BIOCHEMISTRY MAJOR

Overview

Biochemistry is a highly interdisciplinary science that focuses on the study of the chemistry of living systems and understanding their structure and function at the molecular level. In particular, biochemistry lays the foundation for deciphering the mechanisms involved in many diseases that plague the world. Students will learn how biomolecules such as proteins, nucleic acids, fats, lipids, and carbohydrates interact in biological processes, and how structures of these biomolecules relate to function and regulation of metabolic pathways in cells, tissues, and organisms as a whole.

The biochemistry major will prepare students to be the next generation of scientists with a broad range of career options in biotechnology, molecular and cellular biochemistry, medicine, bioengineering, and pharmacology, as well as in allied health fields, including clinical biochemistry, forensic science, the physician associate profession, cosmetics, food technology, and nursing.

The program will also lay a foundation for students to compete for positions in top graduate programs and professional schools in medicine, biomedical engineering, and biomedical sciences.

CIP Code

26.0202 - Biochemistry.
You can use the CIP code to learn more about career paths associated with this field of study and, for international students, possible post-graduation visa extensions. Learn more about CIP codes and other information resources.

Requirements

The biochemistry major is offered in two tracks (p. 2): an American Chemical Society (ACS)-certified track (p. 3) and a general track (p. 2).

Students interested in pursuing courses with an emphasis on chemistry in relation to physical, analytical, and advanced structural and molecular aspects of biochemistry may choose to opt for the ACS track. On the other hand, students inclined more toward cell, molecular, and structural aspects of biochemistry in addition to biocomputational and physiological approaches may pursue the general track. Both tracks require students to participate in research.

Students interested in pursuing more in-depth organic chemistry laboratory coursework have the option of taking CHEM 2531 Organic Chemistry Lab I for Chem Majors and CHEM 2532 Organic Chemistry Lab II for Chem Majors in lieu of CHEM 2541 and CHEM 2542.

Research courses (CHEM 1990 Introduction to Research, CHEM 3990 Directed Research, and CHEM 4990 Independent Research) are available. Students should contact specific faculty for research opportunities based on their research interests.

Chemistry majors and biological sciences majors may not double major in biochemistry, but they may pursue a biochemistry minor. Integrative neuroscience majors pursuing a concentration in systems/computational neuroscience or in cognitive neuroscience may double major in biochemistry. However, integrative neuroscience majors pursuing a concentration in cell and molecular neuroscience may not double major in biochemistry.

A minimum grade of C or higher is required in the following foundational course sequences (lecture and lab) listed below: general chemistry, biology, organic chemistry, and mathematics.

Course	Title	Credits
Foundational Courses		
General Chemistry		
Select one of the following (Rose Hill students take CHEM; Lincoln Center students take NSCI):		6
CHEM 1321 & CHEM 1331 & CHEM 1311	General Chemistry I and General Chemistry Lab I and General Chemistry I Recitation	
NSCI 1321 & NSCI 1331	General Chemistry Lecture I and General Chemistry Lab I	
Select one of the following (Rose Hill students take CHEM; Lincoln Center students take NSCI):		6
CHEM 1322 & CHEM 1332 & CHEM 1312	General Chemistry II and General Chemistry Lab II and General Chemistry II Recitation	
NSCI 1322 & NSCI 1332	General Chemistry Lecture II and General Chemistry Lab II	
Biology		
Select one of the following (Rose Hill students take BISC; Lincoln Center students take NSCI):		5
BISC 1403 & BISC 1413	Introductory Biology I and Introductory Biology Lab I	
NSCI 1403 & NSCI 1413	General Biology Lecture I and General Biology Lab I	
NSCI 1423 & NSCI 1433	Concepts in Biology Lecture I and Concepts in Biology Lab I	
Select one of the following (Rose Hill students take BISC; Lincoln Center students take NSCI):		5
BISC 1404 & BISC 1414	Introductory Biology II and Introductory Biology Lab II	
NSCI 1404 & NSCI 1414	General Biology Lecture II and General Biology Lab II	
NSCI 1424 & NSCI 1434	Concepts in Biology Lecture II and Concepts in Biology Lab II	
Organic Chemistry		
Select one of the following (Rose Hill students take CHEM; Lincoln Center students take NSCI):		6
CHEM 2521 & CHEM 2541 & CHEM 2511	Organic Chemistry I and Organic Chemistry Lab I and Organic Chemistry I Recitation	
CHEM 2521 & CHEM 2531 & CHEM 2511	Organic Chemistry I and Organic Chemistry Lab I for Chem Majors and Organic Chemistry I Recitation	
NSCI 3121 & NSCI 3821	Organic Chemistry Lecture I and Organic Chemistry Lab I	
Select one of the following (Rose Hill students take CHEM; Lincoln Center students take NSCI):		6
CHEM 2522 & CHEM 2542 & CHEM 2512	Organic Chemistry II and Organic Chemistry Lab II and Organic Chemistry II Recitation	

