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 track-connected neuroscience courses that emphasize the different tracks within the major; three specialization courses that allow the student to enhance their study within their chosen track; and a required two-semester minimum, research experience, 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 tracks to share and discuss the results of their research with other integrative neuroscience majors.

### Course Title Credits

#### Foundation Courses

**Required Courses**

Select one of the following options: 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 GENERAL BIOLOGY LAB I
  - NSCI 1424 & NSCI 1434: CONCEPTS IN BIOLOGY LECTURE II and CONCEPTS IN BIOLOGY LAB II

Select one of the following: 3-4

- MATH 1203: APPLIED CALCULUS I
- MATH 1206: CALCULUS I
- MATH 1700: MATHEMATICAL MODELLING
- PSYC 1100: BIOPSYCHOLOGY
- CISC 2500: INFORMATION AND DATA MANAGEMENT
- CISC 4020: BIOINFORMATICS
- or CISC 4631: DATA MINING
- or CISC 4632: NEUROSCIENCE
- or NSCI 2030: NEUROSCIENCE
- PSYC 3110: COGNITIVE NEUROSCIENCE
- CISC 3250: SYSTEMS NEUROSCIENCE

**Research Experience** 1

- NEUR 4999: NEUROSCIENCE RESEARCH (minimum three credits)
- NEUR 4900: NEUROSCIENCE CAPSTONE SEMINAR 1

1 Other courses from the biology, chemistry, computer science, math, natural science, psychology, and physics departments may be used, pending approval.

### Tracks

#### Cell and Molecular Neuroscience Track

**Course Title Credits**

**Chemistry Courses**

Select one of the following 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

**Statistics/Research Methods Course**

NSCI 2040: RESEARCH DESIGN AND ANALYSIS 3-4

or PSYC 2000: STATISTICS

**Specialization courses**

Select three of the following courses 1

- CHEM 2521: ORGANIC CHEMISTRY I & CHEM 2541: ORGANIC CHEMISTRY LAB I
- NSCI 3121: GENETICS LECTURE & NSCI 3821: GENETICS LAB
- BISC 2539: GENERAL GENETICS & BISC 2549: GENERAL GENETICS LAB
- NSCI 3133: GENETICS LECTURE & NSCI 3833: GENETICS LAB
- BISC 4642: ANIMAL BEHAVIOR
- BISC 3754: CELL BIOLOGY
- BISC 4693: DEVELOPMENTAL BIOLOGY
- NSCI 3154: CELL AND DEVELOPMENT BIOLOGY LECTURE & NSCI 3854: CELL AND DEVELOPMENT BIOLOGY LAB
- BISC 3752: MOLECULAR BIOLOGY
- NSCI 4176: MOLECULAR BIOLOGY LECTURE
- NSCI 2122: IMMUNOLOGY LECTURE
- NSCI 2018: BIOLOGY OF AGING
- BISC 3232: HUMAN PHYSIOLOGY & BISC 3242: HUMAN PHYSIOLOGY LAB
- NSCI 4112: ANIMAL PHYSIOLOGY LECTURE
- NSCI 2141: VERTEBRATE ANATOMY LECTURE

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Integrative Neuroscience Major

BISC 3221 HUMAN ANATOMY and HUMAN ANATOMY LAB 5
&BISC 3231
NSCI 4144 MICROANATOMY LECTURE 3

1 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.

Cognitive Neuroscience Track

Course Title Credits

Chemistry Courses
Select one of the following options: 12

Option 1:
CHEM 1321 GENERAL CHEMISTRY I
& CHEM 1331 GENERAL CHEMISTRY LAB I
CHEM 1322 GENERAL CHEMISTRY II
& CHEM 1332 GENERAL CHEMISTRY LAB II

Option 2:
NSCI 1321 GENERAL CHEMISTRY LECTURE I
& NSCI 1331 GENERAL CHEMISTRY LAB I
NSCI 1322 GENERAL CHEMISTRY LECTURE II
& NSCI 1332 GENERAL CHEMISTRY LAB II

Option 3:
Interdisciplinary Chemistry I and II with labs

Statistics/Research Methods Course

PSYC 2000 STATISTICS 4

Specialization
Select three of the following courses 1
PSYC 2010 RESEARCH METHODS LAB 5
PSYC 2301 SENSATION AND PERCEPTION LAB 5
PSYC 2501 COGNITION LABORATORY 5
PSYC 2401 MEMORY LABORATORY 5
PSYC 3901 LAB IN BEHAVIORAL ANALYSIS 5

Systems Neuroscience Track

Course Title Credits

Chemistry Courses
Select one of the following options: 12

Option 1:
CHEM 1321 GENERAL CHEMISTRY I
& CHEM 1331 GENERAL CHEMISTRY LAB I
CHEM 1322 GENERAL CHEMISTRY II
& CHEM 1332 GENERAL CHEMISTRY LAB II

Option 2:
NSCI 1321 GENERAL CHEMISTRY LECTURE I
& NSCI 1331 GENERAL CHEMISTRY LAB I
NSCI 1322 GENERAL CHEMISTRY LECTURE II
& NSCI 1332 GENERAL CHEMISTRY LAB II

Option 3:
Interdisciplinary Chemistry I and II with labs

Availability

The Integrative Neuroscience major is available to students at Fordham College Rose Hill and Fordham College Lincoln Center. Students in Fordham School of Professional and Continuing Studies may major in integrative neuroscience only if 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.

Statistics/Research Methods Course

CISC 2850 COMPUTER AND DATA ANALYSIS 4

Specialization
Select three of the following courses
CISC 1600 COMPUTER SCIENCE I
& CISC 1610 COMPUTER SCIENCE I LAB
CISC 3060 INTRODUCTION TO ROBOTICS 4
CISC 3270 HEALTH AND MEDICAL INFORMATICS 4
CISC 4020 BIOINFORMATICS 4
CISC 4090 THEORY OF COMPUTATION 4
CISC 4597 ARTIFICIAL INTELLIGENCE 4
CISC 4621 MACHINE LEARNING 4
CISC 5900 INFORMATION FUSION 3,4

Courses labeled Lab with a PSYC XX01 designation also include lecture.