

Cell and Molecular Biology, BS

The BS Cell and Molecular Biology curriculum lays the groundwork for strong scientific training with basic course work in mathematics, chemistry, and physics, relevant to biology. Students pursue a focused program of study emphasizing processes operating at the cellular and molecular levels of biological systems, including specialty courses in molecular cell biology and advanced genomics. Students choose from a range of advanced electives that delve deeply into molecular aspects of biology.

Program Requirements

Complete all courses listed below unless otherwise indicated. Also complete any corequisite labs, recitations, clinicals, or tools courses where specified and complete any additional courses needed beyond specific college and major requirements to satisfy graduation credit requirements.

Universitywide Requirements

All undergraduate students are required to complete the Universitywide Requirements (<http://catalog.northeastern.edu/undergraduate/university-academics/university-wide-requirements/>).

NUPath Requirements

All undergraduate students are required to complete the NUPath Requirements (<http://catalog.northeastern.edu/undergraduate/university-academics/nupath/>).

Cell and Molecular Biology Major Requirements

Code	Title	Hours
Introduction to College		
Introduction to Experiential Learning		
BIOL 1000 or INSC 1000	Biology at Northeastern Science at Northeastern	1
EESC 2000	Professional Development for Co-op	1
Required Biology		
<i>Foundations</i>		
BIOL 1107 and BIOL 1108	Foundations of Biology and Lab for BIOL 1107	5
<i>Genetics</i>		
BIOL 2301 and BIOL 2302	Genetics and Molecular Biology and Lab for BIOL 2301	5
<i>Project Lab</i>		
BIOL 2309	Biology Project Lab	4
<i>Inquiries</i>		
BIOL 2299	Inquiries in Biological Sciences	4
<i>Biochemistry</i>		
BIOL 3611 and BIOL 3612	Biochemistry and Lab for BIOL 3611	5
<i>Molecular Biology</i>		
BIOL 4707	Cell and Molecular Biology	4
BIOL 5591	Advanced Genomics	4
Intermediate/Advanced Cell and Molecular Biology Electives		
Complete two of the following:		8-9
BIOL 3411	Current Topics in Cell and Molecular Biology	
BIOL 3421 and BIOL 3422	Microbiology and Lab for BIOL 3421	
BIOL 2329	Bioethics	
BIOL 3601	Neural Systems and Behavior	
BIOL 3603	Mammalian Systems Physiology	
BIOL 3605	Developmental Neurobiology	
BIOL 5307	Biological Electron Microscopy	
BIOL 5541	Endocrinology	
BIOL 5543	Stem Cells and Regeneration	

BIOL 5549	Inventions in Microbial Biotechnology
BIOL 5569	Advanced Microbiology
BIOL 5573	Medical Microbiology
BIOL 5581	Biological Imaging
BIOL 5583	Immunology
BIOL 5585	Evolution
BIOL 5587	Comparative Neurobiology
BIOL 5593	Cell and Molecular Biology of Aging
BIOL 5597	Immunotherapies of Cancer and Infectious Disease
EEMB 3001	Genetics and Evolution in Action

Research

One of the two Intermediate/Advanced Electives can be a research course:

BIOL 4991	Research
BIOL 4994	Internship
BIOL 4970	Junior/Senior Honors Project 1
BIOL 4971	Junior/Senior Honors Project 2

Biology Capstone

Code	Title	Hours
Please complete one of the following options to fulfill the capstone requirement:		
BIOL 4701	Biology Capstone	1-4
BIOL 4900	Biology Research Capstone (concurrent with BIOL 4991 or BIOL 4994, which may be used toward Intermediate/Advanced Cell and Molecular Biology Electives)	
BIOL 4971	Junior/Senior Honors Project 2	

Supporting Courses

Code	Title	Hours
Mathematics		
MATH 1251	Calculus and Differential Equations for Biology 1	4
Statistics		
ENVR 2500 and ENVR 2501	Biostatistics and Lab for ENVR 2500	5
Chemistry		
<i>General Chemistry</i>		
CHEM 1161 and CHEM 1162 and CHEM 1163	General Chemistry for Science Majors and Lab for CHEM 1161 and Recitation for CHEM 1161	5
<i>Organic Chemistry</i>		
CHEM 2311 and CHEM 2312	Organic Chemistry 1 and Lab for CHEM 2311	5
CHEM 2313 and CHEM 2314	Organic Chemistry 2 and Lab for CHEM 2313	5
Physics		
<i>Physics 1</i>		
Complete one of the following lecture/lab pairs. PHYS 1145/PHYS 1146 is recommended:		
PHYS 1145 and PHYS 1146	Physics for Life Sciences 1 and Lab for PHYS 1145	5
PHYS 1151 and PHYS 1152 and PHYS 1153	Physics for Engineering 1 and Lab for PHYS 1151 and Interactive Learning Seminar for PHYS 1151	
PHYS 1161 and PHYS 1162	Physics 1 and Lab for PHYS 1161	
<i>Physics 2</i>		
Complete one of the following lecture/lab pairs. PHYS 1147/PHYS 1148 is recommended:		
PHYS 1147 and PHYS 1148	Physics for Life Sciences 2 and Lab for PHYS 1147	5

