Neuroscience (BA/BS)

Neuroscience is for undergraduate students interested in studying the relationship between the brain and behavior. Coursework is jointly taught by biology, human physiology and psychology faculty to provide well-rounded training. Foundational courses are in biology, chemistry, human physiology, math, physics, and psychology. Upper division coursework focuses on three main areas of neuroscience: molecular/cellular neuroscience, systems neuroscience, and cognitive neuroscience. Students can also take advanced skills courses in programming or computational techniques. They may also conduct cutting-edge research in a neuroscience lab.

Neuroscience graduates will have a strong understanding of the structure and function of the nervous system, demonstrate critical thinking, quantitative and analytical skills, and communicate effectively about neuroscience research.

Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Demonstrate broad-based content knowledge and understanding of terminology and concepts in neuroscience at multiple levels of organization.
- Critically read and evaluate scientific information.
- Apply data analysis skills to understand neuroscience information.
- Communicate clearly and effectively about neuroscience information.

Neuroscience Major

As outlined below, the Neuroscience majors consists of the following components: 1) foundation courses in the natural sciences; 2) math and statistics coursework; 3) life science fundamentals; 4) a core neuroscience sequence; 5) upper-division elective courses; and 6) advanced skills courses and/or research experience. The total number of credits is 101-104.

Code	Title	Credits
Foundation Courses in Natural Sciences:		**49-52**
BI 221Z & BI 222Z & BI 214	Principles of Biology I: Cells and Principles of Biology II: Organisms and General Biology IV: Biochemistry and Genetics	
or BI 281H & BI 282H & BI 283H	Accelerated Biology I: Cells, Biochemistry and Physiology and Accelerated Biology II: Genetics and Molecular Biology and Accelerated Biology III: Evolution, Diversity and Ecology	
CH 221Z	General Chemistry I	
or CH 224H	Advanced General Chemistry I	
CH 222Z	General Chemistry II	
or CH 225H	Advanced General Chemistry II	
CH 223Z	General Chemistry III	
or CH 226H	Advanced General Chemistry III	
PHYS 201	General Physics	
or PHYS 251	Foundations of Physics I	
PHYS 202	General Physics	
or PHYS 252	Foundations of Physics I	
PHYS 203	General Physics	
or PHYS 253	Foundations of Physics I	
PSY 201Z	Introduction to Psychology I	
Select one of the options:		
Option A: [1]		
CH 227Z & CH 217	General Chemistry I Laboratory and Chemistry Tools I	
CH 228Z & CH 218	General Chemistry II Laboratory and Chemistry Tools II	
CH 229Z & CH 219	General Chemistry III Laboratory and Chemistry Tools III	
Option B:		
PHYS 204 & PHYS 205 & PHYS 206	Introductory Physics Laboratory and Introductory Physics Laboratory and Introductory Physics Laboratory	
Math and Statistics Courses:		**8**
MATH 246	Calculus for the Biological Sciences I	
or MATH 251	Differential Calculus	
PSY 302	Statistical Methods in Psychology	
or MATH 425	Statistical Methods I	
or ANTH 470	Statistical Analysis of Biological Anthropology	
Life Science Fundamentals:		**7**
HPHY 211	Medical Terminology	
HPHY 212	Scientific Investigation in Physiology	
Core Neuroscience:		**13**
BI 360	Neurobiology	
HPHY 321	Human Anatomy I (or an equivalent Neuroanatomy course) [2]	
PSY 304	Biopsychology	
Upper Division Electives: [3]		**16**
Molecular/Cellular/Developmental		
BI 320	Molecular Genetics	
BI 322	Cell Biology	
BI 328	Developmental Biology	
BI 422	Protein Toxins in Cell Biology	
BI 427		
BI 463	Cellular Neuroscience	
BI 466	Developmental Neurobiology	
HPHY 432	Neural Development	
Systems		
BI 353	Sensory Physiology	
BI 390	Animal Behavior	
BI 461	Systems Neuroscience	
HPHY 333	Motor Control	
HPHY 412	Sleep Physiology	
HPHY 433	Neurophysiology of Concussion	
HPHY 434	Movement Disorders	
HPHY 436	Clinical Neuroscience	
PSY 445	Brain Mechanisms of Behavior	
PSY 450	Hormones and Behavior	
Cognitive		
PSY 305	Cognition	

PSY 348	Music and the Brain	
PSY 383	Psychoactive Drugs	
PSY 433	Learning and Memory	
PSY 436	Human Performance	
PSY 438	Perception	
PSY 449	Cognitive Neuroscience	
PSY 458	Decision-Making	
PSY 475	Cognitive Development	
Advanced Skills Courses and Research Experience		**8**
BI 401	Research: [Topic]	
BI 403	Thesis	
CS 472	Machine Learning	
HPHY 401	Research: [Topic]	
HPHY 403	Thesis	
PSY 401	Research: [Topic]	
PSY 403	Thesis	
PSY 412	Applied Data Analysis	
Total Credits		**101-104**

[1] Students who transfer CH 227Z/228Z/229Z credits from other schools may have the corresponding CH 217/218/219 course and credit requirements waived.

