From:	Smith, Randy
To:	Campbell, Charlie
Cc:	Andridge, Rebecca; Reed, Katie; Smith, Randy; Duffy, Lisa; Bricker, Adrienne; Vankeerbergen, Bernadette; Martin, Andrew; Olesik, Susan V.; Clinchot, Dan; Bradford, Carol; Horn, David
Subject:	Proposal to revise the Neuroscience BS
Date:	Wednesday, April 19, 2023 4:55:20 PM
Attachments:	image001.png

Charlie:

The proposal from the Neuroscience Undergraduate Program to revise the Neuroscience major leading to the Bachelor of Science degree was approved by the Council on Academic Affairs at its meeting on April 19, 2023. Thank you for attending the meeting to respond to questions/comments.

No additional level of internal approval is necessary. This action will be included in the Council's next Annual Activities Report to the University Senate (July 2023).

The Office of the University Registrar will work you with any implementation issues.

Please keep a copy of this message for your file on the proposal and I will do the same for the file in the Office of Academic Affairs.

If you have any questions please contact the Chair of the Council, Professor Rebecca Andridge (.1) or me.

Randy

THE OHIO STATE UNIVERSITY

W. Randy Smith, Ph.D.
Vice Provost for Academic Programs
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203 Bricker Hall, 190 North Oval Mall, Columbus, OH 43210
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smith.70@osu.edu

From:	Vankeerbergen, Bernadette
To:	Smith, Randy; Reed, Katie
Cc:	Martin, Andrew; Jenkins, Mary Ellen; Steinmetz, Brad
Subject:	Revision to the Neuroscience
Date:	Friday, March 24, 2023 2:11:02 PM
Attachments:	Neuroscience BS rev 3-7-2023.pdf image001.png ASCC SBS Panel_Change to Neuroscience Major Letter.pdf

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Dear Randy and Katie,

Please find attached a proposal to revise the Neuroscience BS. The changes were approved today (March 24, 2023) by the ASC Curriculum Committee (ASCC).

We are now advancing the proposal for review by CAA. The attached documents are (1) the actual proposal and (2) the Social and Behavioral Sciences Panel cover letter to ASCC .

Please note the GEN Embedded Literacies included in the proposal. These were not previously reported to CAA.

Please use this email as a cover letter indicating that the proposal has been duly reviewed and approved by the appropriate ASC curricular bodies (including the full ASC Curriculum Committee).

The contacts for this proposal are Professor Kathryn Lenz (Faculty Director--Neuroscience Program) and Dr. Charlie Campbell (Staff Director—Neuroscience Program).

Please let me know if you have any questions.

Best regards,
Bernadette

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Associate Professor Brad Steinmetz
Chair, Arts and Sciences Curriculum Committee

Dear Professor Steinmetz and Members of the Arts and Sciences Curriculum Committee,

On December 15, 2022, the ASCC's Social and Behavioral Sciences Panel reviewed and unanimously approved with contingencies a proposal for changes to the undergraduate neuroscience program. There are two proposed changes to the neuroscience program: 1) establishment of a 33-credit hour major that incorporated the new embedded literacies, and 2) implementation of a minimum grade requirement for the Neuroscience Honors Survey Course (Neurosc 1100H).

The current neuroscience program consists of 36-credit hours of coursework across five categories. The proposed change reduces the total number of credit hours for the major from 36 to 33 across six categories including: (1) the survey course, (2) four core courses, (3) one data analysis course, (4) four specialization courses, (5) one breadth course, and (6) one advanced writing course. The reduction in credit hours was accomplished by reducing the course requirements for the specialization and breadth categories. In addition, the 33-credit hour major was designed to incorporate the new GE requirements (e.g., the advanced writing course). The proposed change to the major will bring the total number of credits in-line with other STEM majors (e.g., biology, microbiology, molecular genetics) which are credit 30-credit hour programs. Students on the current 36-hour curriculum may petition to transition to the 33-credit hour curriculum, which will be managed by their Neuroscience Academic Advisor.

The second proposed change to the major is the implementation of a minimum grade requirement of a B or better for the survey course. The rationale for this change was, in part, to set the expectation that strong performance in the class is necessary for success in the major. Students are able to build connections with their academic advisors in this course, and are able to retake the course if necessary.

All contingencies have been met. Therefore, we advance the proposal for the change to the undergraduate neuroscience program to the Arts and Sciences Curriculum Committee with a motion to approve.

Sincerely,

Christina M. Roup, Ph.D.
Associate Professor

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ASC Curriculum Committee and Council on Academic Affairs

The Ohio State University

Columbus, OH 43210

Dear Members of the Curriculum Committee and Council,

For nearly a decade the Neuroscience Undergraduate Program, which is co-administrated by the College of Arts and Sciences and the College of Medicine, has continued to experience incredible academic growth, which has led to an increase in our visibility and reputation in the campus and national neuroscience communities. As of September 2022, the Neuroscience Undergraduate Program is home to 642 Majors, 481 Pre-Majors, and 107 Minors. With the university's implementation of a new General Education program, the Neuroscience undergraduate academic unit has an opportunity to enhance its curricular offerings to continue our focus on student success, as well as to adjust our program to remain a leader in our field.

In order to continue pursuing our goal of excellence to eminence, we are proposing a series of enhancements to the neuroscience program, as detailed herein.

The areas of proposed enhancement and clarification to our program are:

I. Establishing a 33-semester credit hour major that incorporates the new GE Embedded Literacies and aligns the Neuroscience major with comparable STEM majors.

II. Implementation of a minimum grade requirement for the Neurosc 1100 (H) survey course.

This document, framed in a question/answer format, will serve to explain our proposed modifications, justify our motivations, and address any questions that we anticipate the Committee and Council may have.

I. Establishing a 33-semester credit hour major that incorporates the new GE Embedded Literacies and brings the major in line with comparable STEM majors.

What is the composition of the current major curriculum (36-semester credit hours)?

The current major consists of 36 credit hours of coursework, which are distributed across 5 categories:

1) Survey,

2) Core Requirements (4 courses),

3) Data Analysis Requirement (1 course),

4) Specialization Requirements (5 courses), and

5) Breadth Requirements (2 courses).

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Overall, students take approximately 12 classes (totaling 36 semester credit hours not including pre-requisites) to complete the neuroscience major.

Who is following the 36-semester hour curriculum?

The current major was established for all students that have entered the university prior to SP23. Any student that entered the university SP23 and beyond who has successfully petitioned the College of the Arts and Sciences to follow the Legacy GEs would also follow the 36-semester hour major.

Once the new 33-semester hour curriculum we are proposing is approved, we predict that some students may prefer to transition from the 36-semester hour curriculum to the new 33-semseter hour curriculum. We will accommodate this process via the following procedure. A student must first complete a Curriculum-Path Consultation (CPC) with their Neuroscience Academic Advisor. A CPC is comprised of a detailed comparison of the student's requirements for both the 36 and 33-semester hour majors as well as their GE (New or Legacy) requirements. The CPC includes all courses that the student needs to graduate, as well as any foreseeable courses needed for pre-professional or career preparation. After the CPC, the student can take as much time as needed for their deliberation, however, the Neuroscience Advising Office enforces a minimum of one day to contemplate their choice before the student can officially declare a change from the 36-semester hour to the 33-semester hour version. This waiting period is an attempt to help a student find time to examine their curricular choice and make a wise decision after weighing the pros and cons of each option.

What are some situations that an advisor could encounter during a Curriculum-Path Consultation?
Neuroscience Academic Advisors do more than just help students select courses to meet their degree requirements. Neuroscience Academic advisors may also aid students transition to college life, aid in career exploration, plan for academic requirements, be a resource for understanding university/college policies, help find research and volunteer opportunities, and help students find ways to be a more marketable candidates for future career opportunities. During the CPC a few common situations tend to arise related to these areas of academic advising. Three common situations and considerations that factor into student decision-making are explored below.

4-year Timeline Viability
Many students express their wish or need, based on financial or other real-world pressures, to complete their undergraduate degree within a 4-year timeline. During the CPC, a student will be able to see how all their classes are utilized to meet their degree and related requirements between the two curriculum plans. This information allows the student to make a more informed decision on which plan to pursue based on timing considerations.

Educational Goal Attainment
Some students may want to purse minors, double-majors, Study Abroad experiences, or complete other educational goals while also pursuing their Bachelor of Science degree. During the CPC, the advisor aids the student with incorporating these goals into their expressed timeline. For some students this may fit perfectly into a 4-year timeframe, while other students may be able to shorten or lengthen their stay at university to achieve these goals.

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Science GPA Concerns
Many neuroscience students have medical and health related career goals, and these programs tend to closely examine a student's science/major GPA. Some students will want to take additional science or major coursework (e.g., Neuroscience, Biology, and Chemistry) to enhance their competitiveness for such programs. In these situations, it may be advantageous for a student to pursue the 36-semester hour major to emphasize this type of coursework.

What is the composition of the newly proposed major curriculum (33- semester credit hours)?
The proposed 33-semester credit hour major is distributed across 6 categories:

1) Survey,

2) Core Requirements (4 courses),

3) Data Analysis Requirement (1 course),

4) Specialization Requirements(4 courses),

5) Breadth Requirement (1 course), and

6) Advanced Writing Requirement (1 course).

Overall, students take approximately 11 classes (totaling 33-semester credit hours not including pre-requisites) to complete the neuroscience major.

Who will be following the 33-Semester Hour curriculum?

The 33-credit hour major was constructed to incorporate the New GE requirements, including the new Embedded Literacy requirements of Technology, Statistical Analysis and Advanced Writing. Students with admit terms of SP23 and beyond will follow these major requirements.

How does the 33-semester credit hour major align with other STEM majors?

Several comparable STEM majors at Ohio State that host a large population of pre-professional students (e.g., Biology, Microbiology, and Molecular Genetics) are 30-semester credit hour programs. In contrast the Neuroscience Major was constructed as a 36-semester credit hour program and would have increased to 39-semester hours upon the addition of the Advanced Writing literacy requirement to the curriculum. 39-semester hours coupled with pre-professional course requirements can cause scheduling and timely graduation challenges for our student body.

To address these challenges, the faculty, including Department Chairs and Vice-Chairs for Instruction in both Psychology and Neuroscience Departments, on our Steering Committee have unanimously approved a reduction of one course in the Specialization and the Breadth Requirements. This reduction would maintain ample student exposure to upper-level coursework in several sub-domains of neuroscience, while continuing to allow their degrees to be achievable in a 4-year timeframe. To ensure an adequate level of proficiency is maintained specifically in the domain of Neuroscience, we propose to truncate the

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number of discipline-complementary courses, rather than discipline-central courses, that students can use toward the major requirements. In our currently approved major, students may take two of the following three courses to count toward their major: Biochem 4511, MolGen 4500 and MicroBio 4000, as these courses are relevant to the understanding of the cells and functioning of the nervous system, though they are not specifically neuroscience courses. We propose to revise our curriculum to allow one of these three courses to be used toward the revised major requirements. Together, these changes will allow our students to gain ample exposure to the disciple of Neuroscience, aid them in reaching their degrees in a 4-year timeframe, as well as remaining competitive with our internal and external STEM benchmark programs.

