

Cell and Molecular Biology, BS (Boston)

The Bachelor of Science in Cell and Molecular Biology curriculum lays the groundwork for strong scientific training with basic coursework 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 (<https://catalog.northeastern.edu/undergraduate/university-academics/university-wide-requirements/>).

NUPath Requirements

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

Cell and Molecular Biology Major Requirements

Code	Title	Hours
Introduction to College		
BIOL 1000 or INSC 1000	Biology at Northeastern Science at Northeastern	1
Experiential Learning Introduction		
EESC 2000	Professional Development for Co-op	1
Cell and Molecular Biology Core Courses		
BIOL 1107 and BIOL 1108	Foundations of Biology and Lab for BIOL 1107	5
BIOL 2299	Inquiries in Biological Sciences	4
BIOL 2301 and BIOL 2302	Genetics and Molecular Biology and Lab for BIOL 2301	5
BIOL 2309	Biology Project Lab	4
BIOL 3611 and BIOL 3612	Biochemistry and Lab for BIOL 3611	5
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 2329	Bioethics	
BIOL 3411	Current Topics in Cell and Molecular Biology	
BIOL 3421 and BIOL 3422	Microbiology and Lab for BIOL 3421	
BIOL 3601	Neural Systems and Behavior	
BIOL 3603	Mammalian Systems Physiology	
BIOL 3605	Developmental Neurobiology	
BIOL 5306	Biological Clocks	
BIOL 5541	Endocrinology	
BIOL 5543	Stem Cells and Regeneration	
BIOL 5549	Inventions in Microbial Biotechnology	
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 5595	Cell and Molecular Neuroscience
BIOL 5597	Immunotherapies of Cancer and Infectious Disease

Research

One of the two intermediate/advanced electives can be a research course: 4

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

Biology Capstone

Code	Title	Hours
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Complete one of the following to fulfill the capstone requirement: 1–4

BIOL 4701	Biology Capstone
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
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Mathematics

MATH 1341	Calculus 1 for Science and Engineering	4
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Statistics

ENVR 2500 and ENVR 2501 and ENVR 2502	Biostatistics and Lab for ENVR 2500 and Recitation for ENVR 2500	5
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Chemistry

CHEM 1161 and CHEM 1162 and CHEM 1163	General Chemistry for Science Majors and Lab for CHEM 1161 and Recitation for CHEM 1161	5
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CHEM 2311 and CHEM 2312	Organic Chemistry 1 and Lab for CHEM 2311	5
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CHEM 2313 and CHEM 2314	Organic Chemistry 2 and Lab for CHEM 2313	5
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Physics 1

PHYS 1145 and PHYS 1146	Physics for Life Sciences 1 and Lab for PHYS 1145
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Physics 2

PHYS 1147 and PHYS 1148	Physics for Life Sciences 2 and Lab for PHYS 1147
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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

Writing Requirements

Code	Title	Hours
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ENGW 1111 or ENGW 1102	First-Year Writing First-Year Writing for Multilingual Writers	4
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ENGW 3307	Advanced Writing in the Sciences	4
or ENGW 3315	Interdisciplinary Advanced Writing in the Disciplines	

Cell and Molecular Biology Major Credit/GPA Requirement

Complete 78 semester hours in the major. A minimum 2.000 GPA in the following course codes is required: BIOC, BIOL, BNSC, CHEM, EEMB, ENVR, MATH, PHYS, PSYC.

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

NUpath Requirements Satisfied

- Advanced Writing in the Discipline
- Analyzing and Using Data
- Conducting Formal and Quantitative Reasoning
- Demonstrating Thought and Action in a Capstone
- Engaging with the Natural and Designed World
- Writing in the First Year
- Writing-Intensive in the Major

Program Requirement

130 total semester hours required

Plan of Study

Please note that these are sample plans of study. They include a selection of course options that carry corequisite labs and the 4-semester-hour capstone option. Total program hours may be lower for students who choose other course options and/or other capstone options. While the requirements are the same for all students, individual schedules may vary.

Sample Plans of Study

FOUR YEARS, TWO CO-OPS IN SUMMER SECOND HALF/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			
INSC 1000		1 Elective		4			
MATH 1341		4					
Elective		4					
	19		17		9		0
Year 2							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 2313		4 BIOL 2309		4 BIOL 3611		4 Co-op	0
CHEM 2314		1 EESC 2000		1 BIOL 3612		1	
ENVR 2500		4 PHYS 1145		4 Elective		4	
ENVR 2501		1 PHYS 1146		1			
Intermediate/advanced CMB elective		4 Elective		4			
Elective		4 Elective		4			
	18		18		9		0
Year 3							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	ENGW 3307		4 BIOL 4707		4 Co-op	0
		PHYS 1147		4 Elective		4	
		PHYS 1148		1			
		Elective		4			

		Intermediate/advanced CMB elective	4				
	0		17		8		0
Year 4							
Fall	Hours	Spring	Hours				
Co-op	0	BIOL 5591	4				
		Capstone	4				
		Intermediate/advanced science elective	4				
		Intermediate/advanced biology laboratory	1				
		Elective	4				
	0		17				

Total Hours: 132

FIVE YEARS, THREE CO-OPS IN SUMMER SECOND HALF/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 1341	4	Elective	4				
INSC 1000	1						
	15		17		9		0
Year 2							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
CHEM 2313	4	BIOL 2309	4	BIOL 3611	4	Co-op	0
CHEM 2314	1	EESC 2000	1	BIOL 3612	1		
ENVR 2500	4	PHYS 1145	4				
ENVR 2501	1	PHYS 1146	1				
Elective	4	Elective	4				
Elective	4	Elective	4				
	18		18		5		0
Year 3							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	BIOL 4707	4	Vacation		Co-op	0
		ENGW 3307	4				
		PHYS 1147	4				
		PHYS 1148	1				
		Elective	4				
	0		17		0		0
Year 4							
Fall	Hours	Spring	Hours	Summer 1	Hours	Summer 2	Hours
Co-op	0	Intermediate/advanced CMB elective	4	Vacation		Co-op	0
		Intermediate/advanced science elective	4				
		Elective	4				
		Elective	4				
	0		16		0		0

Year 5			
Fall	Hours	Spring	Hours
Co-op		0 BIOL 5591	4
		Capstone	4
		Intermediate/advanced CMB elective	4
		Intermediate/advanced CMB elective lab	1
		Elective	4
	0		17
Total Hours: 132			