CHEM 2522 & CHEM 2532 & CHEM 2512	Organic Chemistry II and Organic Chemistry Lab II for Chem Majors and Organic Chemistry II Recitation	
NSCI 3122 & NSCI 3822	Organic Chemistry Lecture II and Organic Chemistry Lab II	
Mathematics [1]		
MATH 1206	Calculus I	4
MATH 1207	Calculus II	4
Physics		
Select one of the following (Rose Hill students take PHYS; Lincoln Center students take NSCI):		4
PHYS 1501 & PHYS 1511 & PHYS 1503	General Physics I and Physics I Lab and General Physics I Recitation	
PHYS 1601 & PHYS 1511 & PHYS 1603	Introduction to Physics I and Physics I Lab and Introduction to Physics I Recitation	
PHYS 1701 & PHYS 1511 & PHYS 1703	Physics I and Physics I Lab and Physics I Recitation	
NSCI 1501 & NSCI 1511	General Physics Lecture I and General Physics Lab I	
Select one of the following (Rose Hill students take PHYS; Lincoln Center students take NSCI):		4
PHYS 1502 & PHYS 1512 & PHYS 1504	General Physics II and Physics II Lab and General Physics II Recitation	
PHYS 1602 & PHYS 1512 & PHYS 1604	Introduction to Physics II and Physics II Lab and Introduction to Physics II Recitation	
PHYS 1702 & PHYS 1512 & PHYS 1704	Physics II and Physics II Lab and Physics II Recitation	
NSCI 1502 & NSCI 1512	General Physics Lecture II and General Physics Lab II	
Track Courses [2]		
Select one of the following:		
General Track		
ACS Track		

[1] Students interested in the ACS track should complete Calculus I (MATH 1206) and Calculus II (MATH 1207) as early as possible in their studies. A score of 4 or 5 in AP Calculus AB or BC, or an IB HL Mathematics (Analysis and Approaches) score of 6 or 7, fulfills the Calculus I requirement.

[2] Consult the Tracks section (p. 2) for the required and elective courses that comprise each track.

Availability

The major in biochemistry is available at Fordham College at Rose Hill and at Fordham College at Lincoln Center. Students in Fordham's School of Professional and Continuing Studies may major in biochemistry only if they receive the approval of their advising dean and/or department, and their schedules are sufficiently flexible to permit them to take day courses at the Rose Hill or Lincoln Center campuses. Students should note that many of the courses that comprise the major are offered only at the Rose Hill campus.