How does the Program conduct a course utilization/inclusion analysis?

When a course is being vetted for inclusion into the program's curriculum the course in question must meet three specific criteria: 1) The course must adequately cover a domain of neuroscience that is not currently being covered, or can enhance a student's understanding of the discipline by its inclusion, 2) The course fits into one or more of the program's constructed 3 specializations: Molecular/Cellular, Systems/Behavioral, or Cognitive/Computational; and 3) The course has been examined by the program's Steering Committee and has received a majority vote of the members.

Recently the courses of Neurosc 4425 (Neurotrauma), MicroBio 4000 (Basic and Practical Microbiology), and MolGen 5650 (Analysis and Interpretation of Biological Data) were examined by this process. Neurosc 4425 was created by the Department of Neuroscience and covers a domain of neuroscience that was not currently being taught by our faculty. The addition of the course into the major's curriculum would allow our students the opportunity to learn about a salient area of the science. Moreover, since the content of the course had large elements of both the Molecular/Cellular and Systems/Behavioral Specializations, it was deemed appropriate for its inclusion in those tracks, and therefore a breadth option for the Cognitive/Computational Specialization.

MicroBio 4000 was also examined for utilization in the major. The major was created with courses that could enhance a student's understanding of the Neuroscience discipline but are not directly neuroscience courses per se. During the creation of the major's curriculum the courses of BioChem 4511 (Introduction to Biological Chemistry) and MolGen 4500 (General Genetics) were incorporate in the major for that purpose. However, Biochem 4511 and MolGen 4500 do not have associated laboratory experiences. In fact, none of the courses found in the Neuroscience Major have laboratory components. In addition to MicroBio 4000's weekly laboratory requirements, students would also gain knowledge and experiences with prokaryotic/eukaryotic metabolism, cell physiology, staining techniques, micro-biome impact on the body, and other transferable skills and knowledge. Given these aspects of the MicroBio 4000 course, it was deemed to enhance a student's understanding of the neuroscience discipline by its inclusion similar to Biochem 4511 and MolGen 4500. This course was also deemed appropriate as a Specialization Requirement for the Molecular/Cellular and Systems/Behavioral curricula, and therefore a breadth option for Cognitive/Computational Specialization.

MolGen 5650, which represents 1 of 4 options for completing the Data Analysis Requirement, was examined for removal from the Neuroscience Major. This course has an extremely low utilization by the students in the program, and its removal would help with streamlining the curriculum. We have found the overwhelming majority of students in the program use Psych 2220, Stats 2450, or Stats 2480 to satisfy the program's Data Analysis Requirement. By a majority vote of the committee the course was removed from the program for the above reasons.

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How does the 33-semester credit hour major incorporate the new Embedded Literacies? The 33-semester credit hour major incorporates the new Technology, Statistical Analysis, and Advanced Writing requirements. The Technology Literacy requirement is covered by a curricular enhancement of both Psych 3313/3313H (Introduction to Behavioral Neuroscience) and Neurosc 3000 (Introduction to Cellular and Molecular Neuroscience)—courses which are found in the Core Requirement section of all three specializations. The Statistical Analysis Literacy requirement has been met by continuing the already-established Statistical Analysis Literacy from the Legacy GE, which remains as one course requirement for all three specializations. A new section has been added to the major to cover the new Advanced Writing Literacy GE requirement, labeled "Advanced Writing Requirement". The Neuroscience Undergraduate Program has worked with the Department of English to develop appropriate courses, which allows our students to take either English 3304 or English 3305 to meet this requirement. Our two units are currently working to develop other courses to give our students additional options in meeting this Literacy requirement in the future.

36-Semester Hour and 33-Semester Hours Side-By-Side Comparison:

Major Requirements	36-Hour Major	33-Hour Major	Change in Requirements
Survey	1 Course	1 Course	0
Core Requirement	4 Courses	4 Courses	0
Statical Requirement	1 Course	1 Course	0
Specialization Requirement	5 Courses	4 Courses	-1
Breadth Requirement	2 Courses	1 Course	-1
Advance Writing Requirement	N/A	1 Course	1
			33-Hour Major has 1 less required course

Overall, students will take one added course from the newly incorporated Advanced Writing Requirement, one less Specialization Requirement course, and one less Breadth Requirement course. This would be a net difference of 1 fewer course (36 credit hours to 33 credit hours). These changes have been approved by a unanimous positive vote of the Neuroscience Steering Committee that is comprised of faculty and leadership (department chairs and associate chairs for teaching) from the College of Arts and Sciences and the College of Medicine.

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Will the program make changes to its Program Assessment Plan to measure the new GE learning literacies?

In 2012, the Neuroscience Major was created with the standard that a student must earn at least a C in a course for it to be counted toward the major requirements. Additionally, a 2.0 cumulative grade-point average (GPA) is required for the major coursework to count toward a degree. A few years later, the Pre-Major requirements were introduced to help scaffold student success in the advanced courses that comprise the major. However, these program aspects were not included in the program's assessment plan. Currently, the Neuroscience Undergraduate Program is developing and enhancing its Program Assessment Plan to incorporate the above items, the measurement of the new GE embedded literacy, as well as other new assessment objectives. The previous assessment plan included the following learning goals: 1) Students will acquire a strong foundational background in core disciplines of neuroscience, 2) Students will acquire statistical skills, 3) Students will acquire advanced knowledge of molecular/cellular neuroscience, systems/behavioral neuroscience, or cognitive/computational neuroscience, and 4) Students will engage in critical reading of the primary scientific literature in advanced courses.

It is our goal that a new assessment plan will provide a more comprehensive examination of the program's learning goals and aspirational objectives. The development of the new assessment plan is in the preliminary/construction stage. We will be presenting a framework for the new assessment plan to the Neuroscience Steering Committee during the SP23 and SU23 semesters. Below delineates the primary area of analysis in the new assessment plan, as well as some examples of topics that will be examined:

1) Benchmark Schools Analysis (e.g., governance structure and oversight; curriculum domain coverage);
2) Pre-Major Sequence Analysis (e.g., minimum grade of B effects);
3) Core/Foundational Knowledge Learning Goals (e.g., student perceptions of learning and advanced-level coursework readiness);
4) Embedded GE Literacies (e.g., application, impact, and implications);
5) Curricular Structure and Function (e.g., C vs C- effects and course utilization);
6) Diversity, Equity, and Inclusion Assessments (e.g., discovery/planning, climate/implementation, and impact/review)
7) Neuroscience Research Experience for Minoritized Scholars (e.g., mentorship and professional networking);
8) Advising Office (e.g., knowledge, trustworthiness, and culture shaping);
9) Professional Outcomes (e.g., placement rates and graduation trajectories).

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II. Implementation of a minimum grade requirement for the Neurosc 1100 (H) survey course

What is the current protocol?

The neuroscience program already has an established Pre-Major protocol for students to matriculate into the Neuroscience major. This matriculation criteria are:

1) Earn a grade of "B" or better in Psych 3313 (Introduction to Behavioral Neuroscience) and Neuro 3000 (Cellular and Molecular Neuroscience;
2) Take Neurosc 1100 (H);
3) Earn a "B" or better cumulative/overall GPA, and 4) complete the pre-major requirements within 3 semesters or by a customized timeline set in conjunction with their Neuroscience Advisor.

Additionally, the Neuroscience Advising office has developed resources to help provide our students in the pre-major a scaffold to reach these requirements. Such resources include:

1) Peer-Lead Tutoring Program for the Neurosc 1100, Psych 3313, and Neurosc 3000 courses.
2) Enhanced advising office hours known as Drop-In Hours. These Drop-In Hours are advising interactions that do not need an appointment to discuss academic topics with an advisor. On average, the program offers 10 hours of Drop-Ins per week. This is in addition to offering scheduled one-on-one appointments.
3) Students receive an update each semester on their progress toward all the pre-major requirements.
4) A student may retake any course (including using grade forgiveness) to meet these requirements.
5) The office can help direct students to many resources that the college and university has to offer in helping students be successful in their educational and vocational endeavors.

What is the proposed change to the protocol?

It has been demonstrated that the Neuroscience Survey (Neurosc 1100 (H)) has aided students prepare vocationally, has enhanced their academic preparedness, and has helped establish a level of confidence while proceeding through their degree requirements. Given the success of the course, we endeavor to add the minimum grade of B or higher to the course's requirements in the pre-major. This would allow the course to be equivalent in valance with the other requirements, as well as to help bolster their understanding of the material presented in the class. Setting the expectation that strong performance in this class was necessary to their success in the major would lead to stronger outcomes for all students in academic and professional outcomes in future semesters. Moreover, in order to build a stronger connection with students, the academic advisors of the program are the instructors for the Neurosc 1100 (H) course. The vast majority (over 93% last academic year) of the students that take the course earn a grade at or above the minimum grade of B that is being proposed. Moreover, congruent with the other pre-major requirements, a student may retake any course to earn the grade requirement for matriculation into the full major. Students that do not meet the minimum grade but wish to matriculate into the full major will be counseled to retake the course as outlined above with other pre-major required courses.

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We hope that this document has clearly explained our proposed changes. Please feel free to contact us with any questions that may remain after reading our document.

Sincerely,

Kathryn M. Lenz, PhD (she/her) Associate Professor

Department of Psychology & Neuroscience Director

Neuroscience Undergraduate Program, Co-Director Neuroscience Graduate Program
Psychology Building, Room 45, 1835 Neil Ave, Columbus OH 43210, USA Lenz.56@osu.edu

Dr. Charlie Campbell

Director – Curriculum & Student Services

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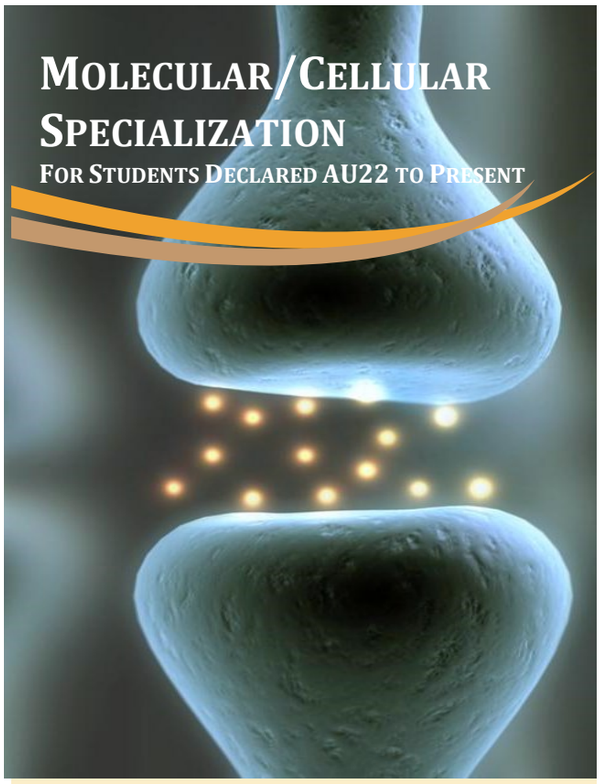
NEW



Molecular/Cellular Specialization

For Students Declared AU22 to Present

What is Molecular/Cellular Neuroscience?

