introduction to Biostatistics	

<b>Physics Core</b>		
Select one group from the following:		10

Group A:		
PH 121	General Physics I (GT-SC1)	
& PH 122	and General Physics II (GT-SC1)	
Group B:		
PH 141	Physics for Scientists and Engineers I (GT-SC1)	
& PH 142	and Physics for Scientists and Engineers II (GT-SC1)	

<b>Chemistry Core</b>		
CHEM 111	General Chemistry I (GT-SC2)	4
CHEM 112	General Chemistry Lab I (GT-SC1)	1
CHEM 113	General Chemistry II	3
CHEM 114	General Chemistry Lab II	1
CHEM 345	Organic Chemistry I	4
CHEM 346	Organic Chemistry II	4

<b>Biology Core</b>		
Select one group from the following:		4-5

Group A:		
BZ 310	Cell Biology	
Group B:		
LIFE 210	Introductory Eukaryotic Cell Biology	
& LIFE 212	and Introductory Cell Biology Laboratory	
LIFE 102	Attributes of Living Systems (GT-SC1)	4

<b>Biochemistry Core</b>		
BC 401	Comprehensive Biochemistry I	3
BC 403	Comprehensive Biochemistry II	3
BC 404	Comprehensive Biochemistry Laboratory	2

<b>Microbiology Core</b>		
MIP 300	General Microbiology	3
MIP 342	Immunology	4

<b>Molecular Genetics Core</b>		
BC 463	Molecular Genetics	3
or MIP 450	Microbial Genetics	
Select one group from the following:		4-6

Group A:		
BZ 350	Molecular and General Genetics	
Group B:		
LIFE 201B	Introductory Genetics: Molecular/	
& LIFE 203	Immunological/Developmental (GT-SC2)	
	and Introductory Genetics Laboratory	

Group C:		
SOCR 330	Principles of Genetics	
& SOCR 331	and Genetics Laboratory	

<b>Seminar</b>		
BC 493	Senior Seminar	1

<b>Selected Courses</b>		
Select one course from the following:		3-4
BC 465	Molecular Regulation of Cell Function	

BZ 433	Behavioral Genetics	
MIP 420	Medical and Molecular Virology	
MIP 443	Microbial Physiology	
<b>Advanced Laboratory</b>		
Select four credits from the following:		4
BC 475	Mentored Research	
BC 495	Independent Study	
BC 499A	Thesis: Laboratory Research-Based	
BC 499B	Thesis: Literature Based	
BC 499C	Thesis: Literature-based in Health and Med Sci	
BC 499D	Thesis: Literature-based in Pre-Pharmacy	
BZ 495	Independent Study	
MIP 302	General Microbiology Laboratory	
MIP 343	Immunology Laboratory	
MIP 425	Virology and Cell Culture Laboratory	
MIP 495	Independent Study	
<b>Program Total Credits:</b>		<b>72-75</b>