

# Neuroscience BS

## MAJOR REQUIREMENTS

- A grade of C- or higher is required for all major coursework.
- Neuroscience BS total units = 75-77 units

### Neuroscience Core Requirements (55-57 units)

#### Introductory Requirements (32 units)

Course Number	Course Name	Units
BISC 220L or 221L	General Biology: Cell Biology and Physiology; Advanced General Biology	4
CHEM 105aL or 115aL	General Chemistry; Advanced General Chemistry ( <i>placement exam or AP credit required</i> )	4
CHEM 105bL/115bL	General Chemistry; Advanced General Chemistry ( <i>CHEM 105aL or 115aL</i> )	4
CHEM 322aL	Organic Chemistry ( <i>CHEM 105bL or 115bL</i> )	4
CHEM 322bL	Organic Chemistry ( <i>CHEM 322aL</i> )	4
MATH 125	Calculus I ( <i>placement exam or AP credit required</i> )	4
PHYS 135aL/151L	Physics for Life Science; Fundamental of Physics I: Mechanics and Thermodynamics ( <i>MATH 125</i> )	4
PHYS 135bL/152L	Physics for Life Science; Fundamental of Physics II: Electricity and Magnetism ( <i>PHYS 135aL</i> )	4

#### STATISTICS REQUIREMENT- CHOOSE ONE (4 units)

Course Number	Course Name	Units
PSYC 274L	Statistics	4
BISC 305/QBIO 305	Introduction to Statistics for Biologists	4
BUAD 310	Applied Business Statistics	4
ECON 317	Introduction to Statistics for Economists ( <i>MATH 118 or MATH 125</i> )	4
HP 340L	Health Behavior Statistical Methods	4
MATH 208x	Elementary Probability and Statistics ( <i>MATH 125</i> )	4
MATH 307	Statistical Inference and Data Analysis ( <i>MATH 125</i> )	4
MATH 407	Probability Theory ( <i>MATH 226 or MATH 227 or MATH 229</i> )	4

#### NEUROSCIENCE REQUIREMENTS (9 units)

Course Number	Course Name	Units
NEUR/BISC 199 ( <i>spring</i> )	Neuroscience Colloquium	1
PSYC 100L	Introduction to Psychology	4
BISC 421 ( <i>fall</i> )	Neurobiology ( <i>BISC 220L</i> )	4

#### CHOOSE TWO (8 units)

Course Number	Course Name	Units
BISC 407 ( <i>spring</i> )	Cellular and Molecular Neuroscience	4
BISC 408 ( <i>spring</i> )	Systems Neuroscience: From Synapses to Perception ( <i>BISC 421</i> )	4
PSYC 440	Introduction to Cognitive Neuroscience ( <i>PSYC 100L</i> )	4

#### Introduction to Programming - CHOOSE ONE (2-4 units)

Course Number	Course Name	Units
ITP 109	Intro. to Java	
ITP 115	Programming in Python	
ITP 116	Object-Oriented Programming	
ITP 165	Introduction to C++ Programming	
ITP 168	Intro. to MATLAB	
ITP 265	Accelerated Programming in Python	
CSCI 103L	Intro to Programming (C/C++)	
CSCI 455	Intro. To Programming Systems Design	2-4

#### NEUROSCIENCE UPPER-DIVISION ELECTIVE REQUIREMENT (20 units required; 4 units must include lab)

Course Number	Course Name	Units
BISC 307L ( <i>spring</i> )	General Physiology ( <i>BISC 220L or 221L</i> )	4
BISC 312 ( <i>spring</i> )	Molecular Biochemistry ( <i>BISC 220L or 221L; cannot take CHEM 350 if this course is taken</i> )	4
BISC 313L ( <i>spring</i> )	Evolution & Population Genetics ( <i>BISC 120L or 121L; BISC 220L or 221L</i> )	4
BISC 320L ( <i>fall</i> )	Molecular Biology ( <i>CHEM 105bL or 115bL</i> )	4

