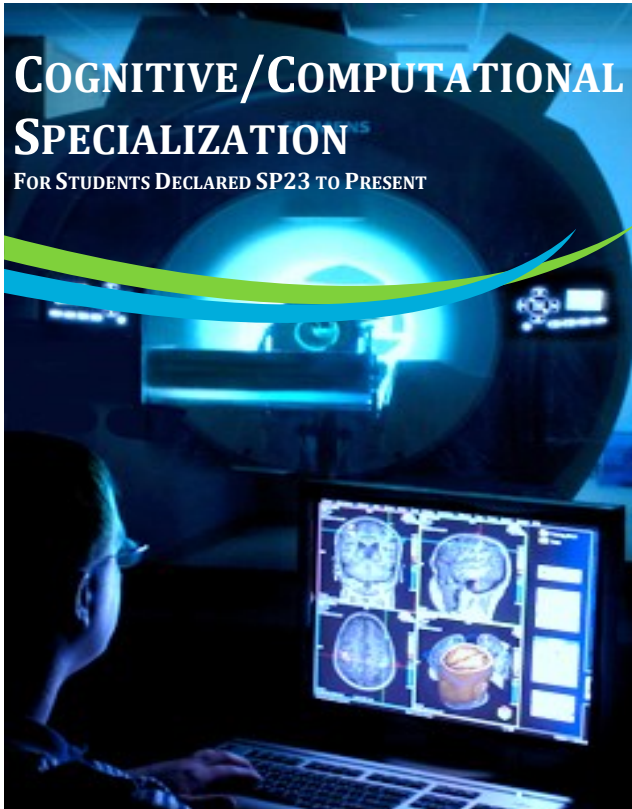# COGNITIVE/COMPUTATIONAL SPECIALIZATION

FOR STUDENTS DECLARED SP23 TO PRESENT

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 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

Form Last Updated SP23

The Neuroscience Undergraduate Program is a selective admissions major. 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.

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

I. PROFESSIONAL AND CURRICULUM READINESS
Take the course below

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

All Full and Pre-major students must complete Neuro 1100(H), 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 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

- **Ling 3701   Language and the Mind**
  3hrs | Au, Sp | (Pre-reqs: Psych 1100)

- **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, 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)

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: 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)

- **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)

- **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)
  Students can only use ONE of these courses toward the major

- **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.

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-six (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 GE 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 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.

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. **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:**
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