

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:		49-52
BI 211 & BI 212 & BI 214	General Biology I: Cells and General 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 221 & CH 222 & CH 223	General Chemistry I and General Chemistry II and General Chemistry III	
or CH 224H & CH 225H	Advanced General Chemistry I and Advanced General Chemistry II and Advanced General Chemistry III	
& CH 226H		

PHYS 201 & PHYS 202 & PHYS 203	General Physics and General Physics and General Physics	
or PHYS 251 & PHYS 252	Foundations of Physics I and Foundations of Physics I and Foundations of Physics I	
& PHYS 253		
CH 227 & CH 228 & CH 229	General Chemistry Laboratory and General Chemistry Laboratory and General Chemistry Laboratory	
or PHYS 204 & PHYS 205	Introductory Physics Laboratory and Introductory Physics Laboratory and Introductory Physics Laboratory	
& PHYS 206		
PSY 201Z	Introduction to Psychology I	
Math and Statistics Courses:		8
MATH 246 or MATH 251	Calculus for the Biological Sciences I and Calculus I	
PSY 302 or MATH 425 or ANTH 470	Statistical Methods in Psychology and Statistical Methods I and Statistical Analysis of Biological Anthropology	
Life Science Fundamentals:		7
HPHY 211	Medical Terminology	
HPHY 212	Scientific Investigation in Physiology	
Core Neuroscience: Sequence order is recommended but not required		18
HPHY 321 & HPHY 322	Human Anatomy I 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 463	Cellular Neuroscience	
BI 466	Developmental Neurobiology	
HPHY 432	Neural Development	
Systems		
BI 353	Sensory Physiology	
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		106-109

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

- 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, 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 201Z	Introduction to Psychology I	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	Research: [Topic]	2
or	or Research: [Topic]	
HPHY 401	or Research: [Topic]	
or		
PSY 401		

Credits **16**

Winter

PSY 304	Biopsychology	4
PHYS 202	General Physics	4
Core education course		4
BI 401	Research: [Topic]	2
or	or Research: [Topic]	
HPHY 401	or Research: [Topic]	
or		
PSY 401		

Credits **14**

Spring

BI 360	Neurobiology	4
PHYS 203	General Physics	4
Core education course		4
BI 401	Research: [Topic]	2
or	or Research: [Topic]	
HPHY 401	or Research: [Topic]	
or		
PSY 401		

Credits **14**

Fourth Year

Fall

Upper-division NEURO elective		4
Core education course		4
Core education course		4
BI 401	Research: [Topic]	2
or	or Research: [Topic]	
HPHY 401	or Research: [Topic]	
or		
PSY 401		

Credits **14**

Winter

Upper-division NEURO elective		4
Upper-division NEURO elective		4
Core education course		4

Credits **12**

Spring

Upper-division NEURO elective		4
Core education course		4
Core education course		4

Credits **12**

Total Credits **182**

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 201Z	Introduction to Psychology I	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

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	Research: [Topic]	2
or	or Research: [Topic]	
HPHY 401	or Research: [Topic]	
or		
PSY 401		

Credits **16**

Winter

PSY 304	Biopsychology	4
PHYS 202	General Physics	4
Core education course		4

BI 401	Research: [Topic]	2
or	or Research: [Topic]	
HPHY 401	or Research: [Topic]	
or		
PSY 401		
Elective course		1
Credits		15
Spring		
BI 360	Neurobiology	4
PHYS 203	General Physics	4
Core education course		4
BI 401	Research: [Topic]	2
or	or Research: [Topic]	
HPHY 401	or Research: [Topic]	
or		
PSY 401		
Credits		14
Fourth Year		
Fall		
Upper-division NEURO elective		4
Upper-division NEURO elective		4
Core education course		4
BI 401	Research: [Topic]	2
or	or Research: [Topic]	
HPHY 401	or Research: [Topic]	
or		
PSY 401		
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		180