Molecular/Cellular Neuroscience is a subfield of neuroscience that examines the mechanisms related to the basic biological processes of neurons and support cells of the nervous system. Molecular/Cellular neuroscientists tend to study how neurons communicate, how parts of neurons (e.g. axons and dendrites) function, and explore the anatomy/physiology of neurons.

Technology Embedded Literacy
(Use of Both Psych 3313(H) and Neurosc 3000)

Data Analysis Embedded Literacy
(Student Chooses 1 of 3 Courses)

Advanced Writing Embedded Literacy
(Choose 1 of the 2 Courses)

DECLARATION REQUIREMENTS

In order to declare the Neuroscience Major or Minor, students must meet with a Neuroscience Advisor to discuss the requirements. To sign-up for a meeting please contact us at the following link:

https://NeuroscienceMajor.osu.edu/advising/declare

Contact Us

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http://NeuroscienceMajor.osu.edu

The requirements for the 33-semester hour (11 classes) Neuroscience Major are distributed across 6 Requirements: Professional Survey, Core, Data Analysis, Specialization, Breadth, and Writing.

All students must complete Neuro 1100(H), Psych 3313 and Neuro 3000 with grades of 'B' or higher and earn a minimum 3.0 cumulative GPA to matriculate into the major.

I. Professional and Curriculum Readiness

Take the course below

- **Neuro 1100(H) Neuroscience Survey**
  1hr | Au, Sp | (Pre-reqs: Full or Pre-Majors Only)

II. Core Requirements

Take all 4 of the courses below

All Full and Pre-major students must complete Neuro 1100(H), Psych 3313(H) and Neuro 3000 with grades of 'B' or higher in these classes, and earn a minimum 3.0 cumulative GPA

- **Psych 3313(H) Introduction to Behavioral Neuroscience**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100)
- **Neuro 3000 Introduction to Molecular/Cellular Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113)
- **Psych 3513 Introduction to Cognitive Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **Neuro 3050 Structure & Function of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113 & Neuro 3000)

III. Data Analysis Requirement

Take 1 of the 3 courses below

- **Psych 2220 Introduction to Data Analysis in Psychology**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100 & Math 1148)
- **Stats 2480 Statistics for Life Sciences**
  3hrs | Sp | (Pre-reqs: Math 1151)
- **Stats 2450 Introduction to Statistical Analysis**
  3hrs | Au, Sp | (Pre-reqs: Math 1151)

IV. Specialization Requirements

Choose at least 4 specialization courses from the options below

- **Neuro 4550 Autism Spectrum Disorder & Neurodev Disorders**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4425 Neurotrauma: TBI, Stroke, & Spinal Cord Injury**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Neuro 3010 Neurophysiology**
  3hrs | Au | (Pre-reqs: Neuro 3000 & Neuro 3050)
- **Neuro 3305 Neuropharmacology**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Neuro 4050H Neurogenetics**
  3h rs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4100 Basic & Clinical Foundations of Neuro Disease**
  3 hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4640 Neuronal Signal Transduction**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Neuro 5790H Developmental Neuroscience**
  3hrs | Sp | (Pre-reqs: Neuro 3000 & 3050 & Jr. or Sr.)
- **Psych 4644 Hormones & Behavior**
  3hrs | Au, Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
  Not Open to Students with Credit For Neuro 5644
- **Psych 5603 Stem Cells and the Brain**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 4305 Introduction to Psychopharmacology**
  3hrs | Sp | (Pre-reqs: Permission of Instructor)
  Not Open to Students With Credit For PHR 4440 or Biophrm 5824
- **Biophrm 5824 Pharmacology of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Permission of Instructor)
  Not Open to Students with Credit For PHR 4440 or Psych 4305
- **Chem 5230 Neurotransmitter Chemistry**
  3hrs | Sp | (Pre-reqs: Chem 2540, & 2520)
- **Neuro 4623 Biological Clocks & Rhythms**
  3hrs | Sp | Spring '16 '18 (Pre-reqs: Neuro 3000)
- **Biochem 4511 / MolGen 4500 / MicroBio 4000**
  3-4hrs | Au, Sp Su | (Refer to Course Catalog for Pre-reqs)
  Students can only use ONE of these courses toward the major

NEW

V. Breadth Requirement

Choose at least 1 course from the list below

- **Neuro 3025** **History of Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4850** **Contemporary Topics in Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 4501** **Advanced Behavioral Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: 3313 & Neuro 3000)
- **Psych 5089** **Cognitive Aging, Neurodegen, & Neuroplasticity**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5613(H)** **Biological Psychiatry**
  3hrs | Sp | (Pre-reqs: Honors, Psych 3313 & Neuro 3000)
- **Psych 5602** **Behavioral Genetics**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5604** **Sex Differences in the Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5622** **The Development of Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **EEOB 4550** **Neurobiology of Behavior**
  3hrs | Au | (Pre-reqs: 2 courses in Bio)
- **Psych/CSE/Ling/Philos 5612 Introduction to Cognitive Science**
  3hrs | Au | (Pre-reqs: 12hr in Psych/CSE/Ling/Philos)
- **Psych 5614** **Cognitive Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 or 3000)
- **Psych 5618** **Intro to Computational Cognitive Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5628** **Developmental Cognitive Neuroscience**
  3hrs | Au | (Pre-reqs: Psych 3313 or 3000)
- **SHS 5760** **Neurology of Speech and Hearing Mechanisms**
  3hrs | Au, Sp | (Pre-reqs: Psych 3313 & 3000)
- **Ling 3701** **Language and the Mind**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **Psych 3321** **Quantitative and Statistical Methods in Psych**
  3hrs | Au, Sp | (Pre-reqs: B or higher in 2220)
- **Math 4350** **Quantitative Neuroscience**
  3hrs | Sp | (Pre-reqs: Math 1152)
- **Psych 5608** **Intro to Mathematical Psychology**
  3hrs | Au | (Pre-reqs: Psych 3321, 3313 & Neuro 3000)
- **Psych 5898** **Seminar in Behavioral Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313, Neuro 300, Sr Standing)
- **CSE 5052** **Survey of Artificial Intelligence for Non-Majors**
  3hrs | Au | (Pre-reqs: Programming & Neuro 3000)
- **CSE 5526** **Introduction to Neural Networks**
  3hrs | Au | (Pre-reqs: CSE 3521)
- **Econ 5870** **Neuroeconomics and Decision Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & 3000)
- **ECE 5070** **Neuroengineering and Neuroprosthetics**
  3hrs | Au | (Pre-reqs: Permission of Instructor)
  Not Open to Students With Credit For Neuro 5070
- **Neuro 4998/3193 Undergraduate Research & Individual Studies**
  Pre-approval required.
  3 credit hours (no more and no less than 3 credit hours) of any combination of Undergraduate Research (4998), Internship (3191) and Individual Studies (3193) can be applied as a course toward Breadth Requirement.

VI. Neuroscience Writing Requirement

Choose at least 1 course from the list below

- **English 3304** **Business & Professional Writing**
  3hrs | Au, Sp, | (English 1110.XX)
- **English 3305** **Technical Writing: Science and Engineering Majors**
  3hrs | Au, Sp | (English 1110.XX)

Important information about the Neuroscience Major

1. **All Students must meet the following requirements to declare the neuroscience major:**
   - First, meet with an advisor to officially be declared as a pre-neuroscience major
   - Complete 24 total semester credit hours
   - At least 12 of those semester credit hours must be from graded OSU coursework
   - An overall GPA greater than or equal to 3.0
   - Earn at least a " **B** " in Psych 3313, Neuro 3000, and Neurosc 1100(H)
2. Thirty-three (33) semester credits in approved Neuroscience coursework.
3. **Honors students** must take at least one honors or graduate level course. Approved courses can be found here: http://neurosciencemajor.osu.edu/honors
4. **Honors students** must complete the Pre-Major Requirements
5. **For courses to apply toward the major, you must earn at least a " C ".**
6. At least half of the major's curriculum must be completed at Ohio State.
7. Majors will follow the Bachelor of Science curriculum for Autumn 2022 to Present GENs and other degree requirements.
8. Students are encouraged to focus on completion of core requirements before beginning their specialization coursework.
9. To earn your degree you will need an overall GPA of at least a 2.0.
10. Research experience is also strongly encouraged for students considering graduate and professional training. You may enroll in a variety of 4998 opportunities. http://neurosciencemajor.osu.edu/4998
11. Up to 3 credit hours of experiential coursework can be applied to the breadth requirements of the major. This experiential coursework can be from any combination of the following classes: Undergraduate Research (4998), Internships (3191), and Individual Studies(3193). 3 Credits of these courses can be combined to count as one course toward the Breadth Requirements. Pre-approval from your neuroscience major advisor is required.
12. Students planning to graduate "With Honors in Arts and Sciences" should visit our website for information on Honors Contract requirements for neuroscience majors. http://neurosciencemajor.osu.edu/honors
13. Courses taken on a Pass/Non-Pass (PA/NP) basis cannot be used on the major.

