

# NATURAL SCIENCE MAJOR

## Overview

The natural science major at Fordham College at Lincoln Center (FCLC) offers a comprehensive and interdisciplinary education, emphasizing undergraduate training through rigorous coursework, lab experiences, and independent research. The department includes faculty members with expertise in chemistry, physics, data science, and biology who teach courses supporting a variety of majors and programs. Students can choose concentrations in chemical sciences, organismal biology, and cell and molecular biology within the natural science major.

Beyond the needs of students in the pre-health professions program, the department's courses also fulfill requirements for integrative neuroscience, environmental science, the FCLC Honors Program, the biochemistry major/minor, and the core curriculum. With small class sizes and hands-on lab work, students benefit from personalized attention and mentorship, preparing them for successful careers in medicine, academia, and education.

The Department of Natural Sciences plays a crucial role in the pre-health program at FCLC, offering required courses for students aspiring to enter health professions. Although students can major in any field, they can complete all their pre-health requirements through the Department of Natural Sciences (NSCI), with the exception of Calculus or Applied Calculus, which the mathematics department at FCLC provides. The department's interdisciplinary approach and rigorous training ensure that pre-health students receive a solid foundation in the sciences. By following the recommended curriculum guidelines and engaging in independent research, students are well-prepared for medical school and other health-related graduate programs.

## CIP Code

30.0101 - Biological and Physical Sciences.

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 following courses are required for the natural science major.

Course	Title	Credits
<b>Required Courses</b>		
NSCI 1403 & NSCI 1413	General Biology Lecture I and General Biology Lab I <sup>1</sup>	5
NSCI 1404 & NSCI 1414	General Biology Lecture II and General Biology Lab II	5
NSCI 1321 & NSCI 1331	General Chemistry Lecture I and General Chemistry Lab I	6
NSCI 1322 & NSCI 1332	General Chemistry Lecture II and General Chemistry Lab II	6
NSCI 1501 & NSCI 1511	General Physics Lecture I and General Physics Lab I	4
NSCI 1502 & NSCI 1512	General Physics Lecture II and General Physics Lab II	4

NSCI 2040	Research Design and Analysis	3
NSCI 3121 & NSCI 3821	Organic Chemistry Lecture I and Organic Chemistry Lab I	6
NSCI 3122 & NSCI 3822	Organic Chemistry Lecture II and Organic Chemistry Lab II	6
NSCI 4222	Science, Technology, and Society Values	4
MATH 1203 or MATH 1206	Applied Calculus I Calculus I	3 to 4

### Electives

Select at least six electives. Of these, four must include a lab and two electives do not need to include a lab. Refer to the Electives tab for the complete list of courses offered. <sup>2</sup>

<sup>1</sup> NSCI 1423 Concepts in Biology Lecture I and NSCI 1424 Concepts in Biology Lecture II may be substituted, respectively, for NSCI 1403 General Biology Lecture I and NSCI 1404 General Biology Lecture II.

<sup>2</sup> One Independent Study course, NSCI 4999 Tutorial, substitutes for one upper-level elective lecture plus lab.

Other courses may be counted at the department chair's discretion. It is possible to select electives in order to follow special interests and career goals. This must be done in consultation with the student's departmental adviser. A grade of C- or better is required in all courses taken to fulfill the major. A student may not take the second half of a one-year course if the grade for the first half is below a C-.

Students are advised that the lecture and laboratory components of general biology, general chemistry, general physics, and organic chemistry should always be taken concurrently.

Additionally, natural science majors should take these courses within the natural sciences department (i.e. students should register for NSCI classes). FCLC students should take these courses during the regular day (i.e. before 6 p.m.).

Advanced placement course credit may be substituted in partial fulfillment of these requisites. Students without two semesters' advanced placement in chemistry should note that NSCI 1321 General Chemistry Lecture I and NSCI 1322 General Chemistry Lecture II are prerequisites for NSCI 3121 Organic Chemistry Lecture I and NSCI 3122 Organic Chemistry Lecture II.

