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 104-107 (depending on whether majors complete the General Biology Sequence or the Biology Honors Sequence).

Code	Title	Credits
Foundation Courses in Natural Sciences:		**46-49**
BI 211	General Biology I: Cells	
& BI 212	and General Biology II: Organisms	
& BI 214	and General Biology IV: Biochemistry and Genetics	
or BI 281H	Honors Biology I: Cells, Biochemistry and Physiology	
& BI 282H	and Honors Biology II: Genetics and Molecular Biology	
& BI 283H	and Honors Biology III: Evolution, Diversity and Ecology	
CH 221	General Chemistry I	
& CH 222	and General Chemistry II	
& CH 223	and General Chemistry III	
or CH 224H	Advanced General Chemistry I	
& CH 225H	and Advanced General Chemistry II	
& CH 226H	and Advanced General Chemistry III	
PHYS 201	General Physics	
& PHYS 202	and General Physics	
& PHYS 203	and General Physics	
or PHYS 251	Foundations of Physics I	
& PHYS 252	and Foundations of Physics I	
& PHYS 253	and Foundations of Physics I	
CH 227	General Chemistry Laboratory	
& CH 228	and General Chemistry Laboratory	
& CH 229	and General Chemistry Laboratory	
or PHYS 204	Introductory Physics Laboratory	
& PHYS 205	and Introductory Physics Laboratory	
& PHYS 206	and Introductory Physics Laboratory	
PSY 201	Mind and Brain	
Math and Statistics Courses:		**8**
MATH 246	Calculus for the Biological Sciences I	
or MATH 251	Calculus I	
PSY 302	Statistical Methods in Psychology	
or MATH 425	Statistical Methods I	
or ANTH 470	Statistical Analysis of Biological Anthropology	
Life Science Fundamentals:		**8**
HPHY 211	Medical Terminology	
HPHY 212	Scientific Investigation in Physiology	
Core Neuroscience: Sequence order is recommended but not required		**18**
HPHY 321	Human Anatomy I	
& HPHY 322	and Human Physiology I (Fall)	
PSY 304	Biopsychology (Winter)	
BI 360	Neurobiology (Spring)	
Upper Division Electives: [1]		**16**
Molecular/Cellular/Developmental		
BI 320	Molecular Genetics	
BI 322	Cell Biology	
BI 328	Developmental Biology	
BI 356	Animal Physiology	
BI 422	Protein Toxins in Cell Biology	
BI 427	Molecular Genetics of Human Disease	
BI 466	Developmental Neurobiology	
HPHY 432	Neural Development	
Systems		
BI 353	Sensory Physiology	
BI 399	Special Studies: [Topic]	
BI 410	Experimental Course: [Topic]	
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		
BI 410	Experimental Course: [Topic] (Neural Basis of Cognition)	
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	
BI 407	Seminar: [Topic]	
BI 410	Experimental Course: [Topic] (Introduction to Programming for Biologists)	
BI 410	Experimental Course: [Topic] (Matlab for Biologists)	
BI 410	Experimental Course: [Topic] (Analysis Neural Data)	
BI 485		
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		**104-107**

[1] 16 required credits with at least 12 credits from 400-level courses; at least one course from each of the three area

Additional Requirements

- All courses counted towards the Neuroscience Major requirements must be taken for a letter grade and passed with a grade of C or better.
- 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, or PSY 403 Thesis (*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.

Neuroscience Bachelor of Arts

Course	Title	Credits Milestones
First Year		
Fall		
CH 111	Introduction to Chemical Principles	4
MATH 111Z	Precalculus I: Functions	4
WR 121Z	Composition I	4
Language 101		4
	Credits	**16**
Winter		
CH 221	General Chemistry I	4
CH 227	General Chemistry Laboratory	2
MATH 112Z	Precalculus II: Trigonometry	4
WR 123	College Composition III	4
Language 102		4
	Credits	**18**
Spring		
CH 222	General Chemistry II	4
CH 228	General Chemistry Laboratory	2
MATH 246	Calculus for the Biological Sciences I	4
Language 103		4
	Credits	**14**
Second Year		
Fall		
BI 211	General Biology I: Cells	5
CH 223	General Chemistry III	4
CH 229	General Chemistry Laboratory	2
HPHY 211	Medical Terminology	3
Language 201		4
	Credits	**18**
Winter		
BI 212	General Biology II: Organisms	5
HPHY 212	Scientific Investigation in Physiology	4
PSY 201	Mind and Brain	4
Language 202		4
	Credits	**17**
Spring		
BI 214	General Biology IV: Biochemistry and Genetics	5
PSY 302	Statistical Methods in Psychology	4
Core education course		4
Language 203		4
	Credits	**17**
Third Year		
Fall		
HPHY 321	Human Anatomy I	5
HPHY 322	Human Physiology I	5
PHYS 201	General Physics	4