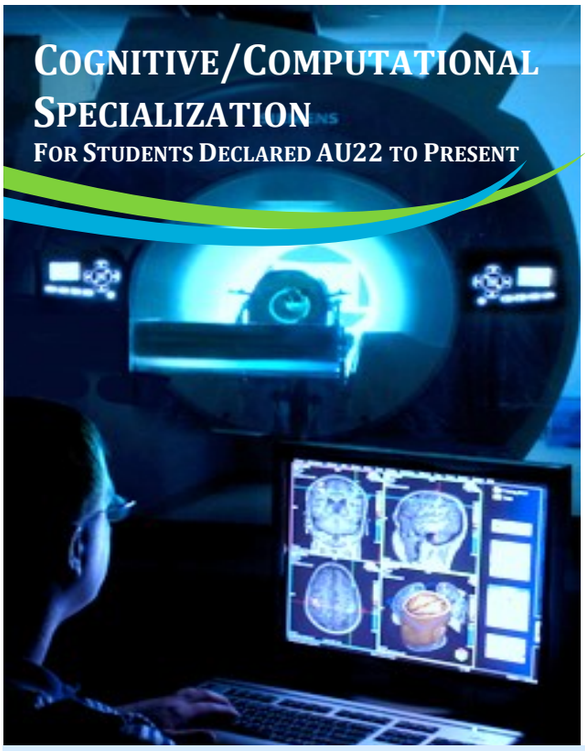
Honors Requirements

All Honors students must take at least **ONE** Neuro Advisor Approved graduate-level course to fulfill their Honors requirement. Honors students must speak with their advisor to select a course. The chosen course to fulfill the requirement can count as **EITHER** one Breadth course or one Specialization course. The approved graduate-level courses can be found at this link: https://NeuroscienceMajor.osu.edu/honors

NEW

COGNITIVE/COMPUTATIONAL SPECIALIZATION

FOR STUDENTS DECLARED AU22 TO PRESENT



The requirements for the 33-semester hour (11 classes) Neuroscience Major are distributed across 6 Requirements: Professional Survey, Core, Data Analysis, Specialization, Breadth, and Writing.

All students must complete Neuro 1100(H), Psych 3313 and Neuro 3000 with grades of 'B' or higher and earn a minimum 3.0 cumulative GPA to matriculate into the major.

I. PROFESSIONAL AND CURRICULUM READINESS

Neuro 1100(H) Neuroscience Survey
1hr | Au, Sp | (Pre-reqs: Full or Pre-Majors Only)

II. CORE REQUIREMENTS

Take all 4 of the courses below

All Full and Pre-major students must complete Neuro 1100(H), Psych 3313(H) and Neuro 3000 with grades of 'B' or higher in these classes, and earn a minimum 3.0 cumulative GPA

- **Psych 3313(H) Introduction to Behavioral Neuroscience**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100)
- **Neuro 3000 Introduction to Molecular/Cellular Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113 and Pre-Major)
- **Psych 3513 Introduction to Cognitive Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **Neuro 3050 Structure & Function of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113 & Neuro 3000)

III. DATA ANALYSIS REQUIREMENT

Take 1 of the 3 Courses

- **Psych 2220 Introduction to Data Analysis in Psychology**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100 & Math 1148)
- **Stats 2480 Statistics for Life Sciences**
  3hrs | Sp | (Pre-reqs: Math 1151)
- **Stats 2450 Introduction to Statistical Analysis**
  3hrs | Au, Sp | (Pre-reqs: Math 1151)

IV. SPECIALIZATION REQUIREMENTS

Choose at least 4 specialization courses from the options below

- **Psych 3321 Quantitative/Statistical Methods in Psychology**
  3hrs | Au, Sp | (Pre-reqs: B or higher in 2220)
- **Psych 5608 Intro to Mathematical Psychology**
  3hrs | Au | (Pre-reqs: Psych 3321, 3313 & Neuro 3000)
- **Psych/CSE/Ling/Philos 5612 Introduction to Cognitive Science**
  3hrs | Au | (Pre-reqs: 12hr in Psych/CSE/Ling/Philos)
- **Psych 5614 Cognitive Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 or Neuro 3000)
- **Psych 5618 Intro to Computational Cognitive Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5628 Developmental Cognitive Neuroscience**
  3hrs | Au | (Pre-reqs: Psych 3313 or Neuro 3000)
- **Math 4350 Quantitative Neuroscience**
  3hrs | Sp | (Pre-reqs: Math 1152)
- **Psych 5089 Cognitive Aging, Neurodegen, & Neuroplasticity**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Ling 3701 Language and the Mind**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **CSE 5052 Survey of Artificial Intelligence for Non-Majors**
  3hrs | Au | (Pre-reqs: CSE Programming & Neuro 3000)
- **CSE 5526 Introduction to Neural Networks**
  3hrs | Au | (Pre-reqs: CSE 3521)
- **SHS 5760 Neurology of Speech and Hearing Mechanisms**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Econ 5870 Neuroeconomics and Decision Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **ECE 5070 Neuroengineering and Neuroprosthetics**
  3hrs | Au | (Pre-reqs: Permission of Instructor
  Not Open to Students With Credit For Neuro 5070

What is Cognitive/Computational Neuroscience?

Cognitive/Computational neuroscience is a subfield of neuroscience that studies the neural mechanisms that underlie mental processes. Cognitive/Computational neuroscientists tend to study how specific areas of the brain are related to thought and sensory processing, create mathematical models to understand cognitive processes, and may conduct research in areas of artificial intelligence.

Data Analysis Embedded Literacy
(Student Chooses 1 of 3 Courses)

Advanced Writing Embedded Literacy
(Choose 1 of the 2 Courses)

DECLARATION REQUIREMENTS

In order to declare the Neuroscience Major or Minor, students must meet with a Neuroscience Advisor to discuss the requirements. To sign-up for a meeting please contact us at the following link:
https://neurosciencemajor.osu.edu/advising/declare

CONTACT US

Neuroscience Undergraduate Program
College of Medicine & College of Arts and Sciences
10 Townshend Hall
1885 Neil Avenue Mall
Columbus, OH 43210
Phone: (614) 292-8512
http://NeuroscienceMajor.osu.edu

NEW

V. Breadth Requirement

Choose 1 Course from the list below

- **Neuro 3025** **History of Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4850** **Contemporary Topics in Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4425** **Neurotrauma: TBI, Stroke, & Spinal Cord Injury**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Neuro 3305** **Neuropharmacology**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Psych 4501** **Advanced Behavioral Neuroscience**
  3hrs | Sp | (Pre-reqs: 3313 & Neuro 3000)
- **Psych 5602** **Behavioral Genetics**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5604** **Sex Differences in the Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5622** **The Development of Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5898** **Seminar in Behavioral Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 4501)
- **Psych 5613(H)** **Biological Psychiatry**
  3hrs | Sp | (Pre-reqs: Honors, Psych 3313 & Neuro 3000)
- **EEOB 4550** **Neurobiology of Behavior**
  3hrs | Au | (Pre-reqs: 2 courses in Bio)
- **Neuro 3010** **Neurophysiology**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4050H** **Neurogenetics**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4640** **Neuronal Signal Transduction**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Neuro 5790H** **Developmental Neuroscience**
  3hrs | Sp | (Pre-reqs: Neuro 3000 & 3050 & Jr. or Sr. standing)
- **Psych 4305** **Introduction to Psychopharmacology**
  3hrs | Sp | (Pre-reqs: Permission of Instructor)
  Not Open to Students With Credit For PHR 4440 or Biophrm 5824
- **Biophrm 5824** **Pharmacology of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Permission of Instructor)
  Not Open to Students with Credit For PHR 4440 or Psych 4305
- **Chem 5230** **Neurotransmitter Chemistry**
  3hrs | Sp | (Pre-reqs: Chem 2540 & 2520)
- **Neuro 4623** **Biological Clocks & Rhythms**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Psych 4644** **Hormones & Behavior**
  3hrs | Au Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
  Not Open to Students with Credit For Neuro 5644
- **Psych 5603** **Stem Cells and the Brain**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4100** **Basic & Clinical Foundations of Neurological Disease**
  3 hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4550** **Autism Spectrum Disorder & Neurodev Disorders**
  3 hrs | Au | (Pre-reqs: Neuro 3000)
- **Biochem 4511 / MolGen 4500 / MicroBio 4000**
  3-4hrs | Au, Sp Su | (Refer to Course Catalog for Pre-reqs)
- **Neuro 4998/3193 Undergraduate Research & Individual Studies**
  Pre-approval required.
  3 credit hours (no more and no less than 3 credit hours) of any combination of Undergraduate Research (4998), Internship (3191) and Individual Studies (3193) can be applied as a course toward Breadth Requirement.

VI. Neuroscience Writing Requirement

Choose at least 1 course from the list below

- **English 3304** **Business & Professional Writing**
  3hrs | Au, Sp, | (English 1110.XX)
- **English 3305** **Technical Writing: Science and Engineering Majors**
  3hrs | Au, Sp | (English 1110.XX)

Important information about the Neuroscience Major

1. **Students must meet the following requirements to declare the neuroscience major:**
   - First, meet with an advisor to officially be declared as a pre-neuroscience major
   - Complete 24 total semester credit hours
   - At least 12 of those semester credit hours must be from graded OSU coursework
   - An overall GPA greater than or equal to 3.0
   - Earn at least a " **B** " in Psych 3313, Neuro 3000, and Neurosc 1100(H)
2. Thirty-three (33) semester credits in approved Neuroscience coursework.
3. **Honors students** must take at least one honors or graduate level course. Approved courses can be found here: http://neurosciencemajor.osu.edu/honors
4. **Honors students** must complete the Pre-Major Requirements.
5. **For courses to apply toward the major, you must earn at least a " C ".**
6. At least half of the major's curriculum must be completed at Ohio State.
7. Majors will follow the Bachelor of Science curriculum for Autumn 2022 to Present GENs and other degree requirements.
8. Students are encouraged to focus on completion of core requirements before beginning their specialization coursework.
9. To earn your degree, you will need an overall GPA of at least a 2.0.
10. Research experience is also strongly encouraged for students considering graduate and professional training. You may enroll in a variety of 4998 opportunities. http://neurosciencemajor.osu.edu/4998
11. Up to 3 credit hours of experiential coursework can be applied to the breadth requirements of the major. This experiential coursework can be from any combination of the following classes: Undergraduate Research (4998), Internships (3191), and Individual Studies(3193). 3 Credits of these courses can be combined to count as one course toward the Breadth Requirements. Pre-approval from your neuroscience major advisor is required.
12. Students planning to graduate "With Honors in Arts and Sciences" should visit our website for information on Honors Contract requirements for neuroscience majors. http://neurosciencemajor.osu.edu/honors
13. Courses taken on a Pass/Non-Pass (PA/NP) basis cannot be used on the major.