PHYS 1155 and PHYS 1156 and PHYS 1157	Physics for Engineering 2 and Lab for PHYS 1155 and Interactive Learning Seminar for PHYS 1155
PHYS 1165 and PHYS 1166	Physics 2 and Lab for PHYS 1165

Intermediate or Advanced Science

Complete one course from the following: 4-5

BIOL 2301 to BIOL 5999

CHEM 2311 to CHEM 5999

EEMB 2290 to EEMB 5999

ENVR 2310 to ENVR 5999

MATH 2280 to MATH 5999

PHYS 2303 to PHYS 5999

PSYC 2290 to PSYC 5999

Cell and Molecular Biology Major Credit/GPA Requirement

Complete 79 semester hours in the major with a cumulative GPA of 2.000.

Due to overlap in course content, double majoring in cell and molecular biology and biology, biochemistry, marine biology or behavioral neuroscience is not permitted.

Program Requirement

136 total semester hours required

Plan of Study

Please note that these are sample plans of study. While the requirements are the same for all students, individual schedules may vary.

Four Years, Two Co-ops in Summer 2/Fall

Year 1								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
BIOL 1107		4 BIOL 2299		4 BIOL 2301		4 Vacation		
BIOL 1108		1 CHEM 2311		4 BIOL 2302		1		
CHEM 1161		4 CHEM 2312		1 Elective		4		
CHEM 1162		1 ENGW 1111		4				
MATH 1251		4 Elective		4				
Elective		4						
INSC 1000		1						
		19		17		9		0
Year 2								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
ENVR 2500		4 BIOL 2309		4 BIOL 3611		4 Co-op		
ENVR 2501		1 PHYS 1145		4 BIOL 3612		1		
CHEM 2313		4 PHYS 1146		1 Elective		4		
CHEM 2314		1 Elective		4				
Intermediate/advanced CMB elective		4 Elective		4				
(Intermediate/advanced CMB elective lab)		1 EESC 2000		1				
Elective		4						
		19		18		9		0
Year 3								
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours	Hours
Co-op		Intermediate/advanced CMB elective		4 BIOL 4707		4 Co-op		
Elective		4 (Intermediate/advanced CMB elective lab)		1 Elective		4		

4 Cell and Molecular Biology, BS

	PHYS 1147	4		
	PHYS 1148	1		
	ENGW 3307	4		
	Elective	4		
	4	18	8	0

Year 4

Fall	Hours	Spring	Hours		
Co-op		BIOL 5591	4		
		Capstone Option	4-5		
		Intermediate/advanced science elective	4		
		(Intermediate/advanced science elective lab)	1		
		Elective	4		
	0		17-18		

Total Hours: 138-139

Five Years, Three Co-ops in Summer 2/Fall

Year 1

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
BIOL 1107		4 BIOL 2299		4 BIOL 2301		4 Vacation	
BIOL 1108		1 CHEM 2311		4 BIOL 2302		1	
CHEM 1161		4 CHEM 2312		1 Elective		4	
CHEM 1162		1 ENGW 1111		4			
MATH 1251		4 Elective		4			
Elective		4					
INSC 1000		1					
	19		17		9		0

Year 2

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
ENVR 2500		4 BIOL 2309		4 BIOL 3611		4 Co-op	
ENVR 2501		1 PHYS 1145		4 BIOL 3612		1	
CHEM 2313		4 PHYS 1146		1			
CHEM 2314		1 Elective		4			
Elective		4 Elective		4			
Elective		4 EESC 2000		1			
	18		18		5		0

Year 3

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		BIOL 4707		4 Vacation		Co-op	
		PHYS 1147		4			
		PHYS 1148		1			
		ENGW 3307		4			
		Elective		4			
	0		17		0		0

Year 4

Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op		Intermediate/advanced CMB elective		4 Vacation		Co-op	
		(Intermediate/advanced CMB elective lab)		1			
		Intermediate/advanced science elective		4			

		Intermediate/advanced science elective lab)	1		
		Elective	4		
		Elective	4		
	0		18	0	0
Year 5					
Fall	Hours	Spring	Hours		
Co-op		BIOL 5591	4		
		Capstone Option	4-5		
		Intermediate/advanced CMB elective	4		
		(Intermediate/advanced CMB elective lab)	1		
		Elective	4		
	0		17-18		

Total Hours: 138-139