[2] Please contact the program's advisor for more information.

[3] 16 required credits with at least 12 credits from 400-level courses; at least one course from each of the three area

Additional Requirements

- Courses used to fulfill the major requirements must be taken for a letter grade and passed with a grade of C or better. Coursework transferred in from Advanced Placement or International Baccalaureate exams are acceptable with a mark of P*.
- At least 34 credits of coursework applied to the major must be taken at the University of Oregon.

Criteria for Honors

To graduate with Honors in Neuroscience, the following requirements must be met:

1. A completed Neuroscience Honors application with signature of a faculty research advisor from BI, HPHY or PSY
2. Completion of all Neuroscience major requirements
3. A minimum 3.5 GPA in all courses applied to the major
4. At least three credits in BI 403/HPHY 403/PSY 403 Thesis or BI 401/HPHY 401/PSY 401 Research. (*These credits may be applied to the advanced skills courses and research experience requirement).*
5. Completion of an honors thesis under supervision of a committee, consisting of one BI, HPHY, or PSY faculty member and at least one other committee member (Ph.D. student, postdoctoral scholar, or faculty) from BI, HPHY, or PSY.

Four-Year Degree Plan

The degree plan shown is only a sample of how students may complete their degrees in four years. There are alternative ways. Students should consult their advisor to determine the best path for them.

Bachelor of Science in Neuroscience

Course	Title	Credits	Milestones
First Year			
Fall			
CH 111	Introduction to Chemical Principles	Preparation for CH 221	4
MATH 111Z	Precalculus I: Functions		4
WR 121Z	Composition I		4
Core-education course		Arts & Letters or Social Science	4
	Credits		**16**
Winter			
CH 221Z	General Chemistry I		4
CH 227Z & CH 217	General Chemistry I Laboratory and Chemistry Tools I	One year of either chemistry lab or physics lab is required	2
MATH 112Z	Precalculus II: Trigonometry		4
WR 123	College Composition III		4
	Credits		**14**
Spring			
CH 222Z	General Chemistry II		4
CH 228Z & CH 218	General Chemistry II Laboratory and Chemistry Tools II		2
MATH 246	Calculus for the Biological Sciences I	Recommended instead of MATH 251Z	4
PSY 201Z	Introduction to Psychology I		4
	Credits		**14**
Second Year			
Fall			
BI 221Z	Principles of Biology I: Cells		5
CH 223Z	General Chemistry III		4
CH 229Z & CH 219	General Chemistry III Laboratory and Chemistry Tools III		2
HPHY 211	Medical Terminology		3
	Credits		**14**
Winter			
BI 222Z	Principles of Biology II: Organisms		5
HPHY 212	Scientific Investigation in Physiology		4
Core-education course		Arts & Letters or Social Science	4

Core-education course		Arts & Letters or Social Science	4
	Credits		**17**
Spring			
BI 214	General Biology IV: Biochemistry and Genetics		5
PSY 302	Statistical Methods in Psychology		4
Core-education course		Arts & Letters or Social Science	4
Cultural literacy course		Global Perspectives or US: DIA	4
	Credits		**17**
Third Year			
Fall			
PSY 304	Biopsychology	Neuroscience core course	4
PHYS 201	General Physics	One year of either chemistry or physics lab is required	4
Core-education course		Arts & Letters or Social Science	4
BI 401	Research: [Topic]	Eight credits of research or advanced skills courses are required	2
	Credits		**14**
Winter			
HPHY 321	Human Anatomy I (or an equivalent Neuroanatomy course) [1]	Neuroscier core course	5
PHYS 202	General Physics		4
Core-education course		Arts & Letters or Social Science	4
PSY 401	Research: [Topic]	If not involved in research, take an advanced skills course	2
	Credits		**15**
Spring			
BI 360	Neurobiology	Neuroscience core course	4
PHYS 203	General Physics		4
PSY 449	Cognitive Neuroscience	Or other upper-division Cognitive course	4
Core-education course		Arts & Letters or Social Science	4
	Credits		**16**
Fourth Year			
Fall			
HPHY 436	Clinical Neuroscience	Or other upper-division Systems course	4
BI 430	Analysis of Neural Data	Or other advanced skills course	4
Core-education course		Arts & Letters or Social Science	4
Cultural literacy course		Global Perspectives or US: DIA	4
	Credits		**16**
Winter			
BI 322	Cell Biology	Or other upper-division Molecular/ Cellular/ Developmental course	4

BI 461	Systems Neuroscience	Four NEUR elective courses are required, at least three at the 400-level	4
Electives		Can include additional NEUR coursework	7
	Credits		**15**
Spring			
Electives		Can include additional NEUR coursework	12
	Credits		**12**
	Total Credits		**180**

[1] Please contact the program's advisor for more information.