BIOMOLECULAR SCIENCE (BS)

Department Website (https://engineering.nyu.edu/academics/departments/chemical-and-biomolecular-engineering/)

NYSED: 28082 **HEGIS:** 0499.00 **CIP:** 26.0210

Program Descriptions

Biomolecular science exists at the interface between biology and chemistry. Scientists working in this area can have major impacts on society. Genetically-modified crops reduce food insecurity. Novel therapies, such as artificial organs, extend life. Inexpensive and renewable energy sources (like oil from algae) and bioremediation help address the problems of climate change and environmental degradation. A BS in Biomolecular Science is also a suitable starting point for careers in medicine. Our program was developed in cooperation with deans from major medical schools, and graduates have gone on to Harvard Dental School, Mount Sinai Medical School, and NYU Medical School, among other prestigious programs.

Our BS program in Biomolecular Science allows students to join their efforts to improve the world. The first two years of the program focus on core courses to provide a solid foundation in the fundamentals of science — math, physics, chemistry, and biology. From there, students can concentrate their studies in biomedical science or biotechnology.

Admissions

New York University's Office of Undergraduate Admissions supports the application process for all undergraduate programs at NYU. For additional information about undergraduate admissions, including application requirements, see How to Apply (https://www.nyu.edu/admissions/undergraduate-admissions/how-to-apply.html).

Program Requirements

The program requires the completion of 128 credits, comprised of the following:

Course	Title	Credits
General Education Requirements		
EXPOS-UA 1	Writing as Inquiry	4
EXPOS-UA 22	Advanced Writing for Engineers	4
Humanities and Social Science Electives (four 4-credit courses, for a total of 16 credits) [1]		16
Major Requirements		
Engineering and Technology Forum		
EG-UY 1001	Engineering and Technology Forum	1
Computational		
CS-UY 1133	Engineering Problem Solving and Programming	3
or CS-UY 1114	Intro To Programming & Problem Solving	
or CS-UY 1113	Problem Solving and Programming I	
Mathematics		
MA-UY 1024	Calculus I for Engineers	4
MA-UY 1124	Calculus II for Engineers	4
Chemistry		
CM-UY 1013	General Chemistry I	3
CM-UY 1011	General Chemistry Laboratory I	1
CM-UY 1023	General Chemistry II	3
CM-UY 1021	General Chemistry Laboratory II	1
CM-UY 2213	Organic Chemistry I	3
CM-UY 2211	Organic Chemistry Laboratory I	1
CM-UY 2223	Organic Chemistry II	3
CM-UY 2221	Organic Chemistry Laboratory II	1
CM-UY 3314	Biochemistry I	4
CM-UY 3323	Biochemistry II	3
CM-UY 3714	Physical Chemistry I	4
Biology		
BMS-UY 1003	Introduction to Cell and Molecular Biology	3
BMS-UY 1001	Introduction to Cell and Molecular Biology Laboratory	1
BMS-UY 2003	Introduction to Physiology	3
BMS-UY 2001	Introduction to Physiology Laboratory	1
BMS-UY 1032	Introduction to Biomolecular Science [2]	2
BMS-UY 2713	Biostatistics	3
BMS-UY 3613	Advanced Molecular Biology	3
BMS-UY 3611	Advanced Molecular Biology Laboratory	1
BMS-UY 3713	Advanced Cell Biology	3
BMS-UY 3711	Advanced Cell Biology Laboratory	1
BMS-UY 4113	Genetics and Genomics	3
BMS-UY 4111	Genetics and Genomics Laboratory	1
BMS-UY 4914	Undergraduate Research in Biomolecular Sciences [3]	4
BMS-UY 4924	Undergraduate Research in Biomolecular Sciences [3]	4
Physics		
PH-UY 1013	Mechanics	3
PH-UY 2023	Electricity, Magnetism, & Fluids	3
PH-UY 2033	Waves, Optics, & Thermodynamics	3
PH-UY 2121	General Physics Laboratory I	1
PH-UY 2131	General Physics Laboratory II	1
Electives		
Other Elective Credits [4]		21
Total Credits		**128**

1. Choice of Humanities and Social Sciences electives must conform to the Tandon requirements described in the Bulletin. At least one elective must be an ethics course, such as STS-UY 2144 Ethics and Technology. At least one elective must be at the 3xxx/4xxx level. At least one elective must be an Advanced Seminar, identifiable by course number 4504. If you have already completed a writing-intensive course, you do not have to take the Advanced Seminar. Students may take a maximum of 4 courses or 16 credits at other schools of NYU.
2. BMS-UY 1032 Introduction to Biomolecular Science cannot be taken by and is not required for transfer students or students changing major after their first year.
3. Students electing senior research must take both semesters of research and write a BS thesis. Students may replace research and thesis with 8 credits of technical electives from Group 2.
4. Elective options:
   1. At least 6 credits of technical electives must be selected from the following courses: BMS-UY (level 2, 3, and 4), CM-UY (level 3 and 4), BT-GY, BE-GY and BI-GY (collectively referred to as “Group 1”).
   2. At least 6 credits of technical electives must be selected from the following courses: A Group 1 course (as defined above), MA-UY, CS-

UY, PH-UY, CBE-UY or, with adviser's permission a technical elective related to BMS major at another school of NYU (collectively referred to as "Group 2"). Students may take a maximum of 4 courses or 16 credits at other schools of NYU.