Tracks

General track

Course	Title	Credits
Required Courses		
CHEM 4221 & CHEM 4231	Biochemistry I and Biochemistry Lab I	4
CHEM 4222	Biochemistry II	3
CHEM 3141	Methods of Biochemical Research (also fulfills Eloquentia Perfecta 3 requirement for the Core Curriculum)	3
CHEM 4251	Physical and Computational Models of Biochemical Systems	3
CHEM 4030	Chemistry Seminar (taken in both semesters of junior and senior years, four times total)	0
Select one of the following (Rose Hill students take BISC; Lincoln Center students take NSCI):		*3 to 5*
BISC 2539 & BISC 2549	General Genetics and General Genetics Lab	
NSCI 3133	Genetics Lecture	
Select one of the following (Rose Hill students take BISC; Lincoln Center students take NSCI):		*3 to 5*
BISC 3752	Molecular Biology	
NSCI 4176 & NSCI 4876	Molecular Biology Lecture and Molecular Biology Lab	
Elective Courses		
Select two of the following:		*6 to 12*
BISC 3132 & BISC 3142	Human Physiology and Human Physiology Lab	
BISC 3754/ NSCI 3154	Cell Biology (Rose Hill students take BISC; Lincoln Center students take NSCI)	
BISC 3893	Introduction to Virology	
BISC 4530	Cancer Biology and Signaling	
CHEM 3621 & CHEM 3631	Physical Chemistry I and Physical Chemistry Lab I [1]	
CHEM 3622 & CHEM 3632	Physical Chemistry II and Physical Chemistry Lab II [1]	
CHEM 3721 or CHEM 3722	Quantitative Analysis Instrumental Analysis	
CHEM 4241	Biomimetic Chemistry	
CHEM 4621	Bionanotechnology and Introduction to Nanomedicine	
NSCI 4081	Neurochemistry	

[1] Only one Physical Chemistry sequence (CHEM 3621 Physical Chemistry I and CHEM 3631 Physical Chemistry Lab I or CHEM 3622 Physical Chemistry II and CHEM 3632 Physical Chemistry Lab II) may count towards the major.

American Chemical Society (ACS) track

Course	Title	Credits
Required Courses		
CHEM 4221 & CHEM 4231	Biochemistry I and Biochemistry Lab I	4
CHEM 4222	Biochemistry II	3
CHEM 3721	Quantitative Analysis	4
or CHEM 3722	Instrumental Analysis	
CHEM 4422	Inorganic Chemistry	3
CHEM 4030	Chemistry Seminar (taken in both semesters of junior and senior years, four times total)	0
Select one of the following: [1]		*6*
CHEM 3621 & CHEM 3631	Physical Chemistry I and Physical Chemistry Lab I	
CHEM 3622 & CHEM 3632	Physical Chemistry II and Physical Chemistry Lab II	
Select one of the following (Rose Hill students take BISC; Lincoln Center students take NSCI):		*3 to 5*
BISC 2539 & BISC 2549	General Genetics and General Genetics Lab	
NSCI 3133	Genetics Lecture	
Select one of the following (Rose Hill students take BISC; Lincoln Center students take NSCI):		*3 to 5*
BISC 3752	Molecular Biology	
NSCI 4176 & NSCI 4876	Molecular Biology Lecture and Molecular Biology Lab	
Elective Courses		
Select one of the following:		*3 to 5*
BISC 3132 & BISC 3142	Human Physiology and Human Physiology Lab	
BISC 3754/ NSCI 3154	Cell Biology (Rose Hill students take BISC; Lincoln Center students take NSCI)	
BISC 3893	Introduction to Virology	
BISC 4530	Cancer Biology and Signaling	
CHEM 3141	Methods of Biochemical Research (also fulfills Eloquentia Perfecta 3 requirement for the Core Curriculum)	
CHEM 4241	Biomimetic Chemistry	
CHEM 4251	Physical and Computational Models of Biochemical Systems	
CHEM 4621	Bionanotechnology and Introduction to Nanomedicine	
NSCI 4081	Neurochemistry	

[1] Only one Physical Chemistry sequence (CHEM 3621 Physical Chemistry I and CHEM 3631 Physical Chemistry Lab I or CHEM 3622 Physical Chemistry II and CHEM 3632 Physical Chemistry Lab II) may count towards the major.