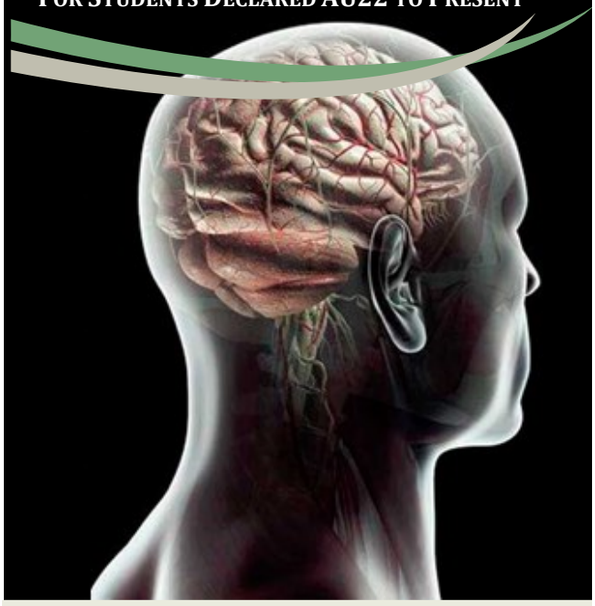
Honors Requirements

All Honors students must take at least **ONE** Neuro Advisor Approved graduate-level course to fulfill their Honors requirement. Honors students must speak with their advisor to select a course. The chosen course to fulfill the requirement can count as **EITHER** one Breadth course or one Specialization course. The approved graduate-level courses can be found at this link: https://NeuroscienceMajor.osu.edu/honors

NEW

Systems/Behavioral Specialization

For Students Declared AU22 to Present



What is Systems/Behavioral Neuroscience?

Systems/Behavioral Neuroscience studies how neurons work together in networks to understand the mechanisms that underlie behavior. Systems/Behavioral neuroscientists tend to study how the nervous system is related to psychiatric and neurological disorders, how groups of neurons form systems that are related to specified functions (e.g., motor control, learning & memory), and what happens when such systems dysfunction.

Technology Embedded Literacy
(Use of Both Psych 3313(H) and Neurosc 3000)

Data Analysis Embedded Literacy
(Student Chooses 1 of 3 Courses)

Advanced Writing Embedded Literacy
(Choose 1 of the 2 Courses)

DECLARATION REQUIREMENTS

In order to declare the Neuroscience Major or Minor, students must meet with a Neuroscience Advisor to discuss the requirements. To sign-up for a meeting please contact us at the following link: https://neurosciencemajor.osu.edu/advising/declare

CONTACT US

Neuroscience Undergraduate Program
College of Medicine & College of Arts and Sciences
10 Townshend Hall
1885 Neil Avenue Mall
Columbus, OH 43210
Phone: (614) 292-8512
http://NeuroscienceMajor.osu.edu

The requirements for the 33-semester hour (11 classes) Neuroscience Major are distributed across 6 Requirements: Professional Survey, Core, Data Analysis, Specialization, Breadth, and Writing.

All students must complete Neuro 1100(H), Psych 3313 and Neuro 3000 with grades of 'B' or higher and earn a minimum 3.0 cumulative GPA to matriculate into the major.

I. Professional and Curriculum Readiness

- **Neuro 1100H Neuroscience Survey**
  1hr | Au, Sp | (Pre-reqs: Full or Pre-Majors Only)

II. Core Requirements

Take all 4 of the courses below

All Full and Pre-major students must complete Neuro 1100(H), Psych 3313(H) and Neuro 3000 with grades of 'B' or higher in these classes, and earn a minimum 3.0 cumulative GPA

- **Psych 3313(H) Introduction to Behavioral Neuroscience**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100)
- **Neuro 3000 Introduction to Molecular/Cellular Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113)
- **Psych 3513 Introduction to Cognitive Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **Neuro 3050 Structure & Function of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113 & Neuro 3000)

III. Data Analysis Requirement

Take 1 of the 3 courses below

- **Psych 2220 Introduction to Data Analysis in Psychology**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100 & Math 1148)
- **Stats 2480 Statistics for Life Sciences**
  3hrs | Sp | (Pre-reqs: Math 1151)
- **Stats 2450 Introduction to Statistical Analysis**
  3hrs | Au, Sp | (Pre-reqs: Math 1151)

IV. Specialization Requirements

Choose at least 4 specialization courses from the options below

- **Neuro 4550 Autism Spectrum Disorder & Neurodev Disorders**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4425 Neurotrauma: TBI, Stroke, & Spinal Cord Injury**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Psych 4501 Advanced Behavioral Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4100 Basic & Clinical Foundations of Neuro Disease**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Psych 4644 Hormones & Behavior**
  3hrs | Au Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
  Not Open to Students with Credit For Neuro 5644
- **Psych 5613(H) Biological Psychiatry**
  3hrs | Sp | (Pre-reqs: Honors, 3313 & 3000)
- **Psych 5602 Behavioral Genetics**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5603 Stem Cells and the Brain**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5604 Sex Differences in the Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5622 The Development of Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5898 Seminar in Behavioral Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 4501)
- **Neuro 4623 Biological Clocks & Rhythms**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **EEOB 4550 Neurobiology of Behavior**
  3hrs | Au | (Pre-reqs: 2 courses in Bio)
- **Psych 4305 Psychopharmacology**
  3hrs | Au, Sp | (Pre-reqs: Permission of Instructor)
  Not Open to Students With Credit For PHR 4440 or BioPhrm 5824
- **Biophrm 5824 Pharmacology of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Permission of Instructor)
  Not Open to Students With Credit For PHR 4440 or Psych 4305
- **Biochem 4511 / MolGen 4500 / MicroBio 4000**
  3-4hrs | Au, Sp Su | (Refer to Course Catalog for Pre-reqs)
  Students can only use ONE of these courses toward the major

NEW

V. Breadth Requirement

Choose 1 Course from the list below

- **Neuro 3025** **History of Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4850** **Contemporary Topics in Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 3010** **Neurophysiology**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 3305** **Neuropharmocology**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Neuro 4050H** **Neurogenetics**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4640** **Neuronal Signal Transduction**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Neuro 5790H** **Developmental Neuroscience**
  3hrs | Sp | (Pre-reqs: Neuro 3000 & 3050 & Jr. or Sr.)
- **Chem 5230** **Neurotransmitter Chemistry**
  3hrs | Sp | (Pre-reqs: Chem 2540 & 2520)
- **Ling 3701** **Language and the Mind**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **Psych/CSE/Ling/Philos 5612 Introduction to Cognitive Science**
  3hrs | Au | (Pre-reqs: 12hr in Psych/CSE/Ling/Philos)
- **Psych 5089** **Cognitive Aging, Neurodegen, & Neuroplasticity**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5614** **Cognitive Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & 3000)
- **Psych 5618** **Intro to Computational Cognitive Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5628** **Developmental Cognitive Neuroscience**
  3hrs | Au | (Pre-reqs: Psych 3313 & 3000)
- **SHS 5760** **Neurology of Speech and Hearing Mechanisms**
  3hrs | Au, Sp | (Pre-reqs: Psych 3313 & 3000)
- **Psych 3321** **Quantitative and Statistical Methods in Psychology**
  3hrs | Au, Sp | (Pre-reqs: B or higher in 2220)
- **Math 4350** **Quantitative Neuroscience**
  3hrs | Sp | (Pre-reqs: Math 1152)
- **Psych 5608** **Intro to Mathematical Psychology**
  3hrs | Au | (Pre-reqs: Psych 3321, 3313 & Neuro 3000)
- **CSE 5052** **Survey of Artificial Intelligence for Non-Majors**
  3hrs | Au | (Pre-reqs: CSE Programming & Neuro 3000)
- **CSE 5526** **Introduction to Neural Networks**
  3hrs | Au | (Pre-reqs: CSE 3521)
- **Econ 5870** **Neuroeconomics and Decision Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & 3000).
- **ECE 5070** **Neuroengineering and Neuroprosthetics**
  3hrs | Au | (Pre-reqs: Permission of Instructor)
  Not Open to Students With Credit For Neuro 5070
- **Neuro 4998/3193 Undergraduate Research & Individual Studies**
  Pre-approval required.
  3 credit hours (no more and no less than 3 credit hours) of any combination of Undergraduate Research (4998), Internship (3191) and Individual Studies (3193) can be applied as a course toward Breadth Requirement.

VI. Neuroscience Writing Requirement

Choose at least 1 course from the list below

- **English 3304** **Business & Professional Writing**
  3hrs | Au, Sp, | (English 1110.XX)
- **English 3305** **Technical Writing: Science and Engineering Majors**
  3hrs | Au, Sp | (English 1110.XX)

Important information about the Neuroscience Major

1. **All Students must meet the following requirements to declare the neuroscience major:**
   - First, meet with an advisor to officially be declared as a pre-neuroscience major
   - Complete 24 total semester credit hours
   - At least 12 of those semester credit hours must be from graded OSU coursework
   - An overall GPA greater than or equal to 3.0
   - Earn at least a " B " in Psych 3313, Neuro 3000, and Neurosc 1100(H)
2. Thirty-three (33) semester credits in approved Neuroscience coursework.
3. **Honors students** must take at least one honors or graduate level course. Approved courses can be found here: http://neurosciencemajor.osu.edu/honors
4. **Honors students** must complete the Pre-Major Requirements
5. **For courses to apply toward the major, you must earn at least a " C ".**
6. At least half of the major's curriculum must be completed at Ohio State.
7. Majors will follow the Bachelor of Science curriculum for Autumn 2022 GENs and other degree requirements.
8. Students are encouraged to focus on completion of core requirements before beginning their specialization coursework.
9. To earn your degree you will need an overall GPA of at least a 2.0.
10. Research experience is also strongly encouraged for students considering graduate and professional training. You may enroll in a variety of 4998 opportunities. http://neurosciencemajor.osu.edu/4998
11. Up to 3 credit hours of experiential coursework can be applied to the breadth requirements of the major. This experiential coursework can be from any combination of the following classes: Undergraduate Research (4998), Internships (3191), and Individual Studies(3193). 3 Credits of these courses can be combined to count as one course toward the Breadth Requirements. Pre-approval from your neuroscience major advisor is required.
12. Students planning to graduate "With Honors in Arts and Sciences" should visit our website for information on Honors Contract requirements for neuroscience majors. http://neurosciencemajor.osu.edu/honors
13. Courses taken on a Pass/Non-Pass (PA/NP) basis cannot be used on the major.

