

Docket Item:

University Program Approval: University of Oregon, Bachelor of Arts (B.A.)/Bachelor of Science (B.S.) in Neuroscience

Summary:

University of Oregon proposes a new degree program leading to a B.A./B.S. in Neuroscience. The statewide Provosts' Council has unanimously recommended approval. Higher Education Coordinating Commission (HECC) staff completed a review of the proposed program. After analysis, HECC staff recommends approval of the program as proposed.

Staff Recommendation:

The HECC recommends the adoption of the following resolution:

RESOLVED, that the Higher Education Coordinating Commission approve the following program:
B.A./B.S. in Neuroscience at the University of Oregon



Proposal for a New Academic Program

Institution: University of Oregon

College/School: College of Arts & Sciences

Department/Program Name: Neuroscience (interdisciplinary: Human Physiology, Psychology and Biology)

Degree and Program Title: Bachelor of Arts and Bachelor of Science in Neuroscience

1. Program Description

a. Proposed Classification of Instructional Programs (CIP) number.

26.1501

b. Brief overview (1-2 paragraphs) of the proposed program, including its disciplinary foundations and connections; program objectives; programmatic focus; degree, certificate, minor, and concentrations offered.

The proposed Neuroscience degree program is an interdisciplinary major, which will be jointly administered by Biology (BI), Human Physiology (HPHY), and Psychology (PSY) beginning in Fall 2020. The Neuroscience major will offer rigorous training to undergraduates interested in studying brain and behavior and will address a critical need to serve students with interests in this broad discipline, allowing them to earn a Bachelor's degree in Neuroscience. Majors will take a required set of core neuroscience courses, a supporting set of coursework in biology, chemistry, human physiology, math, physics, and psychology, and upper-division coursework in three different areas of neuroscience. The training will conclude with successful completion of advanced coursework in programming or computational techniques or an in-depth research experience in a neuroscience lab, in recognition of the skills required for neuroscience-related careers. Upon completion of the Neuroscience major, graduates will demonstrate strong content knowledge in the field of neuroscience, critical thinking and scientific literacy skills, quantitative and analytical skills, and an ability to communicate effectively about neuroscience research. Neuroscience majors will be well-prepared for careers in scientific research, medicine, and allied health professions, as well as science-related government, nonprofit, and industry jobs.

c. Course of study – proposed curriculum, including course numbers, titles, and credit hours.

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).

Foundation courses in natural sciences(46-49 credits)

- General Biology Sequence: BI 211, 212, and 214 (12 credits) OR Biology Honors Sequence: BI 281H, 282H, 283H (15 credits)
- General Chemistry Sequence: CH 221, 222, 223 OR Chemistry Honors Sequence: CH 224H, 225H, 226H (12 credits)
- Introductory Physics Sequence: PHYS 201, 202, 203 OR Foundations of Physics Sequence: PHYS 251, 252, 253 (12 credits)
- General Chemistry Laboratory: CH 227, 228, 229 OR General Physics Laboratory: PHYS 204, 205, 206 (6 credits)
- Mind & Brain: PSY 201 (4 credits)

Math and statistics courses(8 credits)

- MATH 246 or 251
- PSY 302 Statistical Methods in Psychology OR MATH 425 Statistical Methods I OR ANTH 470 Statistical Analysis of Biological Anthropology

Life science fundamentals(8 credits)

- HPHY 211 Medical Terminology
- HPHY 212 Scientific Investigations in Physiology

Core neuroscience sequence(18 credits; recommended, but not required, to be taken in this order)

- HPHY 321 Human Anatomy I & HPHY 322 Human Physiology I (Fall)
- PSY 304 Biopsychology (Winter)
- BI 360 Neurobiology (Spring)

Upper-division elective courses(16 required credits with at least 12 credits from 400-level courses; at least one course from each of the three areas)

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 Biology
- HPHY 337 Clinical Pharmacology
- HPHY 432 Neural Development

Systems

- BI 353 Sensory Physiology
- BI 399 Visual System
- BI 410 Auditory Systems
- 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 & Behavior

