

Course Syllabus – NEURO 560

Course Information

Course Number: NEURO 560 SP24
Course Name: Concepts of Learning and Memory
Term: SP 2024
Start Date: 04/02/2024
End Date: 06/21/2024
Credits: 3.0

Meeting Days / Times

Tuesdays and Thursdays, 10:00-11:30am PT / 1:00-2:30pm ET
(See Calendar in Canvas for the most up-to-date schedule.)

Locations

CA: Large Conference Room (Hazen Theory Building)
FL: A116

Course Managers

Role	Last Name	First Name	Email Address
Course Director	Puthanveettil	Sathyanarayanan	sputhanv@scripps.edu
TA	Deane	Hannah	hdeane@scripps.edu

Course Description

This is a lecture course, with lectures provided by the teaching faculty. The course is designed to introduce graduate students and other participants to the field of learning and memory. The course will cover classical and modern concepts of learning and memory across all levels at which learning and memory is studied, including behavioral, anatomical, cellular, molecular and genetic levels of analysis. It will also introduce the many different systems in which learning and memory are studied, including Aplysia, Drosophila, mice, rats, monkeys, and humans. The basic concepts of learning and memory will also be related to the diseases of learning and memory.

Program Learning Outcomes

By the end of the program, students will have accomplished these objectives:

PLO1: Original Research – graduate students are expected to develop the skills critical for generating high-quality research output. This would include absorbing, recalling, and contextualizing scientific knowledge, evaluating scientific information and data, creating testable hypotheses and investigating hypotheses, mastering scientific tools and techniques, displaying ethical behavior, and receiving and giving feedback.

PLO2: Communication – graduate students are expected to demonstrate the oral, written, and media skills to effectively communicate the impact of a study or a body of work to the greater scientific community and to the public at large using a number of methods.

PLO3: Critical Thinking – graduate students are expected to develop a self-directed process to analyze information, form opinions or judgments, and use this process to improve the quality of their scientific thoughts, navigate problems, and make informed decisions.

PLO4: Intellectual Curiosity – graduate students are expected to acquire the capacity to build their intellectual curiosity and demonstrate problem solving approaches that serve their professional growth and ability to impact a field.

PLO5: Career and Professional Development – graduate students are expected to develop a variety of transferable skill sets throughout their graduate experience, including management and leadership, inclusiveness, resilience, scientific rigor, collaboration, accountability, time management, teamwork, networking, and career planning.

For a detailed description of each outcome and specific success indicators, please refer to this web page: <https://education.scripps.edu/graduate/doctoral-program/>.

Course Learning Outcomes

Upon completion of this course students will be able to:

CLO1: Understand the general concepts of learning and memory.

CLO2: Analyze papers in the literature of learning and memory.

CLO3: Conduct critical analysis of contemporary basic research in learning and memory.

CLO4: Discuss essential concepts of learning and memory.

CLO5: Have an appreciation for the history of research of learning and memory that has brought us to the current state of the field.

Background Preparation (Prerequisites)

There are no prerequisites for this course. Students will find it helpful to have a general undergraduate level introduction to neuroscience, genetics, molecular biology, and behavior. However, the necessary background to understand the material will be presented during the course and in the assigned reading material.

Course Materials

Useful to Consult: Kandel & Squire (2008). *Memory: From mind to molecules*. ISBN: 978-0981519418.

Useful to Consult: Squire (1987). *Memory and brain*. ISBN: 978-0195042085.

Useful to Consult: Bear, Connors, Paradiso (2015). *Neuroscience: Exploring the brain*. ISBN: 978-0781778176.

Useful to Consult: Luria, Solotaroff, Bruner (1987). *The mind of a mnemonist*. ISBN: 978-0674576223.

Useful to Consult: Schacter (2002). *The seven sins of memory: How the mind forgets and remembers*. ISBN: 978-0618219193.

Expectations and Logistics

Each 90-minute class will consist of a lecture from a faculty member for approximately 75 minutes. The last 15 minutes will be used to discuss and highlight one or more recent research papers that contribute important and recent information to the topic under discussion. Lectures will be accompanied by slide presentations (PowerPoint) assembled by the lecturer.

Grading of the exams will be based on the student's general understanding of the subject matter as determined by answers to short-answer and essay questions. Class participation will be evaluated on the quality and quantity of participation in classroom discussions.

Attendance Statement

Students are expected to attend all classes. Students who are unable to attend class must seek permission for an excused absence from the course director or teaching assistant. Unapproved absences or late attendance for three or more classes may result in a lower grade or an "incomplete" for the course. If a student has to miss a class, he or she should arrange to get notes from a fellow student and is strongly encouraged to meet with the teaching assistant to obtain the missed material.

