

# Neuroscience BA

## MAJOR REQUIREMENTS

- A grade of C- or higher is required is required for all major coursework.
- Neuroscience BA total units = 49 units

## Neuroscience Core Requirements (33 units)

### Introductory Requirements (12 units)

Course Number	Course Name	Units
BISC 220L or 221L	General Biology: Cell Biology and Physiology; Advanced General Biology	4
CHEM 103L/105aL/115aL	Gen. Chemistry for Env. And Life; Gen. Chemistry; Adv. Gen. Chemistry ( <i>placement exam or AP credit required</i> )	4
MATH 125	Calculus I ( <i>placement exam or AP credit required</i> )	4

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

Course Number	Course Name	Units
PSYC 274L	Statisitcs	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

### NEUROSCIENCE UPPER-DIVISION ELECTIVE REQUIREMENT (16 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 ( <i>fall</i> )	Genetics ( <i>BISC 120L or 121L; BISC 220L or 221L; BISC 320L; CHEM 322aL</i> )	4
BISC 330L	Biochemistry ( <i>CHEM 322aL</i> )	4
BISC 403 ( <i>fall</i> )	Advanced Molecular Biology ( <i>BISC 320L</i> )	4
BISC 406L ( <i>fall</i> )	Biotechnology ( <i>BISC 320L</i> )	4
BISC 410 ( <i>spring</i> )	Applications of Molecular Biology to Medicine ( <i>BISC 330L</i> )	4
BISC 411	Cell Biology ( <i>BISC 220L or 221L; BISC 320L</i> )	4
BISC 423 ( <i>spring</i> )	Epilepsy to Ecstasy: Biological Basis of Neurological Disorders ( <i>BISC 421</i> )	4
BISC 424 ( <i>spring</i> )	Brain Architecture ( <i>BISC 421</i> )	4
BISC 444 ( <i>fall</i> )	Practical Analysis of Biological Data in R	2
BISC 461 ( <i>fall</i> )	Seminar in Molecular and Computational Biology	2
BISC 462	Seminar in Neurobiology ( <i>can be repeated twice; different topic each semester</i> )	2
BISC 480	Developmental Biology ( <i>BISC 220L or 221L</i> )	4
BISC 481/QBIO 481 ( <i>fall</i> )	Structural Bioinformatics: From Atoms to Cells	4
BISC 486 ( <i>fall</i> )	Regenerative Medicine: Principles, Paradigms and Practice ( <i>BISC 220 or BISC 221 or BISC 320</i> )	4
BISC 499	Neuroimmunology ( <b>No other topics</b> )	4
BME 210 ( <i>spring</i> )	Biomedical Computer Simulation Methods ( <i>coreq. MATH 245</i> )	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
ECON 405	Neuroeconomics	4
GERO 310 (fall)	Physiology of Aging	4
GERO 414 (spring)	Neurobiology of Aging (BISC 220L or 221L)	4
GERO 415 (spring)	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
GERO 320 (fall)	Psychology of Adult Development (Upper Division Elective)	4

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

Course Number	Course Name	Units
BISC 515	Evolution and Human Biology	4
BME 575L	Computational Neuroengineering (BME 502)	3
CSCI 564	Brain Theory and Artificial Intelligence	3
NSCI 524	Advanced Overview of Neurosciences (BISC 421)	4
PSYC 506	Learning and Cognition	4
PSYC 510	Visual Cognition	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	Introduction to Functional Magnetic Resonance Imaging	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 (7 total units)

# Neuroscience BA

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 103L or 105aL or 115aL [GE E]	4
WRIT 150	4
GE A, B, C, G, or H	4
Foreign Language	4
<b>Total Units</b>	<b>16</b>

Semester 2	
Course	Units
BISC 220L or 221L [GE D]	4
MATH 125 [GE F]	4
GESM 110, 120, or 130	4
Foreign Language	4
NEUR 199	1
<b>Total Units</b>	<b>17</b>

Semester 3	
Course	Units
BISC 421 (BISC 220L/221L)	4
PSYC 100L	4
GE A, B, C, G, or H	4
Foreign Language	4
<b>Total Units</b>	<b>16</b>

Semester 4	
Course	Units
BISC 408* (BISC 421)	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
PSYC 440* (PSYC 100L)	4
NEUR UD Elective	4
Elective / 2 <sup>nd</sup> Major / Minor	4
Elective / 2 <sup>nd</sup> Major / Minor	4
<b>Total Units</b>	<b>16</b>

Semester 6	
Course	Units
NEUR UD Elective	4
WRIT 340	4
Elective / 2 <sup>nd</sup> Major / Minor	4
Elective / 2 <sup>nd</sup> Major / Minor	4
<b>Total Units</b>	<b>16</b>

Semester 7	
Course	Units
NEUR UD Elective	4
GE A, B, C, G, or H	4
Elective / 2 <sup>nd</sup> Major / Minor	4
Elective / 2 <sup>nd</sup> Major / Minor	4
<b>Total Units</b>	<b>16</b>

Semester 8	
Course	Units
NEUR UD Elective	4
GE A, B, C, G, or H	4
Elective / 2 <sup>nd</sup> Major / Minor	4
Elective / 2 <sup>nd</sup> Major / Minor	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