## Availability

The major in natural science is available at Fordham College at Lincoln Center and Fordham's School of Professional and Continuing Studies at Lincoln Center.

**Fordham College at Lincoln Center students:** The requirements above are in addition to those of the Core Curriculum.

**Professional and Continuing Studies students:** The requirements above are in addition to those of the PCS Core Curriculum and any additional electives that may be required to earn a minimum of 124 credits.

## Sample Curriculum

Course	Title	Credits
<b>First Year</b>		
<b>Fall</b>		
MATH 1203 or MATH 1206	Applied Calculus I or Calculus I	3
NSCI 1403 & NSCI 1413	General Biology Lecture I and General Biology Lab I	5
NSCI 2040	Research Design and Analysis	3
<b>Credits</b>		<b>11</b>
<b>Spring</b>		
NSCI 1404 & NSCI 1414	General Biology Lecture II and General Biology Lab II	5
<b>Credits</b>		<b>5</b>
<b>Second Year</b>		
<b>Fall</b>		
NSCI 1321 & NSCI 1331	General Chemistry Lecture I and General Chemistry Lab I	6
NSCI 1501 & NSCI 1511	General Physics Lecture I and General Physics Lab I	4
<b>Credits</b>		<b>10</b>
<b>Spring</b>		
NSCI 1322 & NSCI 1332	General Chemistry Lecture II and General Chemistry Lab II	6
NSCI 1502 & NSCI 1512	General Physics Lecture II and General Physics Lab II	4
<b>Credits</b>		<b>10</b>
<b>Third Year</b>		
Begin upper-level electives. Note that NSCI 1403, NSCI 1404, and NSCI 1321 (with their respective labs) are prerequisites for all the Natural Sciences upper-level electives.		
Students can use any six upper-level electives in the major. One lecture plus lab can be fulfilled by NSCI 4999. Students must take that option if they are pursuing a concentration.		
<b>Credits</b>		<b>0</b>
<b>Fall</b>		
NSCI 3121 & NSCI 3821	Organic Chemistry Lecture I and Organic Chemistry Lab I	6
<b>Credits</b>		<b>6</b>
<b>Spring</b>		
NSCI 3122 & NSCI 3822	Organic Chemistry Lecture II and Organic Chemistry Lab II	6
<b>Credits</b>		<b>6</b>
<b>Fourth Year</b>		
See notes under "Third Year."		
<b>Credits</b>		<b>0</b>
<b>Fall</b>		
NSCI 4222	Science, Technology, and Society Values	4
<b>Credits</b>		<b>4</b>
<b>Total Credits</b>		<b>52</b>

## Electives

### Regularly-Offered Elective courses

Course	Title	Credits
<b>Lecture and Lab ARE corequisites</b>		
NSCI 2141 & NSCI 2841	Vertebrate Anatomy Lecture and Vertebrate Anatomy Lab (Fall, odd years)	5
NSCI 2142 & NSCI 2842	Paleoecology Lecture and Paleoecology Lab (Fall, even years)	5
NSCI 4630 & NSCI 4032	Neuroscience and Neuroscience Lab (Fall)	5
<b>Lecture with OPTIONAL lab<sup>1</sup></b>		
NSCI 2010	Global Ecology Lecture (Fall even years)	3
NSCI 2011	Global Ecology Lab (Fall, even years)	2
NSCI 2122	Immunology Lecture (Spring, even years)	3
NSCI 2822	Immunology Lab (Spring, even years)	2
NSCI 3133	Genetics Lecture (Fall, odd years)	3
NSCI 3154	Cell and Development Biology Lecture (Spring, even years)	3
NSCI 3844	Genetics/Developmental Biology Lab (Spring, even years) <sup>2</sup>	2
NSCI 4112	Human and Comparative Physiology Lecture (Spring)	3
NSCI 4812	Human and Comparative Physiology Lab (Spring)	2
NSCI 4143	Advanced Microbiology Lecture (Fall, even years)	3
NSCI 4843	Advanced Microbiology Lab (Fall, even years)	2
NSCI 4153	Biological Chemistry Lecture (Fall, even year)	3
NSCI 4176	Molecular Biology Lecture (Spring, odd years)	3
NSCI 4864	Biological Chemistry/Molecular Biology Lab (Spring, odd years) <sup>3</sup>	2
<b>Lecture without lab</b>		
NSCI 2018	Biology of Aging (Spring, odd years)	3
NSCI 2050	Foundations in Animal Behavior	3
NSCI 3101	Biological Modeling (Spring)	4
NSCI 4080	Medicinal Chemistry: A Case Studies Approach (Spring, odd years)	3
NSCI 4081	Neurochemistry (Spring, even years)	3
NSCI 3280	Machine Learning Methods for Neural and Biological Data	4