3. The remaining courses (up to 9 credits) are free electives, for example, a course related to management, finance, or media studies (adviser's permission is required).

Required Safety Trainings

All sophomore BMS majors must enroll in (on BioRaft) and complete three one-hour training sessions offered by the NYU EHS (Environmental Health and Safety) Office. The three sessions are Lab Safety, Waste Management and Biosafety. Students must show proof (e.g. certificate) that they completed this training to their advisers at their next advisement meeting in order to have their registration holds removed. Each subsequent fall they must take three online refresher sessions until they graduate.

Sample Plan of Study

Course	Title	Credits
1st Semester/Term		
MA-UY 1024	Calculus I for Engineers	4
CM-UY 1013	General Chemistry I	3
CM-UY 1011	General Chemistry Laboratory I	1
EXPOS-UA 1	Writing as Inquiry	4
EG-UY 1001	Engineering and Technology Forum	1
BMS-UY 1003	Introduction to Cell and Molecular Biology	3
BMS-UY 1001	Introduction to Cell and Molecular Biology Laboratory	1
	Credits	**17**
2nd Semester/Term		
MA-UY 1124	Calculus II for Engineers	4
CM-UY 1023	General Chemistry II	3
CM-UY 1021	General Chemistry Laboratory II	1
BMS-UY 2003	Introduction to Physiology	3
BMS-UY 2001	Introduction to Physiology Laboratory	1
EXPOS-UA 22	Advanced Writing for Engineers	4
BMS-UY 1032	Introduction to Biomolecular Science	2
	Credits	**18**
3rd Semester/Term		
CM-UY 2213	Organic Chemistry I	3
CM-UY 2211	Organic Chemistry Laboratory I	1
PH-UY 1013	Mechanics	3
Select one of the following:		3-4
CS-UY 1133	Engineering Problem Solving and Programming	
CS-UY 1113	Problem Solving and Programming I	
CS-UY 1114	Intro To Programming & Problem Solving	
Humanities and Social Sciences Elective		4
Elective		2
	Credits	**17**
4th Semester/Term		
CM-UY 2223	Organic Chemistry II	3
CM-UY 2221	Organic Chemistry Laboratory II	1
PH-UY 2023	Electricity, Magnetism, & Fluids	3
PH-UY 2121	General Physics Laboratory I	1
BMS-UY 2713	Biostatistics	3
Humanities and Social Sciences Elective		4
	Credits	**15**
5th Semester/Term		
PH-UY 2033	Waves, Optics, & Thermodynamics	3
PH-UY 2131	General Physics Laboratory II	1
BMS-UY 3613	Advanced Molecular Biology	3
BMS-UY 3611	Advanced Molecular Biology Laboratory	1
CM-UY 3314	Biochemistry I	4
Humanities and Social Sciences Elective		4
	Credits	**16**
6th Semester/Term		
BMS-UY 3713	Advanced Cell Biology	3
BMS-UY 3711	Advanced Cell Biology Laboratory	1
CM-UY 3714	Physical Chemistry I	4
CM-UY 3323	Biochemistry II	3
Humanities and Social Sciences Elective		4
	Credits	**15**
7th Semester/Term		
BMS-UY 4113	Genetics and Genomics	3
BMS-UY 4111	Genetics and Genomics Laboratory	1
BMS-UY 4914	Undergraduate Research in Biomolecular Sciences	4
Elective		3-4
Elective		3-4
	Credits	**14**
8th Semester/Term		
BMS-UY 4924	Undergraduate Research in Biomolecular Sciences	4
Elective		3-4
Elective		3-4
Elective		3-4
	Credits	**16**
	Total Credits	**128**

Learning Outcomes

Upon successful completion of the program, graduates will:

1. Learn the major concepts of chemistry and biology and their relations to biomolecular science.
2. Learn the use of basic chemical and biological techniques and instrumentation.
3. Be prepared for advanced studies and research in biomolecular science and related fields.
4. Be prepared for employment in biomedical and other health-related fields, STEM education, and post-graduate studies.

Policies

NYU Policies

University-wide policies can be found on the New York University Policy pages (https://bulletins.nyu.edu/nyu/policies/).

Tandon Policies

Additional academic policies can be found on the Tandon academic policy page (https://bulletins.nyu.edu/undergraduate/engineering/academic-policies/).