

COGS 107A: Neuroanatomy and Physiology Syllabus

Course Overview:

This course will introduce students to elements that contribute to information processing in the brain: from the changes within a single neuron to the gross anatomical organization of the nervous system. In particular, students will learn how a neural architecture emerges from the structural features of single neurons and their intricate connectivity. In addition, students will learn how this architecture ultimately facilitates the types of computations that networks of neurons can perform. There will be an emphasis on the mechanisms through which neural architectures exhibit flexibility at both short (millisecond) and long (years) timescales, providing a basis for dynamic computation.

By the end of the course, students will be able to:

- 1) Describe structural features of a neuron that contribute to its ability to receive and transmit electrical and chemical signals.
- 2) Illustrate mechanisms through which neurons adapt to changing circumstances, and predict the effect of this flexibility upon their ability to process information.
- 3) Apply knowledge of the connectivity between neurons (at gross anatomical and microcircuitry scales) to assess how their interactions enable cooperative processing of information as a neural circuit.
- 4) Construct an argument to support the view that the brain is a flexible, dynamic system on both short and long timescales ranging from milliseconds to years.
- 5) Design experiments for neuroscientific research utilizing both traditional and cutting-edge methods, and virtually implement key experiments using models of the neuron.

Instructor:

Dr. Lara Maria Rangel, CSB 127, (858) 246-2042, lrangel@ucsd.edu
Office hours: Thursday 10:00am - 12:00pm, and by appointment

Teaching Assistants:

Pai-Kay Huang, p2huang@ucsd.edu
Teryn Johnson, t8johnso@ucsd.edu
Pamela Rivière, pdrieviere@ucsd.edu

Instructional Assistants:

Jidong Cai, jic380@ucsd.edu
Chenxin (Tracy) Tian, c5tian@ucsd.edu
Robert Walter, r1walter@ucsd.edu

Course Website:

tritoned.ucsd.edu

Textbooks:

Neuroscience: Exploring the Brain, 4th Edition, Bear, Connors, Paradiso (Required)
Neurons in Action 2: Tutorials and Simulations using NEURON, Moore and Stuart (Optional)

Time and Location:

Tuesday and Thursday 5:00 - 6:20pm, Warren Lecture Hall 2001

Units:

4

Grading:

30% Lab Reports (3 Lab Reports Total, due 10/13, 11/10, and 12/1 at 11:59pm)
15% Midterm
15% Midterm
40% Midterm

Lab Reports:

Lab report instructions will be available on TritonEd. There will be a total of three lab reports, each worth 10% of the final grade. For each report, students will choose to complete ONE of three possible assignments. Students are encouraged to attempt all assignments. Students are also encouraged to work together in obtaining lab results, and may use any graphs or values that were generated collectively in their lab reports, but the process of writing lab reports must be done independently. Lab reports must be submitted electronically via TritonEd. Lab report grades will be deducted by 10% for each day submitted past the deadline.

Midterms:

There will be three cumulative midterms (10/19, 11/16, and 12/07) and NO FINAL EXAM. The highest scoring midterm (1, 2, or 3) will be 40% of the final grade, and the two lowest scoring midterms will be 15% of the final grade. Students may use ONE cheat sheet (front and back, typed or handwritten) during each midterm. Students can work together to select content for cheat sheets, but cheat sheets must be constructed independently and may not be shared during exams. Make-up exams will only be offered to students who have extenuating circumstances such as a medical or family emergency (subject to instructor approval).

Attendance:

Attendance (in lecture and section) is not mandatory, but it is *strongly* encouraged. Podcasts of the lectures will be available on TritonEd.

Extra Credit:

During section each week, students can earn up to **2 extra credit points** (to be applied to the nearest upcoming midterm) by scoring 100% on a quiz that tests for completion of the assigned reading for the week. Students may complete one additional lab report (due by 12/1, 11:59pm) to increase the score of a midterm grade by **5%**.

Academic Integrity:

Cheating and plagiarism will not be tolerated. For more information regarding the definition and consequences of cheating, please consult the following university resource on [academic integrity](#).

Disability Access:

Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD) which is located in University Center 202 behind Center Hall. Students are required to present their AFA letters to Faculty (please make arrangements to contact me privately) and to the OSD Liaison in the department in advance so that accommodations may be arranged.

Contact the OSD for further information:

858.534.4382 (phone)

osd@ucsd.edu (email)

<http://disabilities.ucsd.edu> (website)

Title IX Compliance:

The Office for the Prevention of Harassment & Discrimination (OPHD) provides assistance to students, faculty, and staff regarding reports of bias, harassment, and discrimination. OPHD is the UC San Diego Title IX office. Title IX of the Education Amendments of 1972 is the federal law that prohibits sex discrimination in educational institutions that are recipients of federal funds. Students have the right to an educational environment that is free from harassment and discrimination.

Students have options for reporting incidents of sexual violence and sexual harassment. Sexual violence includes sexual assault, dating violence, domestic violence, and stalking. Information about reporting options may be obtained at OPHD at (858) 534-8298, ophd@ucsd.edu or <http://ophd.ucsd.edu>. Students may receive confidential assistance at CARE at the Sexual Assault Resource Center at (858) 534-5793, sarc@ucsd.edu or <http://care.ucsd.edu> or Counseling and Psychological Services (CAPS) at (858) 534-3755 or <http://caps.ucsd.edu>.

Students may feel more comfortable discussing their particular concern with a trusted employee. This may be a faculty member, department Chair, or other University official. These individuals have an obligation to report incidents of sexual violence and sexual harassment to OPHD. This does not necessarily mean that a formal complaint will be filed. If you find yourself in an uncomfortable situation, ask for help.