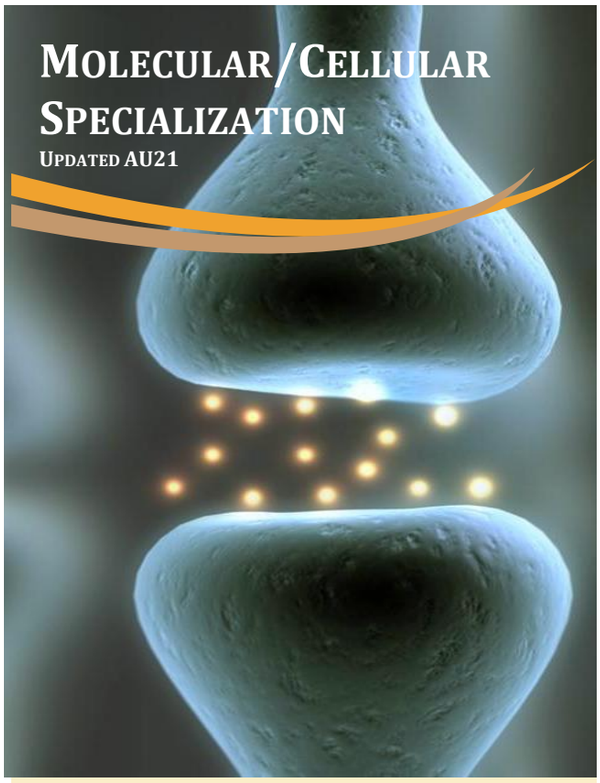
Honors Requirements

All Honors students must take at least **ONE** Neuro Advisor Approved graduate-level course to fulfill their Honors requirement. Honors students must speak with their advisor to select a course. The chosen course to fulfill the requirement can count as **EITHER** one Breadth course or one Specialization course. The approved graduate-level courses can be found at this link: https://NeuroscienceMajor.osu.edu/honors

ORIGINAL

Molecular/Cellular Specialization

Updated AU21



What is Molecular/Cellular Neuroscience?

Molecular/Cellular Neuroscience is a subfield of neuroscience that examines the mechanisms related to the basic biological processes of neurons and support cells of the nervous system. Molecular/Cellular neuroscientists tend to study how neurons communicate, how parts of neurons (e.g. axons and dendrites) function, and explore the anatomy/physiology of neurons.

Declaration Requirements

In order to declare the major, students must meet with a Neuroscience Advisor to discuss the requirements. To set up an appointment:

1. **Stop by room 10 of Townshend Hall**
2. **Give us a call at (614) 292-8512**
3. **E-mail us at NeuroAdvising@osu.edu**
4. **Attend an Info Session**
   NeuroscienceMajor.osu.edu/declare

Contact Us
Neuroscience Undergraduate Program
College of Arts & Sciences and College of Medicine
10 Townshend Hall
1885 Neil Avenue Mall
Columbus, OH 43210
Phone: (614) 292-8512
http://NeuroscienceMajor.osu.edu

The requirements for the 36 semester hour (12 classes) neuroscience major are distributed across four categories: Core, Data Analysis, Specialization, and Breadth.

I. Professional Survey

- **Neuro 1100H** **Neuroscience Honors Survey**
  1hr | Au, Sp | (Pre-reqs: Full or Pre-Majors Only)

II. Core Requirements

Take all 4 of the courses below

Pre-major students must complete Neuro 1100H, Psych 3313 and Neuro 3000 with grades of 'B' or higher in both classes and earn a minimum 3.0 cumulative GPA

- **Psych 3313** **Introduction to Behavioral Neuroscience**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100)
- **Neuro 3000** **Introduction to Molecular/Cellular Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113 and Pre-Major)
- **Psych 3513** **Introduction to Cognitive Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **Neuro 3050** **Structure & Function of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113 & Neuro 3000)

III. Data Analysis Requirement

Take 1 of the 4 courses below

- **Psych 2220** **Introduction to Data Analysis in Psychology**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100 & Math 1148)
- **Stats 2480** **Statistics for Life Sciences**
  3hrs | Sp | (Pre-reqs: Math 1151)
- **Stats 2450** **Introduction to Statistical Analysis**
  3hrs | Au, Sp | (Pre-reqs: Math 1151)
- **MolGen 5650** **Analysis & Interpretation of Biological Data I**
  3hrs | Au | (Pre-reqs: Math 1150 & 10hrs of Bio)

IV. Specialization Requirements

Choose at least 5 specialization courses from the options below

- **Neuro 4550** **Autism Spectrum Disorder & Neurodev Disorders**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 3010** **Neurophysiology**
  3hrs | Au | (Pre-reqs: Neuro 3000 & Neuro 3050)
- **Neuro 3305** **Neuropharmacology**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4050H** **Neurogenetics**
  3h rs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4100** **Basic & Clinical Foundations of Neuro Disease**
  3 hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4640** **Neuronal Signal Transduction**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Neuro 5790H** **Developmental Neuroscience**
  3hrs | Sp | (Pre-reqs: Neuro 3000 & 3050 & Jr. or Sr.)
- **Psych 4644** **Hormones & Behavior**
  3hrs | Au, Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
  Not Open to Students with Credit For Neuro 5644
- **Psych 5603** **Stem Cells and the Brain**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 4305** **Introduction to Psychopharmacology**
  3hrs | Sp | (Pre-reqs: Permission of Instructor)
  Not Open to Students With Credit For PHR 4440 or Biophrm 5824
- **Biophrm 5824** **Pharmacology of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Permission of Instructor)
  Not Open to Students with Credit For PHR 4440 or Psych 4305
- **Chem 5230** **Neurotransmitter Chemistry**
  3hrs | Sp | (Pre-reqs: Chem 2540, & 2520)
- **Neuro 4623** **Biological Clocks & Rhythms**
  3hrs | Sp | Spring '16 '18 (Pre-reqs: Neuro 3000)
- **Biochem 4511** **Intro to Biological Chemistry**
  4hrs | Au, Sp Su | (Pre-reqs: Chem 2510 & Bio 1113)
- **MolGen 4500** **General Genetics**
  3hrs | Au, Sp, Su | (Pre-reqs: Bio 1113 & 3+ hrs Bio)

ORIGINAL

V. Breadth Requirement

Choose at least 2 additional courses from the list below

- **Neuro 3025** **History of Neuroscience**
  3hrs | Sp | (Pre-reqs:Psych 3313 & Neuro 3000)
- **Neuro 4850** **Contemporary Topics in Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 4501** **Advanced Behavioral Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: 3313 & Neuro 3000)
- **Psych 5089** **Cognitive Aging, Neurodegen, & Neuroplasticity**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5613(H)** **Biological Psychiatry**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5602** **Behavioral Genetics**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5604** **Sex Differences in the Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5622** **The Development of Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **EEOB 4550** **Neurobiology of Behavior**
  3hrs | Au | (Pre-reqs: 2 courses in Bio)
- **Ling 3701** **Language and the Mind**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **Psych/CSE/Ling/Philos 5612 Introduction to Cognitive Science**
  3hrs | Au | (Pre-reqs: 12hr in Psych/CSE/Ling/Philos)
- **Psych 5614** **Cognitive Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 or 3000)
- **Psych 5618** **Intro to Computational Cognitive Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5628** **Developmental Cognitive Neuroscience**
  3hrs | Au | (Pre-reqs: Psych 3313 or 3000)
- **SHS 5760** **Neurology of Speech and Hearing Mechanisms**
  3hrs | Au, Sp | (Pre-reqs: Psych 3313 & 3000)
- **Psych 3321** **Quantitative and Statistical Methods in Psych**
  3hrs | Au, Sp | (Pre-reqs: B or higher in 2220)
- **Math 4350** **Quantitative Neuroscience**
  3hrs | Sp | (Pre-reqs: Math 1152)
- **Psych 5608** **Intro to Mathematical Psychology**
  3hrs | Au | (Pre-reqs: Psych 3321)
- **Psych 5898** **Seminar in Behavioral Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 4501)
- **CSE 5052** **Survey of Artificial Intelligence for Non-Majors**
  3hrs | Au | (Pre-reqs: Programming & Neuro 3000)
- **CSE 5526** **Introduction to Neural Networks**
  3hrs | Au | (Pre-reqs: CSE 3521)
- **Econ 5870** **Neuroeconomics and Decision Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & 3000)
- **ECE 5070** **Neuroengineering and Neuroprosthetics**
  3hrs | Au | (Pre-reqs: CSE Programming)
  Not Open to Students With Credit For Neuro 5070
- **Neuro 4998/3193 Undergraduate Research & Individual Studies**
  Pre-approval required.
  Up to 3 credit hours of any combination of Undergraduate Research (4998) and Individual Studies (3193) can be applied to the breadth requirement.

Important information about the Neuroscience Major

1. **Students must meet the following requirements to declare the neuroscience major:**
   - First, meet with an advisor to officially be declared as a pre-neuroscience major
   - Complete 24 total semester credit hours
   - At least 12 of those semester credit hours must be from graded OSU coursework
   - An overall GPA greater than or equal to 3.0
   - Earn at least a " **B** " in Psych 3313, Neuro 3000, and Psych 1100H
2. **Honors students** must take at least one honors or graduate level course. Approved courses can be found here: http://neurosciencemajor.osu.edu/honors
3. Thirty-six (36) semester credits in approved Neuroscience coursework.
4. At least half of the major's curriculum must be completed at Ohio State.
5. Majors will follow the Bachelor of Science curriculum for GE and other degree requirements.
6. Students are encouraged to focus on completion of core requirements before beginning their specialization coursework.
7. For courses to apply toward the major, you must earn at least a " **C** ".
8. To earn your degree you will need an overall GPA of at least a 2.0.
9. Research experience is also strongly encouraged for students considering graduate and professional training. You may enroll in a variety of 4998 opportunities. http://neurosciencemajor.osu.edu/4998
10. Up to 3 hours of experiential coursework can be applied to the breadth requirements of the major. This experiential coursework can be from any combination of the following classes: Undergraduate Research (4998) and Individual Studies). Pre-approval from your neuroscience major advisor is required.
11. Students planning to graduate "With Honors in Arts and Sciences" should visit our website for information on Honors Contract requirements for neuroscience majors. http://neurosciencemajor.osu.edu/honors
12. Courses cannot count for both a minor and a major.

Honors Requirements

All Honors students must take at least one graduate-level course to fulfill their Honors requirement. Honors students must speak with their advisor to select a course. The chosen course to fulfill the requirement can count as EITHER one Breadth course or one Specialization course. The approved graduate-level courses can be found below:

College of Arts and Sciences

- Psych 5603 Stem Cells and the Brain
- Psych 5606 High Level Vision
- Psych 5898 Seminar in Behavioral Neuroscience
- Psych 5618 Intro to Computational Cog Neursocience
- Psych 6810 Statistical Methods in Psychology I
- Psych 6811 Statistical Methods in Psychology II

College of Medicine

- Neurosc 4050H NeuroGenetics
- Neurosc 5790H Developmental Neuroscinece
- Neuro 7050 Neurobiology of Disease
- Neuro 7500 NeuroImmunology
- Neuro 7001 Foundations of Neuroscience I

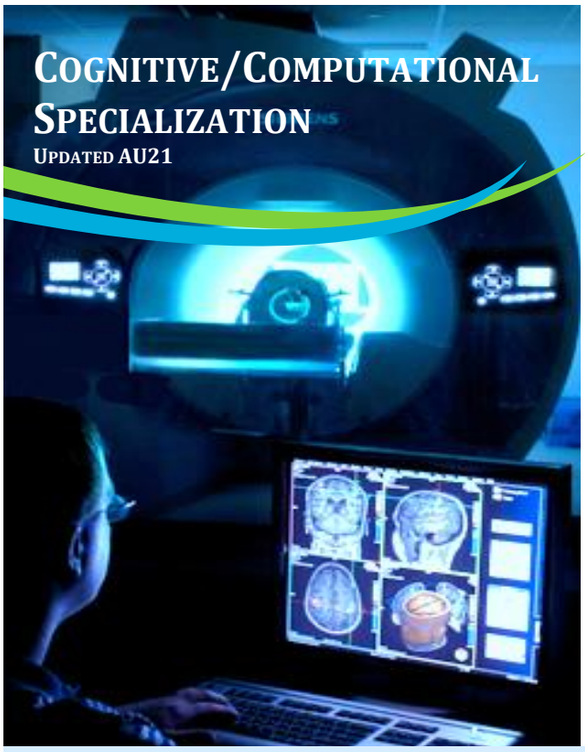
College of Engineering

- CSE 5194.03 Neuroengineering & Neuroprosthetics
- CSE 5526 Introduction to Neural Networks

ORIGINAL

COGNITIVE/COMPUTATIONAL SPECIALIZATION

UPDATED AU21



What is Cognitive/Computational Neuroscience?

