INTEGRATIVE NEUROSCIENCE MAJOR

Requirements

The course requirements for the integrative neuroscience major consist of four components: nine foundation courses required of all integrative neuroscience majors; three required, concentration-connected neuroscience courses that emphasize the different concentrations within the major; three concentration courses that allow the student to enhance their study within their chosen concentration; and a research experience lasting a minimum of two semesters, beginning as early as is reasonable for the student and project, but no later than the summer/fall after the junior year.

All majors must also enroll in a capstone research seminar course for students in all concentrations to share and discuss the results of their research with other integrative neuroscience majors.

A minimum grade of C- is required for courses to count towards the major.

Course	Title	Credits
Required Courses		
Select one of the following biology options:		*8 to 10*
Option 1:		
BISC 1403 & BISC 1413	Introductory Biology I and Introductory Biology Lab I	
BISC 1404 & BISC 1414	Introductory Biology II and Introductory Biology Lab II	
Option 2:		
NSCI 1403 & NSCI 1413	General Biology Lecture I and General Biology Lab I	
NSCI 1404 & NSCI 1414	General Biology Lecture II and General Biology Lab II	
Option 3:		
NSCI 1423 & NSCI 1433	Concepts in Biology Lecture I and Concepts in Biology Lab I	
NSCI 1424 & NSCI 1434	Concepts in Biology Lecture II and Concepts in Biology Lab II	
Option 4:		
HPLC 1603 & HPLC 1604	Honors: Natural Science I and Honors: Natural Science II	
Select one of the following chemistry options:		*12*
Option 1:		
CHEM 1321 & CHEM 1331	General Chemistry I and General Chemistry Lab I	
CHEM 1322 & CHEM 1332	General Chemistry II and General Chemistry Lab II	
Option 2:		
NSCI 1321 & NSCI 1331	General Chemistry Lecture I and General Chemistry Lab I	
NSCI 1322 & NSCI 1332	General Chemistry Lecture II and General Chemistry Lab II	
Select one of the following Mathematics courses:[1]		*3 to 4*
MATH 1203	Applied Calculus I	
MATH 1206	Calculus I	
MATH 1700	Mathematical Modelling	
Select one of the following statistics courses:[2]		*3 to 4*
NSCI 2040	Research Design and Analysis	
PSYC 2000	Statistics	
PSYC 1200	Foundations of Psychology[3]	3
BISC 4532	Neuroscience	3
or NSCI 4630	Neuroscience	
PSYC 3110	Cognitive Neuroscience	4
CISC 1800 & CISC 1810	Introduction to Computer Programming and Introduction to Computer Programming Lab	4
CISC 3250	Systems Neuroscience	4
CISC 4631	Data Mining	4
Three electives in one of these concentrations:		*9 to 12*
Cell and Molecular Neuroscience		
Cognitive Neuroscience		
Systems/Computational Neuroscience		
NEUR 4999	Neuroscience Research	3
NEUR 4900	Neuroscience Capstone Seminar	1

1 AP Calculus AB (MATH 12AB) or AP Calculus BC (MATH 12BC) credit may fulfill this requirement.

2 It is preferable for students to complete the statistics requirement in their sophomore year.

3 PSYC 1200 Foundations of Psychology credit from AP Psychology (score of 4 or 5) may fulfill this requirement.

Learning Goals

Upon graduation from the integrative neuroscience major, students will have achieved the following goals:

1. Students will develop an interdisciplinary comprehensive understanding of fundamental principles in neuroscience;
2. Students will learn to apply knowledge in cognitive neuroscience, cell and molecular neuroscience, and computational neuroscience to gain deep insight into neural mechanisms of brain function and behavior;
3. Students will learn how to become scientifically literate and critically analyze and interpret published literature grounded in cognitive, cell and molecular and computational neuroscience research;
4. Through interdisciplinary coursework, students will develop critical thinking skills necessary for success in an array of fields in and outside of science, including healthcare, research, clinical psychology, data science, law, and business;
5. Through coursework and research experience, students will develop transferrable skills that can be applied to academic and non-academic environments. These include problem solving, data analysis, interpersonal and leadership skills, organizational skills, time management, and proficiency in written and oral communication.

Availability

The integrative neuroscience major is available to students at Fordham College at Rose Hill and Fordham College at Lincoln Center, subject to

fulfillment of major admissions requirements. Students in Fordham's School of Professional and Continuing Studies may major in integrative neuroscience only if they fulfill the major's admissions requirements and 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.

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

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.*

CIP Code

26.1501 - Neuroscience.

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.

Concentrations

Cell and Molecular Neuroscience

Three courses are required from the list below. Note that many courses on the list below have a required lab component. Students may not enroll in two mutually exclusive versions of the same course, where different course numbers are used on each campus to represent a materially identical course (e.g., BISC 2539 General Genetics and NSCI 3133 Genetics Lecture). Please consult your adviser to confirm whether you may enroll in a given course.

Courses in this group have the NECM attribute.

Course	Title	Credits
BISC 2539	General Genetics	3
BISC 3132	Human Physiology	3
BISC 3221	Human Anatomy	3
BISC 3521	Biochemistry	3
BISC 3752	Molecular Biology	3
BISC 3754	Cell Biology	3
BISC 4642	Animal Behavior	4
BISC 4693	Developmental Biology	3
CHEM 2522	Organic Chemistry II	4
CHEM 4221	Biochemistry I	3
NSCI 2018	Biology of Aging	3
NSCI 2122	Immunology Lecture	3
NSCI 2141	Human & Comparative Anatomy Lecture	3
NSCI 3122	Organic Chemistry Lecture II	4
NSCI 3133	Genetics Lecture	3
NSCI 3154	Cell and Development Biology Lecture	3
NSCI 4081	Neurochemistry	3
NSCI 4112	Human and Comparative Physiology Lecture	3
NSCI 4144	Microanatomy Lecture	3
NSCI 4153	Biological Chemistry Lecture	3
NSCI 4176	Molecular Biology Lecture	3

Cognitive Neuroscience

Three courses are required from the list below. Courses labeled Lab with a PSYC XX01 designation also include a lecture.

Courses in this group have the NECG attribute.

Course	Title	Credits
LING 1500	Psycholinguistics	3
LING 3010	Bilingual Minds	4
LING 4015	Language and Thought	4
NSCI 3140	The Biological Basis of Sensation and Perception	3
PHIL 3243	Philosophy of Cognitive Science	4
PHIL 3254	Philosophy of Perception	4
PHIL 3940	Neuroethics	4
PSYC 2010	Research Methods Lab	5
PSYC 2300	Sensation and Perception	4
PSYC 2301	Sensation and Perception Lab	5
PSYC 2401	Memory Laboratory	5
PSYC 2501	Cognition Laboratory	5
PSYC 3550	Consciousness	4
PSYC 4330	Music and Psychology	4

Systems/Computational Neuroscience

Three courses are required from the list below.
Courses in this group have the NESY attribute.

Course	Title	Credits
CISC 2011	Programming for Math and Science	4
CISC 3060	Introduction to Robotics	4
CISC 3280	Machine Learning Methods for Neural and Biological Data	4
CISC 4006	Brains and Behavior in Beasts and Bots	4
CISC 4020	Bioinformatics	4
CISC 4597	Artificial Intelligence	4
CISC 4621	Machine Learning	4
CISC 5800	Machine Learning	3
CISC 6525	Artificial Intelligence	3
NSCI 3101	Biological Modeling Lecture	3
NSCI 3280	Machine Learning Methods for Neural and Biological Data	4