Cognitive

- BI 410 Neural Basis of Cognition
- PSY 305 Cognition
- PSY 348 Music & the Brain
- PSY 383 Psychoactive Drugs
- PSY 433 Learning & Memory
- PSY 436 Human Performance
- PSY 438 Perception
- PSY 440 Psycholinguistics
- PSY 449 Cognitive Neuroscience
- PSY 458 Decision Making
- PSY 475 Cognitive Development

Advanced skills courses and research experience (8 required credits)

- BI 401 Research, BI 403 Thesis, BI 407 Neuroscience Seminar, BI 410 Introduction to Programming for Biologists, BI 410 Matlab for Biologists, BI 410 Analysis Neural Data, BI 485 Techniques in Computational Neuroscience, CIS 372M Machine Learning for Data Science, CIS 472 Machine Learning, HPHY 401 Research, HPHY 403 Thesis, PSY 401 Research, PSY 403 Thesis, PSY 412 Applied Data Analysis

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 from BI, HPHY, or PSY.

d. Manner in which the program will be delivered, including program location (if offered outside of the main campus), course scheduling, and the use of technology (for both on-campus and off-campus delivery).

The BA/BS in Neuroscience will be offered at the University of Oregon home campus in Eugene. We are not currently planning to offer the degree online but some of the courses may be offered online.

e. Adequacy and quality of faculty delivering the program.

The major consists of existing courses from several departments staffed by tenure-track and career faculty that have a long history of high-quality instruction and scholarship. The College of Arts and Sciences has committed to ensuring there are adequate, quality faculty in the future should the demand in the major exceed current capacity. We do not anticipate that happening in the first 5 years.

f. Adequacy of faculty resources – full-time, part-time, adjunct.

See above

g. Other staff.

The major will have a program director and a small program guidance committee, comprised of one faculty member from each of the three departments. No additional faculty will be required in the short term, as the proposal is based on courses that are already being taught. As the major grows, we might need to increase the capacity of the required courses in the three departments. The College of Arts & Sciences has indicated a commitment to funding extra instruction as need.

Staffing resources include:

- A program director (at approximately .33 FTE if NTTF). See schedule here for guidelines: <https://casweb.uoregon.edu/department-head-and-large-program-director-compensation-schedule>.
- Partial FTE (.25, for example) for classified staff administrative help

h. Adequacy of facilities, library, and other resources.

We anticipate no unusual facilities or library needs or other extended infrastructure resources at this time.

i. Anticipated start date.

2. Relationship to Mission and Goals

a. Manner in which the proposed program supports the institution's mission, signature areas of focus, and strategic priorities.

The interdisciplinary Neuroscience major will take advantage of existing shared interests and faculty excellence in the field of neuroscience at the University of Oregon, leveraging the combined strength of the Biology, Human Physiology, and Psychology departments. Most major research universities in the United States already have undergraduate neuroscience majors; in fact, 26 of our 32 AAU Peer Institutions have, or are preparing to launch, a neuroscience major or comparable major (e.g., neurobiology). By offering a Neuroscience major at the University of Oregon, we will better serve students who are interested in the field of neuroscience and must currently choose Biology, Human Physiology, or Psychology as their major. The Neuroscience major will also recruit talented undergraduate students to the University of Oregon and offer an additional undergraduate major for students interested in careers in research, medicine, or other health professions.

b. Manner in which the proposed program contributes to institutional and statewide goals for student access and diversity, quality learning, research, knowledge creation and innovation, and economic and cultural support of Oregon and its communities.

Faculty affiliated with the Neuroscience major are advocates for promoting diversity and increasing the presence of students who are traditionally underrepresented in STEM fields. For example, Adrienne Huxtable (HPHY) and Brice Kuhl (PSY), are both the heads of their departmental diversity committees and are on the CAS Natural Sciences Diversity Leadership committee. Human Physiology, Biology, and Psychology have individually been departments leading the charge on many improvements for diversity, equity, and inclusion on campus. Based on strategies developed in the diversity committees, neuroscience faculty will make efforts to recruit women and minorities into the program.