BISC 325 (fall)	Genetics (BISC 120L or 121L; BISC 220L or 221L; BISC 320L; CHEM 322aL)	4
BISC 330L	Biochemistry (CHEM 322aL)	4
BISC 403 (fall)	Advanced Molecular Biology (BISC 320L)	4
BISC 406L (fall)	Biotechnology (BISC 320L)	4
BISC 410 (spring)	Applications of Molecular Biology to Medicine (BISC 330L)	4
BISC 411	Cell Biology (BISC 220L or 221L; BISC 320L)	4
BISC 423 (spring)	Epilepsy to Ecstasy: Biological Basis of Neurological Disorders (BISC 421)	4
BISC 424 (spring)	Brain Architecture (BISC 421)	4
BISC 444 (fall)	Practical Analysis of Biological Data in R	2
BISC 461 (fall)	Seminar in Molecular and Computational Biology	2
BISC 462	Seminar in Neurobiology (can be repeated twice; different topic each semester)	2
BISC 480	Developmental Biology (BISC 220L or 221L)	4
BISC 481/QBIO 481 (fall)	Structural Bioinformatics: From Atoms to Cells	4
BISC 486 (fall)	Regenerative Medicine: Principles, Paradigms and Practice (BISC 220 or BISC 221 or BISC 320)	4
BISC 499	Neuroimmunology (No other topics)	4
BME 210 (spring)	Biomedical Computer Simulation Methods (coreq. MATH 245)	4
BME 402 (spring)	Control and Communication in the Nervous System (MATH 245; BME 210; BISC 220L or 221L)	4
BPSI 405 (fall)	Organ Systems Physiology, Drug Delivery and Drug Action	4
CHEM 350 (fall)	Molecular Principles in Biochemistry (CHEM 105bL/115bL; coreq. CHEM 322aL; cannot take BISC 312 if this course is taken)	4
CSCI 445L	Introduction to Robotics (CSCI 103L)	4
CSCI 360L	Introduction to Artificial Intelligence (CSCI 104L; CSCI 170)	4
GERO 310 (fall)	Physiology of Aging	4
ECON 405	Neuroeconomics	4
GERO 414 (spring)	Neurobiology of Aging (BISC 220L or 221L)	4
GERO 415	Neuroaffective Disorders of Aging	4
GERO 494 (spring)	Emotion-Cognition Interactions and Aging	4
HBIO 306	Primate Social Behavior	4
HBIO 420L	Applied Human Physiology (BISC 220 or BISC 221)	4
HBIO 435	Neurobiology of Feeding Behavior and Obesity	4
HP 409	Environmental Impacts on the Brain	4
MEDS 340	The Brain in Health and Disease ((BISC 220 or BISC 221) and (CHEM 103 or CHEM 105A or CHEM 115A))	4
MEDS 350	Neurochemistry of Addiction: Drugs, Brain, and Behavior ((BISC 220 or BISC 221) and (CHEM 103 or CHEM 105A or CHEM 115A))	2
NEUR 490x	Directed Research (students must apply and be approved to register)	2-4
PSYC 301L	Cognitive Processes (PSYC 100L)	4
PSYC 304L	Sensation and Perception (PSYC 100L)	4
PSYC 305	Learning and Memory (PSYC 100L)	4
PSYC 320	Principles of Psychobiology (PSYC 100L)	4
PSYC 326	Behavioral Neuroscience (PSYC 100L)	4
PSYC 337L (spring)	Adult Development and Aging (PSYC 100L)	4
PSYC 339L (fall)	Origins of the Mind	4
PSYC 404L	Psychophysiology of Emotion (PSYC 100L; PSYC 274L; PSYC 314)	4
PSYC 420	Animal Behavior (PSYC 100L)	4
PSYC 424	Neuropsychology	4
PSYC 425	Functional Imaging of the Human Brain (PSYC 100L; PSYC 274L)	4
PSYC 426	Motivated Behaviors and Addiction (PSYC 100L)	4
PSYC 427	Neuropsychopharmacology (PSYC 100L)	4
PSYC 428	Advanced Psychobiology Seminar (PSYC 304L or PSYC 326)	4
PSYC 438	Behavioral Genetics (PSYC 274L)	4
PSYC 450 (spring)	Neural Network Models of Social and Cognitive Processes (PSYC 100L)	4
PSYC 452	Social Neuroscience (PSYC 100L)	4
RXRS 403	Neuropharmacology in Health and Disease	4
RXRS 405 (fall)	Breaking Brains: The Pharmacology of Drug Addiction	4
RXRS 412 (fall)	Ethics, Drugs and Society	4

#### AVAILABLE FOR SUBSTITUTION ^

Course Number	Course Name	Units
EE 155	Introduction to Computer Programming for Electrical Engineers (Intro to Programming Requirement)	4
GERO 320 (fall)	Psychology of Adult Development (Upper Division Elective)	4

**GRADUATE-LEVEL COURSEWORK AVAILABLE FOR UPPER-DIVISION ELECTIVE SUBSTITUTION #^**

<b>Course Number</b>	<b>Course Name</b>	<b>Units</b>
BISC 515	Evolution and Human Biology	4
BME 575L	Computational Neuroengineering ( <i>BME 502</i> )	3
CSCI 564	Brain Theory and Artificial Intelligence	3
NSCI 524	Advanced Overview of Neurosciences ( <i>BISC 421</i> )	4
PSYC 506	Learning and Cognition	4
PSYC 510	Visual Cognition ( <i>not in catalogue, but approved for substitution</i> )	4
PSYC 540	Cognitive Neuroscience	4
PSYC 544	Psychophysiology	4
PSYC 545	Neuropsychology	4
PSYC 547	Functional Neuroanatomy	4
PSYC 551	Decision Neuroscience	4
PSYC 555	Intro. to Functional Magnetic Resonance Imaging ( <i>not in catalogue, but approved for substitution</i> )	4

# Student must have a minimum cumulative GPA of 3.3 and receive permission to enroll from Program Director and course instructor.