<sup>1</sup> Lecture can be taken without lab, provided the latter is not needed to fulfill the lab elective requirement for the major.

<sup>2</sup> NSCI 3844 Genetics/Developmental Biology Lab complements either NSCI 3133 Genetics Lecture or NSCI 3154 Cell and Development Biology Lecture, but not both (may be taken concurrently).

<sup>3</sup> NSCI 4864 Biological Chemistry/Molecular Biology Lab complements either NSCI 4153 Biological Chemistry Lecture or NSCI 4176 Molecular Biology Lecture, but not both (may be taken concurrently).

## Concentrations

Students may pursue one of three concentrations within the major: **chemical sciences (CHS)**, **organismal biology (ORB)**, or **cell and molecular biology (C+M)**. Students may major in natural sciences without declaring a concentration. Students opting for one of the concentrations must fulfill the following additional requirements:

1. One of the four lab electives must be NSCI 4999 Tutorial, in the field of the student's chosen concentration.
2. At least two of the three remaining lab electives must be in classes in the chosen concentration, designated in the table below.
3. At least four of the six electives overall (lab or non-lab) must be in classes in the chosen concentration, designated in the table below.

Courses with the subject code CHEM are taught by the Chemistry Department and are offered exclusively at the Rose Hill campus.

### Elective and Concentration Courses

The following table indicates (a) which courses count toward the required lab elective courses and (b) which courses count toward the respective concentrations in CHS, C+M, and ORB.

Course	Electives including lab (minimum 4)	Electives: No lab	Counts toward CHS	Counts toward C+M	Counts toward ORB
Tutorial	NSCI 4999		X	X	X
Advanced Microbiology	NSCI 4143 / NSCI 4843			X	X
Biology of Aging		NSCI 2018			X
Biological Chemistry	NSCI 4153 / NSCI 4864	NSCI 4153	X	X	
Cell and Developmental Biology	NSCI 3154 / NSCI 3844			X	X
Genetics	NSCI 3133 / NSCI 3844			X	X
Global Ecology	NSCI 2010 / NSCI 2011				X
Immunology	NSCI 2122 / NSCI 2822	NSCI 2122	X		
Molecular Biology	NSCI 4176 / NSCI 4864		X	X	
Neuroscience	NSCI 4630 / NSCI 4032			X	X
Neurochemistry	NSCI 4081		X		X
Paleoecology	NSCI 2142 / NSCI 2842				X
Pharmacology	NSCI 4080		X		
Animal Physiology (with either NSCI 4812 or NSCI 4032)	NSCI 4112 / NSCI 4112			X	X

Foundations in Animal Behavior	NSCI 2050		X
Vertebrate Anatomy	NSCI 2141 / NSCI 2841		X
Methods of Chemical Research	CHEM 3141		X
Physical Chemistry 1 with lab	CHEM 3621 / CHEM 3631		X
Physical Chemistry 2 with lab	CHEM 3622 / CHEM 3632		X
Quantitative Analysis	CHEM 3721		X
Instrumental Analysis	CHEM 3722		X
Inorganic Chemistry with lab	CHEM 4422 / CHEM 4432		X