The Neuroscience major emphasizes research throughout the required coursework. All majors will be encouraged to join a research lab affiliated with the university's Institute of Neuroscience (ION), and majors who are underrepresented in the natural sciences will be encouraged to apply for research and mentorship opportunities, such as SCORE (Students of Color Opportunities for Research Enrichment), the McNair Scholars program, and JUMP (Joint Undergrad-Grad Mentorship Program).

c. Manner in which the program meets regional or statewide needs and enhances the state's capacity to:

- i. improve educational attainment in the region and state;
- ii. respond effectively to social, economic, and environmental challenges and opportunities; and
- iii. address civic and cultural demands of citizenship.

The Neuroscience major has been strategically designed to be accessible to all incoming students, including transfer students. The foundational courses in natural sciences as well as one of the two required math courses are all 200-level courses and can be completed at other

institutions, including community colleges. Thus, students will be able to enter the program in the third year and complete the remaining 54 credits over a two-year period. The core neuroscience sequence can be taken out of order to accommodate transfer students who have not yet completed the lower division courses in Human Physiology, and doing so will not compromise a student's ability to succeed in any of the core courses.

Advanced skills courses and/or research experience are a required component of the Neuroscience major in order to ensure that our graduates leave with the skills and competencies necessary for pursuing a career in a neuroscience-related field, such as medicine, scientific research, medical technology, health policy, public health, and social services. By matriculating more students with strong quantitative and analytical skills, we will meet the increasing demand for these skills in the workplace.

3. Accreditation

Accreditation will not be sought as it is not currently available for undergraduate programs in neuroscience.

4. Need

a. Anticipated fall term headcount and FTE enrollment over each of the next five years.

Given the market demand and career opportunities for Neuroscience, we expect this to be a popular degree option for UO students, and that we will attract students who may not have considered coming to UO prior to this degree option. As such, we've estimated potential enrollments accordingly. Note that we anticipate some current biology, psychology and human physiology majors may switch to neuroscience as the base prerequisites are similar. As such, we have a conservative estimate of 10 potential degrees awarded in the third year.

Year 1	Year 2	Year 3	Year 4	Year 5
30 enrolled	50 incoming 90 enrolled	70 incoming 160 enrolled	90 incoming 250 enrolled	100 incoming 360 enrolled

b. Expected degrees/certificates produced over the next five years.

Year 1	Year 2	Year 3	Year 4	Year 5
0	0	10	25	40

c. Characteristics of students to be served (resident/nonresident/international; traditional/ nontraditional; full-time/part-time, etc.).

Students pursuing the BA/BS in Neuroscience will be resident, nonresident, and international full-time traditional students.

d. Evidence of market demand.

Advanced skills courses and/or research experience are a required component of the Neuroscience major in order to ensure that our graduates leave with the skills and

competencies necessary for pursuing a career in a neuroscience-related field, such as medicine, scientific research, medical technology, health policy, public health, and social services. By matriculating more students with strong quantitative and analytical skills, we will meet the increasing demand for these skills in the workplace. According to the U.S. Department of Labor’s Bureau of Labor Statistics, “employment of life, physical, and social science occupations is projected to grow 7 percent from 2018 to 2028, faster than the average for all occupations, which will result in 97,400 new jobs. Increasing demand for expertise in the sciences, particularly in occupations involved in biomedical research, psychology, energy management, and environmental protection, is projected to result in employment growth.”

- e. **If the program’s location is shared with another similar Oregon public university program, the proposal should provide externally validated evidence of need (e.g., surveys, focus groups, documented requests, occupational/employment statistics and forecasts).**

N/A

- f. **Estimate the prospects for success of program graduates (employment or graduate school) and consideration of licensure, if appropriate. What are the expected career paths for students in this program?**

The main objective of the proposed Neuroscience major is to provide students with rigorous training in neuroscience, preparing them for graduate programs in neuroscience as well as a wide variety of neuroscience-related careers. Possible career paths include medicine, physical therapy, occupational therapy, other health professions, graduate programs through the Institute of Neuroscience or at other research universities, and technology or health-related industry jobs.