^Only 25% of upper-division units can be substituted with CHEM, ECON, HP, NSCI, and/or RXRS coursework (10 total units)

# Neuroscience BS

Note: This is a **SAMPLE** 4-year course plan.

Each student will work with their advisor to create an individualized course plan.

Semester 1	
Course	Units
CHEM 105aL or 115aL [GE E]	4
MATH 125 [GE F]	4
WRIT 150	4
Foreign Language I	4
<b>Total Units</b>	<b>16</b>

Semester 2	
Course	Units
CHEM 105bL or 115bL [GE E]	4
BISC 220L or 221L [GE D]	4
GESM 110, 120, or 130	4
Foreign Language II	4
NEUR 199	1
<b>Total Units</b>	<b>17</b>

Semester 3	
Course	Units
CHEM 322aL (CHEM 105bL/115bL)	4
BISC 421 (BISC 220L/221L)	4
PSYC 100L	4
Foreign Language III	4
<b>Total Units</b>	<b>16</b>

Semester 4	
Course	Units
CHEM 322bL (CHEM 322aL)	4
PSYC 274L	4
GE A, B, C, G, or H	4
GE A, B, C, G, or H	4
<b>Total Units</b>	<b>16</b>

Semester 5	
Course	Units
PHYS 135aL (MATH 125)	4
NEUR UD Elective	4
GE A, B, C, G, or H	4
GE A, B, C, G, or H	4
<b>Total Units</b>	<b>16</b>

Semester 6	
Course	Units
PHYS 135bL (PHYS 135aL)	4
BISC 407 or 408 (BISC 421)	4
WRIT 340	4
GE A, B, C, G, or H	4
<b>Total Units</b>	<b>16</b>

Semester 7	
Course	Units
PSYC 440 (PSYC 100L)	4
NEUR UD with Lab Elective	4
Introductory Programming	2
GE A, B, C, G, or H	4
Elective	2
<b>Total Units</b>	<b>16</b>

Semester 8	
Course	Units
NEUR UD Elective	4
NEUR UD Elective	4
NEUR UD Elective	4
Elective	4
<b>Total Units</b>	<b>16</b>

( ) Denotes Prerequisite Course

[ ] Denotes GE designation

Courses highlighted in orange are major requirements

BISC 121L/221L and CHEM 115aL/115bL are reserved for students in Freshman Science Honors

\*BISC 407 may be substituted

# Neuroscience BS

Includes Pre-Med Requirements

This is a **SAMPLE** 4-year course plan.  
Each student will work with their advisor to create an individualized course plan.

Semester 1	
Course	Units
CHEM 105aL or 115aL [GE E]	4
BISC 121L or 120L (Pre-Med; elective)	4
WRIT 150	4
Foreign Language I	4
<b>Total Units</b>	<b>16</b>

Semester 2	
Course	Units
CHEM 105bL or 115bL [GE E]	4
BISC 220L or 221L [GE D]	4
GESM 110, 120, or 130	4
Foreign Language II	4
NEUR 199	1
<b>Total Units</b>	<b>17</b>

Semester 3	
Course	Units
CHEM 322aL (CHEM 105bL/115bL)	4
BISC 421 (BISC 220L/221L)	4
PSYC 100L	4
Foreign Language III	4
<b>Total Units</b>	<b>16</b>

Semester 4	
Course	Units
CHEM 322bL (CHEM 322aL)	4
MATH 125 (GE F)	4
NEUR UD Elective	4
GE A, B, C, G, or H	4
<b>Total Units</b>	<b>16</b>

Semester 5	
Course	Units
PHYS 135aL (MATH 125)	4
PSYC 274L	4
WRIT 340	4
GE A, B, C, G, or H	4
<b>Total Units</b>	<b>16</b>

Semester 6	
Course	Units
PHYS 135bL (PHYS 135aL)	4
BISC 312 (NEUR UD Elective & Pre-Med)	4
SOCI 200 or 242 (GE & Pre-Med)	4
GE A, B, C, G, or H	4
<b>Total Units</b>	<b>16</b>

Semester 7	
Course	Units
PSYC 440* (PSYC 100L)	4
NEUR UD with Lab Elective	4
Introductory Programming	2
GE A, B, C, G, or H	4
Elective	2
<b>Total Units</b>	<b>16</b>

Semester 8	
Course	Units
BISC 408 or 407 (BISC 421)	4
NEUR UD Elective	4
NEUR UD Elective	4
GE A, B, C, G, or H	4
<b>Total Units</b>	<b>16</b>

( ) Denotes Prerequisite Course

[ ] Denotes GE designation

Courses highlighted in orange are major requirements

Units highlighted in yellow are Pre-Med requirements

BISC 121L/221L and CHEM 115aL/115bL are reserved for students in Freshman Science Honors