Cognitive/Computational neuroscience is a subfield of neuroscience that studies the neural mechanisms that underlie mental processes. Cognitive/Computational neuroscientists tend to study how specific areas of the brain are related to thought and sensory processing, create mathematical models to understand cognitive processes, and may conduct research in areas of artificial intelligence.

DECLARATION REQUIREMENTS

In order to declare the pre-major, students must meet with a Neuroscience Advisor to discuss the requirements. To set up an appointment:

1. **Stop by room 10 of Townshend Hall**
2. **Give us a call at (614) 292-8512**
3. **E-mail us at NeuroAdvising@osu.edu**
4. **Attend an Info Session**
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CONTACT US
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10 Townshend Hall
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Columbus, OH 43210
Phone: (614) 292-8512
http://NeuroscienceMajor.osu.edu

The requirements for the 36 semester hour (12 classes) neuroscience major are distributed across four categories: Core, Data Analysis, Specialization, and Breadth.

I. PROFESSIONAL SURVEY

- **Neuro 1100H** **Neuroscience Honors Survey**
  1hr | Au, Sp | (Pre-reqs: Ful or Pre-majors only)

II. CORE REQUIREMENTS

Take all 4 of the courses below

Pre-major students must complete Neuro 1100H, Psych 3313 and Neuro 3000 with grades of 'B' or higher in both classes and earn a minimum 3.0 cumulative GPA

- **Psych 3313** **Introduction to Behavioral Neuroscience**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100)
- **Neuro 3000** **Introduction to Molecular/Cellular Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113 and Pre-Major)
- **Psych 3513** **Introduction to Cognitive Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **Neuro 3050** **Structure & Function of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113 & Neuro 3000)

III. DATA ANALYSIS REQUIREMENT Take 1 of the 4 Courses

- **Psych 2220** **Introduction to Data Analysis in Psychology**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100 & Math 1148)
- **Stats 2480** **Statistics for Life Sciences**
  3hrs | Sp | (Pre-reqs: Math 1151)
- **Stats 2450** **Introduction to Statistical Analysis**
  3hrs | Au, Sp | (Pre-reqs: Math 1151)
- **MolGen 5650** **Analysis & Interpretation of Biological Data I**
  3hrs | Au | (Pre-reqs: Math 1150 & 10hrs 3000-level Bio)

IV. SPECIALIZATION REQUIREMENTS Choose at least 5 Courses

- **Ling 3701** **Language and the Mind**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **Psych 3321** **Quantitative and Statistical Methods in Psychology**
  3hrs | Au, Sp | (Pre-reqs: B or higher in 2220)
- **Psych 5608** **Intro to Mathematical Psychology**
  3hrs | Au | (Pre-reqs: Psych 3321, Psych 3313 & 3000)
- **Psych/CSE/Ling/Philos 5612** **Introduction to Cognitive Science**
  3hrs | Au | (Pre-reqs: 12hr in Psych/CSE/Ling/Philos)
- **Psych 5614** **Cognitive Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 or Neuro 3000)
- **Psych 5618** **Intro to Computational Cognitive Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5628** **Developmental Cognitive Neuroscience**
  3hrs | Au | (Pre-reqs: Psych 3313 or Neuro 3000)
- **Math 4350** **Quantitative Neuroscience**
  3hrs | Sp | (Pre-reqs: Math 1152)
- **Psych 5089** **Cognitive Aging, Neurodegen, & Neuroplasticity**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **CSE 5052** **Survey of Artificial Intelligence for Non-Majors**
  3hrs | Au | (Pre-reqs: CSE Programming & Neuro 3000)
- **CSE 5526** **Introduction to Neural Networks**
  3hrs | Au | (Pre-reqs: CSE 3521)
- **SHS 5760** **Neurology of Speech and Hearing Mechanisms**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Econ 5870** **Neuroeconomics and Decision Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **ECE 5070** **Neuroengineering and Neuroprosthetics**
  3hrs | Au | (Pre-reqs: Programming, Psych 3313, Neuro 3000)
  Not Open to Students With Credit For Neuro 5070

ORIGINAL

V. BREADTH REQUIREMENT

Choose at least 2 additional courses from the list below

- **Neuro 3025** **History of Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4850** **Contemporary Topics in Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 3305** **Neuropharmacology**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 4501** **Advanced Behavioral Neuroscience**
  3hrs | Sp | (Pre-reqs: 3313 & Neuro 3000)
- **Psych 5602** **Behavioral Genetics**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5604** **Sex Differences in the Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5622** **The Development of Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5898** **Seminar in Behavioral Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 4501)
- **Psych 5613(H)** **Biological Psychiatry**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **EEOB 4550** **Neurobiology of Behavior**
  3hrs | Au | (Pre-reqs: 2 courses in Bio)
- **Neuro 3010** **Neurophysiology**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4050H** **Neurogenetics**
  3hrs | Au | (Pre-reqs: Neuro 3000 or Permission of Instructor)
- **Neuro 4640** **Neuronal Signal Transduction**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Neuro 5790H** **Developmental Neuroscience**
  3hrs | Sp | (Pre-reqs: Neuro 3000 & 3050 & Jr. or Sr. standing)
- **Psych 4305** **Introduction to Psychopharmacology**
  3hrs | Sp | (Pre-reqs: Permission of Instructor)
  Not Open to Students With Credit For PHR 4440 or Biophrm 5824
- **Biophrm 5824** **Pharmacology of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Permission of Instructor)
  Not Open to Students with Credit For PHR 4440 or Psych 4305
- **Chem 5230** **Neurotransmitter Chemistry**
  3hrs | Sp | (Pre-reqs: Chem 2540 & 2520)
- **Neuro 4623** **Biological Clocks & Rhythms**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Psych 4644** **Hormones & Behavior**
  3hrs | Au Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
  Not Open to Students with Credit For Neuro 5644
- **Psych 5603** **Stem Cells and the Brain**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4100** **Basic & Clinical Foundations of Neurological Disease**
  3 hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4550** **Autism Spectrum Disorder & Neurodev Disorders**
  3 hrs | Au | (Pre-reqs: Neuro 3000)
- **MolGen 4500** **General Genetics**
  3hrs | Au, Sp, Su | (Pre-reqs: Bio 1113& 3+ hrs Bio)
- **Biochem 4511** **Intro to Biological Chemistry**
  4hrs | Au, Sp, Su | (Pre-reqs: Chem 2510 & Bio1113)
- **Neuro 4998/3193 Undergraduate Research & Individual Studies**
  Pre-approval required.
  Up to 3 credit hours of any combination of Undergraduate Research (4998) and Individual Studies (3193) can be applied to the breadth requirement.

Important information about the Neuroscience Major

1. **Students must meet the following requirements to declare the neuroscience major:**
   - First, meet with an advisor to officially be declared as a pre-neuroscience major
   - Complete 24 total semester credit hours
   - At least 12 of those semester credit hours must be from graded OSU coursework
   - An overall GPA greater than or equal to 3.0
   - Earn at least a " **B** " in Psych 3313 and Neuro 3000
2. **Honors students** must take at least one honors or graduate level course. Approved courses can be found here: http://neurosciencemajor.osu.edu/honors
3. Thirty-six (36) semester credits in approved Neuroscience coursework.
4. At least half of the major's curriculum must be completed at Ohio State.
5. Majors will follow the Bachelor of Science curriculum for GE and other degree requirements.
6. Students are encouraged to focus on completion of core requirements before beginning their specialization coursework.
7. For courses to apply toward the major, you must earn at least a " **C** ".
8. To earn your degree you will need an overall GPA of at least a 2.0.
9. Research experience is also strongly encouraged for students considering graduate and professional training. You may enroll in a variety of 4998 opportunities. http://neurosciencemajor.osu.edu/4998
10. Up to 3 hours of experiential coursework can be applied to the breadth requirements of the major. This experiential coursework can be from any combination of the following classes: Undergraduate Research (4998) and Individual Studies). Pre-approval from your neuroscience major advisor is required.
11. Students planning to graduate "With Honors in Arts and Sciences" should visit our website for information on Honors Contract requirements for neuroscience majors. http://neurosciencemajor.osu.edu/honors
12. Courses cannot count for both a minor and a major.
13. HONORS STUDENTS: Must take one graduate level course. Approved courses can be found below and at this link: http://neurosciencemajor.osu.edu/honors

Honors Requirements

All Honors students must take at least one graduate-level course to fulfill their Honors requirement. Honors students must speak with their advisor to select a course. The chosen course to fulfill the requirement can count as EITHER one Breadth course or one Specialization course. The approved graduate-level courses can be found below:

College of Arts and Sciences

1.	Psych 5603	Stem Cells and the Brain
2.	Psych 5606	High Level Vision
3.	Psych 5898	Seminar in Behavioral Neuroscience
4.	Psych 5618	Intro to Computational Cog Neursocience
5.	Psych 6810	Statistical Methods in Psychology I
6.	Psych 6811	Statistical Methods in Psychology II

College of Medicine

1.	Neurosc 4050H	NeuroGenetics
2.	Neurosc 5790H	Developmental Neuroscinece
3.	Neuro 7050	Neurobiology of Disease
4.	Neuro 7500	NeuroImmunology
5.	Neuro 7001	Foundations of Neuroscience I

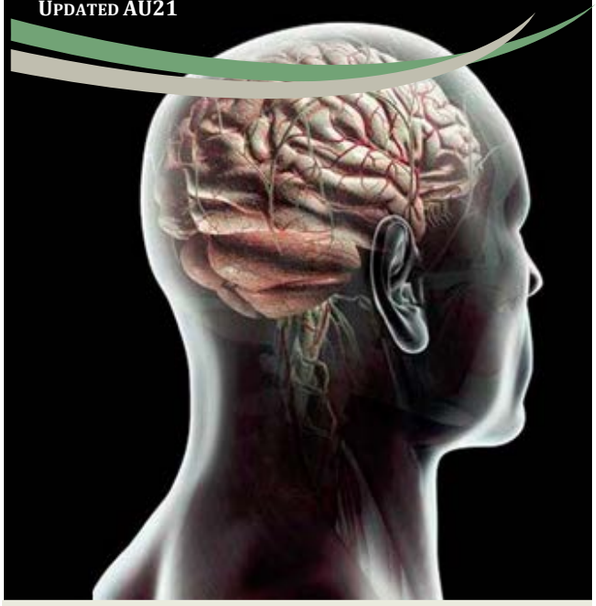
College of Engineering

6.	CSE 5194.03	Neuroengineering & Neuroprosthetics
7.	CSE 5526	Introduction to Neural Networks

ORIGINAL

Systems/Behavioral Specialization

Updated AU21



What is Systems/Behavioral Neuroscience?