5. Outcomes and Quality Assessment

- a. **Expected learning outcomes of the program.**

Principle Learning Outcome (Concept or Skill)	Part of curriculum where this is introduced	Part of curriculum where this is developed	How students demonstrate mastery
1. Demonstrate broad-based content knowledge and understanding of terminology and concepts in neuroscience at multiple levels of organization	200-level foundational natural science courses	300-level neuroscience core courses and upper-division electives	Successful completion of the upper-division electives
2. Critically read and evaluate scientific information	200-level foundational natural science courses	Life science fundamentals, 300-level neuroscience core courses, and upper-division electives	Successful completion of the upper-division electives

Principle Learning Outcome (Concept or Skill)	Part of curriculum where this is introduced	Part of curriculum where this is developed	How students demonstrate mastery
3. Apply data analysis skills to understand neuroscience information	Math and statistics courses AND life science fundamentals	Advanced skills courses and research experience	Successful completion of advanced skills courses and research experience
4. Communicate clearly and effectively about neuroscience information	200-level natural science courses and life science fundamentals	300-level neuroscience core courses and upper-division electives	Successful completion of the upper-division electives

b. Methods by which the learning outcomes will be assessed and used to improve curriculum and instruction.

We will survey students in our three core courses to evaluate the course curriculum at the end of each term to ensure that students are aware of course learning objectives. We will also survey graduating seniors in the Neuroscience major to evaluate the major more holistically and will track graduates of our major to determine the number of students who are receiving employment as well as the additional skills they require but did not receive in our program. We will also maintain contact with graduates who remain in neuroscience-related careers to ensure that our major is meeting current needs.

In addition, the assessment of degree learning outcomes will be derived from a sub-sample of artifacts generated through the program. Each outcome will be assessed on an annual rotation as follows:

Year 1: Outcomes 1,2

Year 2: Outcomes 3,4

c. Nature and level of research and/or scholarly work expected of program faculty; indicators of success in those areas.

The tenure-track and Career faculty teaching in the Neuroscience program include faculty from Biology (BI), Human Physiology (HPHY) and Psychology (PSY), many of whom are researchers affiliated with the Institute of Neuroscience. All of the faculty are currently demonstrating successful instruction and/or scholarship in their home departments.

6. Program Integration and Collaboration

a. Closely related programs in this or other Oregon colleges and universities.

No public institutions in the state of Oregon currently offer a Neuroscience major. Portland State University offers a concentration in Neuropsychology/Neuroscience within the

Psychology major, and Oregon State University offers a Neuroscience option within the Biochemistry & Biophysics major.

- b. Ways in which the program complements other similar programs in other Oregon institutions and other related programs at this institution. Proposal should identify the potential for collaboration.**

We are in conversation with Oregon State University about any possibilities for collaboration. The universities believe that the programs are complementary with UO's program having a broad variety of courses from Biology, Human Physiology, and Psychology, and OSU's option offering a more molecular focus. We are exploring possible collaborations on individual courses.

- c. If applicable, proposal should state why this program may not be collaborating with existing similar programs.**

N/A

- d. Potential impacts on other programs.**

Since we would be the only public institution in Oregon offering a Neuroscience major, impact on other institutions' programs would be minimal.

Institution: University of Oregon

Program: Bachelor of Arts and Bachelor of Science in Neuroscience

Action: At the **January 2, 2020** meeting, the Statewide Provosts Council approved a new program for **University of Oregon, BA/BS in Neuroscience**, to move forward to the Oregon Higher Education Coordinating Commission for its review and approval. The **University of Oregon** Board of Trustees approved the program at its **December 9, 2019** meeting.

Eastern Oregon University

Sarah Witte, provost

Approved

Opposed

Abstained



Oregon State University

Ed Feser, provost

Approved

Opposed

Abstained



Portland State University

Susan Jeffords, provost

Approved

Opposed

Abstained




University of Oregon

Patrick Phillips, provost

Approved

Opposed

Abstained



Oregon Health & Science University

Elena Andresen, interim provost

Approved

Opposed

Abstained



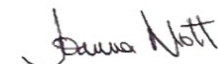
Oregon Tech

Joanna Mott, provost

Approved

Opposed

Abstained



Southern Oregon University

Susan Walsh, provost

Approved

Opposed

Abstained



Western Oregon University

Rob Winningham, provost

Approved

Opposed

Abstained