Scientific and Professional Ethics

The work you do in this course must be your own. Feel free to build on, react to, criticize, and analyze the ideas of others but, when you do, make it known whose ideas you are working with. You must explicitly acknowledge when your work builds on someone else's ideas, including ideas of classmates, professors, and authors you read. If you ever have questions about drawing the line between others' work and your own, ask the course professor who will give you clear guidance. Exams must be completed independently. Any collaboration on answers to exams, unless expressly permitted, may result in an automatic failing grade and possible expulsion from the Graduate Program.

Technology Requirements and Support

For issues related to Canvas, please contact the Graduate Office by email at: gradprgm@scripps.edu or by phone at: 858-784-8469.

Course Grading

Grading is in accordance with the academic policies of the Skaggs Graduate School. The breakdown of grading is as follows:

- Midterm Exam: 40%
- Final Exam: 40%
- Student Participation: 10%
- Journal Club Presentation: 10%

Letter Grade	Percent	GPA	Description
A	93-100	4.00	Outstanding achievement. Student performance demonstrates full command of the course subject matter and evinces a high level of originality and/or creativity that far surpasses course expectations.
A-	90-92	3.67	Excellent achievement. Student performance demonstrates thorough knowledge of the course subject matter and exceeds course expectations by completing all requirements in a superior manner.
B+	87-89	3.33	Very good work. Student performance demonstrates above-average comprehension of the course subject matter and exceeds course expectations on all tasks as defined in the course syllabus. There is notable insight and originality.
B	83-86	3.00	Satisfactory work. Student performance meets designated course expectations and demonstrates understanding of the course subject matter at an acceptable level.
B-	80-82	2.67	Marginal work. Student performance demonstrates incomplete understanding of course subject matter. There is limited perception and originality.
C+	77-79	2.33	Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course subject matter. There is severely limited or no perception or originality. Course will not count toward degree.

C	73-76	2.00	Unsatisfactory work. Student performance demonstrates incomplete and inadequate understanding of course subject matter. There is severely limited or no perception or originality. Course will not count toward degree.
P	73-100	0.00	Satisfactory work. Student performance demonstrated complete and adequate understanding of course subject matter. Course will count toward degree.
F	0-72	0.00	Unacceptable work/Failure. Student performance is unacceptably low level of knowledge and understanding of course subject matter. Course will not count toward degree. Student may continue in program only with permission of the Dean.
I		0.00	Incomplete is assigned when work is of passing quality but is incomplete for a pre-approved reason. Once an incomplete grade is assigned, it remains on student's permanent record until a grade is awarded.
W		0.00	Withdrew from the course with Dean's permission beyond the second week of the term.

- All courses will be recorded and maintained in the student's permanent academic record; only courses that apply towards the degree will appear on the academic transcript. Non-credit or audited courses will not appear on the transcript.
- 4 core courses taken for a letter grade (pass = B- or higher for a core course)
- 2 elective courses taken pass/fail (pass = A, B, C for an elective)

Course Summary

Date	Details
Tue Apr 2, 2024	Introduction and Historical Overview (Puthanveetil)
Thu Apr 4, 2024	Simple Learning: Habituation and Sensitization in Aplysia californica (Puthanveetil)
Tue Apr 9, 2024	Simple Learning (continued) (Puthanveetil)
Thu Apr 11, 2024	Learning and memory in Drosophila (Ja)
Tue Apr 16, 2024	Journal Club 1
Thu Apr 18, 2024	Memory Processes and Experimental Design I (Courtney Miller)
Tue Apr 23, 2024	Memory Processes and Experimental Design II (Miller)
Thu Apr 25, 2024	Journal Club 2
Tue Apr 30, 2024	Functional synaptic plasticity in learning in vertebrates (Rumbaugh)
Thu May 2, 2024	Structural synaptic plasticity and learning in vertebrates (Rumbaugh)
Tue May 7, 2024	Journal Club 3

Thu May 9, 2024	Midterm Exam
	Quiz Learning and Memory Midterm Exam
Tue May 14, 2024	Synapse Complexity (Hacisuleyman)
Thu May 16, 2024	Local Protein and memory formation (Puthanveettil)
Fri May 17, 2024	Commencement
Tue May 21, 2024	Journal Club 4
Thu May 23, 2024	Episodic memory (Wang)
Mon May 27, 2024	Memorial Day
Tue May 28, 2024	Reinforcement Learning (Hattori)
Thu May 30, 2024	Hippocampal place cells-circuitry and memory functions at the systems level (Xu)
Tue Jun 4, 2024	Journal Club 5
Thu Jun 6, 2024	Neurodegeneration 1- Introduction (Subramaniam)
Tue Jun 11, 2024	Neurodegeneration 2- Animal models (Subramaniam)
Thu Jun 13, 2024	Neuropsychiatric Disorders (Puthanveettil)
Tue Jun 18, 2024	Journal Club 6
Thu Jun 20, 2024	Final Exam
	Quiz Learning and Memory Final Exam
	Turn in Final Exam Here