Systems/Behavioral Neuroscience studies how neurons work together in networks to understand the mechanisms that underlie behavior. Systems/Behavioral neuroscientists tend to study how the nervous system is related to psychiatric and neurological disorders, how groups of neurons form systems that are related to specified functions (e.g. motor control, learning & memory), and what happens when such systems dysfunction.

Declaration Requirements

In order to declare the pre-major, students must meet with a Neuroscience Advisor to discuss the requirements. To set up an appointment:

1. **Stop by room 10 Townshend Hall**
2. **Give us a call at (614)-292-8512**
3. **E-mail us at NeuroAdvising@osu.edu**
4. **Attend an Info Session**
   NeuroscienceMajor.osu.edu/declare

Contact Us

Neuroscience Undergraduate Program
College of Medicine & College of Arts and Sciences
10 Townshend Hall
1885 Neil Avenue Mall
Columbus, OH 43210
Phone: (614) 292-8512
http://NeuroscienceMajor.osu.edu

The requirements for the 36 semester hour (12 classes) neuroscience major are distributed across four categories: Core, Data Analysis, Specialization, and Breadth.

I. Professional Survey

- **Neuro 1100H** **Neuroscience Honors Survey**
  1hr | Au, Sp | (Pre-reqs: Full or Pre-Majors Only)

II. Core Requirements

Take all 4 of the courses below

Pre-major students must complete Neuro 1100H, Psych 3313 and Neuro 3000 with grades of 'B' or higher in both classes and earn a minimum 3.0 cumulative GPA

- **Psych 3313** **Introduction to Behavioral Neuroscience**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100)
- **Neuro 3000** **Introduction to Molecular/Cellular Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113 and Pre-Major)
- **Psych 3513** **Introduction to Cognitive Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **Neuro 3050** **Structure & Function of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Bio 1113 & Neuro 3000)

V. Data Analysis Requirement

Take 1 of the 4 courses below

- **Psych 2220** **Introduction to Data Analysis in Psychology**
  3hrs | Au, Sp, Su | (Pre-reqs: Psych 1100 & Math 1148)
- **Stats 2480** **Statistics for Life Sciences**
  3hrs | Sp | (Pre-reqs: Math 1151)
- **Stats 2450** **Introduction to Statistical Analysis**
  3hrs | Au, Sp | (Pre-reqs: Math 1151)
- **MolGen 5650** **Analysis & Interpretation of Biological Data I**
  3hrs | Au | (Pre-reqs: Math 1150 & 10hrs Bio)

III. Specialization Requirements

Choose at least 5 specialization courses from the options below

- **Neuro 4550** **Autism Spectrum Disorder & Neurodev Disorders**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Psych 4501** **Advanced Behavioral Neuroscience**
  3hrs | Au, Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4100** **Basic & Clinical Foundations of Neuro Disease**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Psych 4644** **Hormones & Behavior**
  3hrs | Au Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
  Not Open to Students with Credit For Neuro 5644
- **Psych 5613(H)** **Biological Psychiatry**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5602** **Behavioral Genetics**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5603** **Stem Cells and the Brain**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5604** **Sex Differences in the Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5622** **The Development of Brain and Behavior**
  3hrs | Au | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5898** **Seminar in Behavioral Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 4501)
- **Neuro 4623** **Biological Clocks & Rhythms**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **EEOB 4550** **Neurobiology of Behavior**
  3hrs | Au | (Pre-reqs: 2 courses in Bio)
- **Psych 4305** **Intro To Psychopharmocology**
  3hrs | Sp | (Pre-reqs: Permission of Instructor)
  Not Open to Students With Credit For PHR 4440 or BioPharm 5824
- **Biophrm 5824** **Pharmacology of the Nervous System**
  3hrs | Au, Sp | (Pre-reqs: Permission of Instructor)
  Not Open to Students With Credit For PHR 4440 or Psych 4305
- **Biochem 4511** **Intro to Biological Chemistry**
  4hrs | Au, Sp, Su | (Pre-reqs: Chem 2510 & Bio 1113)
- **MolGen 4500** **General Genetics**
  3hrs | Au, Sp, Su | (Pre-reqs: Bio 1113& 3+ hrs Bio)

ORIGINAL

IV. Breadth Requirement

Choose at least 2 additional courses from the list below

- **Neuro 3025** **History of Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 4850** **Contemporary Topics in Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Neuro 3010** **Neurophysiology**
  3hrs | Au | (Pre-reqs: Neuro 3000 or Neuro 3050)
- **Neuro 3305** **Neuropharmocology**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Neuro 4050H** **Neurogenetics**
  3hrs | Au | (Pre-reqs: Neuro 3000)
- **Neuro 4640** **Neuronal Signal Transduction**
  3hrs | Sp | (Pre-reqs: Neuro 3000)
- **Neuro 5790H** **Developmental Neuroscience**
  3hrs | Sp | (Pre-reqs: Neuro 3000 & 3050 & Jr. or Sr.)
- **Chem 5230** **Neurotransmitter Chemistry**
  3hrs | Sp | (Pre-reqs: Chem 2540 & 2520)
- **Ling 3701** **Language and the Mind**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)
- **Psych/CSE/Ling/Philos 5612 Introduction to Cognitive Science**
  3hrs | Au | (Pre-reqs: 12hr in Psych/CSE/Ling/Philos)
- **Psych 5089** **Cognitive Aging, Neurodegen, & Neuroplasticity**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5614** **Cognitive Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & 3000)
- **Psych 5618** **Intro to Computational Cognitive Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & Neuro 3000)
- **Psych 5628** **Developmental Cognitive Neuroscience**
  3hrs | Au | (Pre-reqs: Psych 3313 & 3000)
- **SHS 5760** **Neurology of Speech and Hearing Mechanisms**
  3hrs | Au, Sp | (Pre-reqs: Psych 3313 & 3000)
- **Psych 3321** **Quantitative and Statistical Methods in Psychology**
  3hrs | Au, Sp | (Pre-reqs: B or higher in 2220)
- **Math 4350** **Quantitative Neuroscience**
  3hrs | Sp | (Pre-reqs: Math 1152)
- **Psych 5608** **Intro to Mathematical Psychology**
  3hrs | Au | (Pre-reqs: Psych 3321, 3313 & Neuro 3000)
- **CSE 5052** **Survey of Artificial Intelligence for Non-Majors**
  3hrs | Au | (Pre-reqs: CSE Programming & Neuro 3000)
- **CSE 5526** **Introduction to Neural Networks**
  3hrs | Au | (Pre-reqs: CSE 3521)
- **Econ 5870** **Neuroeconomics and Decision Neuroscience**
  3hrs | Sp | (Pre-reqs: Psych 3313 & 3000).
- **ECE 5070** **Neuroengineering and Neuroprosthetics**
  3hrs | Au | (Pre-reqs: Programming)
  Not Open to Students With Credit For Neuro 5070
- **Neuro 4998/3193 Undergraduate Research & Individual Studies**
  Pre-approval required.
  Up to 3 credit hours of any combination of Undergraduate Research (4998) and Individual Studies (3193) can be applied to the breadth requirement.

Important information about the Neuroscience Major

1. **Students must meet the following requirements to declare the neuroscience major:**
   - First, meet with an advisor to officially be declared as a pre-neuroscience major
   - Complete 24 total semester credit hours
   - At least 12 of those semester credit hours must be from graded OSU coursework
   - An overall GPA greater than or equal to 3.0
   - Earn at least a " **B** " in Psych 3313 and Neuro 3000
2. **Honors students** must take at least one honors or graduate level course. Approved courses can be found here: http://neurosciencemajor.osu.edu/honors
3. Thirty-six (36) semester credits in approved Neuroscience coursework.
4. At least half of the major's curriculum must be completed at Ohio State.
5. Majors will follow the Bachelor of Science curriculum for GE and other degree requirements.
6. Students are encouraged to focus on completion of core requirements before beginning their specialization coursework.
7. For courses to apply toward the major, you must earn at least a "**C** ".
8. To earn your degree you will need an overall GPA of at least a 2.0.
9. Research experience is also strongly encouraged for students considering graduate and professional training. You may enroll in a variety of 4998 opportunities. http://neurosciencemajor.osu.edu/4998
10. Up to 3 hours of experiential coursework can be applied to the breadth requirements of the major. This experiential coursework can be from any combination of the following classes: Undergraduate Research (4998) and Individual Studies). Pre-approval from your neuroscience major advisor is required.
11. Students planning to graduate "With Honors in Arts and Sciences" should visit our website for information on Honors Contract requirements for neuroscience majors. http://neurosciencemajor.osu.edu/honors
12. Courses cannot count for both a minor and a major

Honors Requirements

All Honors students must take at least one graduate-level course to fulfill their Honors requirement. Honors students must speak with their advisor to select a course. The chosen course to fulfill the requirement can count as EITHER one Breadth course or one Specialization course. The approved graduate-level courses can be found below:

College of Arts and Sciences

- Psych 5603 Stem Cells and the Brain
- Psych 5606 High Level Vision
- Psych 5898 Seminar in Behavioral Neuroscience
- Psych 5618 Intro to Computational Cog Neursocience
- Psych 6810 Statistical Methods in Psychology I
- Psych 6811 Statistical Methods in Psychology II

College of Medicine

- Neurosc 4050H NeuroGenetics
- Neurosc 5790H Developmental Neuroscinece
- Neuro 7050 Neurobiology of Disease
- Neuro 7500 NeuroImmunology
- Neuro 7001 Foundations of Neuroscience I

College of Engineering

- CSE 5194.03 Neuroengineering & Neuroprosthetics
- CSE 5526 Introduction to Neural Networks