BI 401 or HPHY 401 or PSY 401	Research: [Topic] or Research: [Topic] or Research: [Topic]	2
	Credits	**16**
Winter		
PSY 304	Biopsychology	4
PHYS 202	General Physics	4
Core education course		4
BI 401 or HPHY 401 or PSY 401	Research: [Topic] or Research: [Topic] or Research: [Topic]	2
	Credits	**14**
Spring		
BI 360	Neurobiology	4
PHYS 203	General Physics	4
Core education course		4
BI 401 or HPHY 401 or PSY 401	Research: [Topic] or Research: [Topic] or Research: [Topic]	2
	Credits	**14**
Fourth Year		
Fall		
Upper-division NEURO elective		4
Core education course		4
Core education course		4
BI 401 or HPHY 401 or PSY 401	Research: [Topic] or Research: [Topic] or Research: [Topic]	2
	Credits	**14**
Winter		
Upper-division NEURO elective		4
Upper-division NEURO elective		4
Core education course		4
Elective course		1
	Credits	**13**
Spring		
Upper-division NEURO elective		4
Core education course		4
Core education course		4
	Credits	**12**
	Total Credits	**183**

Neuroscience Bachelor of Science

Course	Title	Credits Milestones
First Year		
Fall		
CH 111	Introduction to Chemical Principles	4
MATH 111Z	Precalculus I: Functions	4
WR 121Z	Composition I	4
Core education course		4
	Credits	**16**
Winter		
CH 221	General Chemistry I	4
CH 227	General Chemistry Laboratory	2
MATH 112Z	Precalculus II: Trigonometry	4
WR 123	College Composition III	4
	Credits	**14**
Spring		
CH 222	General Chemistry II	4
CH 228	General Chemistry Laboratory	2
MATH 246	Calculus for the Biological Sciences I	4
PSY 201	Mind and Brain	4
Elective course		1
	Credits	**15**
Second Year		
Fall		
BI 211	General Biology I: Cells	5
CH 223	General Chemistry III	4
CH 229	General Chemistry Laboratory	2
HPHY 211	Medical Terminology	3
	Credits	**14**
Winter		
BI 212	General Biology II: Organisms	5
HPHY 212	Scientific Investigation in Physiology	4
Core education course		4
Core education course		4
	Credits	**17**
Spring		
BI 214	General Biology IV: Biochemistry and Genetics	5
PSY 302	Statistical Methods in Psychology	4
Core education course		4
Elective or Cultural Literacy course		4
	Credits	**17**
Third Year		
Fall		
HPHY 321	Human Anatomy I	5
HPHY 322	Human Physiology I	5
PHYS 201	General Physics	4

BI 401 or HPHY 401 or PSY 401	Research: [Topic] or Research: [Topic] or Research: [Topic]	2
	Credits	**16**
Winter		
PSY 304	Biopsychology	4
PHYS 202	General Physics	4
Core education course		4
BI 401 or HPHY 401 or PSY 401	Research: [Topic] or Research: [Topic] or Research: [Topic]	2
Elective course		1
	Credits	**15**
Spring		
BI 360	Neurobiology	4
PHYS 203	General Physics	4
Core education course		4
BI 401 or HPHY 401 or PSY 401	Research: [Topic] or Research: [Topic] or Research: [Topic]	2
	Credits	**14**
Fourth Year		
Fall		
Upper-division NEURO elective		4
Upper-division NEURO elective		4
Core education course		4
BI 401 or HPHY 401 or PSY 401	Research: [Topic] or Research: [Topic] or Research: [Topic]	2
	Credits	**14**
Winter		
Upper-division NEURO elective		4
Upper-division NEURO elective		4
Core education course		4
Elective or Cultural Literacy course		4
	Credits	**16**
Spring		
Upper-division NEURO elective		4
Elective courses		9
	Credits	**13**
	Total Credits	**181**