

Introduction to Neuroscience
PSYC-2310, NEUR-2310

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Office hours: Mondays 1-3 PM, Tuesdays 1-2 PM (and by appointment).

Peer tutor: Clay Samples Hours: Sundays 9-11 PM

Textbook (required):

Biological Psychology (Fifth Edition)
Breedlove, S. M, Rosenzweig, M. R. and Watson, N. V. (2007)
Sinauer Publishers, Sunderland, MA.
Plus other selected readings.

Course Description: The course is an introductory survey of neuroscience from cells to behavior with an emphasis on the use of sensory input to guide action. The course is designed to provide the student with a basic but thorough understanding of central nervous system anatomy and function. Every opportunity is taken to relate brain function to everyday experience in order to make the material more intuitive. However, given the breadth of the field, a large amount of information is covered requiring a strong commitment on the part of the student.

Attendance: I expect people to attend class. Exam content generally reflects the topics and treatment as discussed in class, not necessarily that in the text book. I also expect students to be on time. I will be closing the door five minutes after class begins.

Evaluation:

Your final grade will be based on three partial exams (90%) and a class project (10%). There will also be a number of assignments and two short reports for extra credit. All assignments must be carried out individually.

Exam dates: Monday Sep 24, Monday November 29, Final exam date.

While not mandatory, class participation is highly encouraged and it will be taken into account when grading.

Blackboard.

Please logon to Blackboard frequently to check for class announcements.

Slides:

The slide presentations for each class will be available in the N drive (N:\lschetti\Intro Neuroscience) soon after each lecture.

Assignments:

There is a number of extra credit assignments designed to help you reinforce some of the anatomical or functional aspects of specific neural processes. Most of the assignments require you to run computer simulations in NetLogo, a freely distributed software package. Further details are available in the **Working with Netlogo** document N drive (N:\lschetti\NetLogo).

The Project:

The project is designed to give the students a chance to apply some of the knowledge they have gained in the course. This semester the project will focus on identifying the brain areas and their likely sequence of activation during the performance of a common task. Further details will be available on BlackBoard.

The Reports:

The reports are designed to help students approach neuroscientific publications in a critical fashion. The student will answer the following questions based on their reading of a research paper: What was the goal of the research? How did the experimenters test their hypothesis? What were the results? How did they interpret their results? And provide a short discussion of the interpretation, preferably using at least one more source. The reports will be worth 1 to 5 extra points each. Each report should be **at most** three pages long.

Session	date	Topic	Readings
1	8/24	Introduction: Brain and Behavior What is the brain? What is its function?	Ch. 1
2	8/27	Evolution of the Nervous System How did vertebrate brains evolve and why do they look the way they do?	Ch. 6
3	8/29	Structure of the Nervous System I Anatomy of the brain stem and spinal cord	Ch. 2 pp. 34-51
4	8/31	Structure of the Nervous System II Anatomy of the Cortex and the subcortical regions	Ch. 2
5	9/5	The Neuron and Potentials A look at the functional units of the brain	Ch. 2 pp. 23-33 Ch. 3 pp. 59-69
6	9/7	Signal integration How do neurons communicate with one another?	Ch. 3 pp. 70-74
7	9/10	The Synapse The hub of neuronal communication	Ch. 3 pp. 75-82
8	9/12	Neuropsychopharmacology How do substances affect brain processes?	Ch. 4
9	9/14	The Cortico-striatal system The basic system of the telencephalon	
10	9/17	Methods in Neuroscience <i>How can we study the brain?</i>	Ch. 2 pp. 51-55 Ch. 3 pp.83-85
11	9/19	Memory: Neural bases	Ch. 18 to p. 558

		The basic processes of plasticity	
12	9/21	Representations	Making memories reading
13	9/24	Exam	
14	9/26	Eye movement: a complex neural network. How does the brain stem control the direction of our gaze?	
15	9/28	Development and early plasticity How does the human brain develop?	Ch. 7 to p. 202
16	10/1	Epigenesis When do we begin learning and what is the result?	Ch. 7 pp. 202-214
17	10/3	Arousal systems Large-scale systems that provide "tone" to the CNS.	
18	10/5	The Hypothalamus How does the brain control our bodily states?	Ch. 13
19	10/8	Motivated behavior Why do we want?	Pleasure seekers reading
20	10/10	Cycles Hormonal control of physiological cycles	Ch. 14 Oxytocin reading
21	10/15	Emotion: subcortical control What do emotions do for us?	Ch. 15 to p. 464
22	10/17	Emotion: cortical involvement The role of emotion in Thought	Ch. 15 pp. 464-469

23	10/19	Vision: the basics How do we perceive light and shape?	Ch. 10 to p. 306
24	10/22	Vision: advanced topics How do we perceive color and recognize objects?	Ch. 10 p. 307-318
25	10/24	Hearing How do we perceive sound and localize its source?	Ch. 9 to p. 267
26	10/26	Somatosensation and Vestibular System How do we map our surroundings with our sense of touch?	Ch. 8 pp. 228-236 Ch. 9 pp. 267-270
27	10/29	Exam	
28	10/31	Memory: implicit processes How, what and why do we learn?	Ch. 17
29	11/2	Memory: explicit processes Declarative and spatial memories	Ch. 17
30	11/7	Movie: The man who lost his body A documentary exploring the role of proprioception	
31	11/9	Movement: the basics How do brains control and organize muscle contraction	Ch. 11 pp. 325-332
32	11/12	Movement: sensorimotor control Using sensory information to guide our movements.	Ch. 11
33	11/14	Language How does the brain control language?	Ch. 19 pp. 571-582

34	11/16	Executive control 1 The processes that grant us flexible and intelligent behavior: Attention Working memory Planning	Ch.19 pp. 587-598
35	11/19	Executive control 2 The processes that grant us flexible and intelligent behavior: Decision-making Action selection Monitoring	Conflict and Cognitive Control
36	11/21	Autism: a neurodevelopmental disorder How brain abnormalities derail development.	
37	11/26	Neurodegenerative disorders What happens when brain cells die in large numbers?	
38	11/28	Parkinson's Disease A common movement disorder.	
39	11/30	Stroke What happens when there is a sudden destruction of brain tissue?	
40	12/3	Psychopathology: Neural components of mental disorders.	
		Final Exam	

Disabilities.

If you have a documented disability and will need accommodations in this class, please speak with me privately early in the semesters so I may be prepared to meet your needs. If you have not already registered with Disability Services for Students, contact the office at 999-7411. You must be registered with DSS before I can provide accommodations.

Academic Integrity.

All students are covered by a policy that prohibits dishonesty in academic work. The Academic Integrity Policy (AIP) covers all students who entered Trinity before the fall of 2004. The Academic Honor Code covers all those who entered the fall of 2004 or later.

The Integrity Policy and the Code share many features: each asserts that the academic community is based on honesty and trust; each contains the same violations; each provides for a procedure to determine if a violation has occurred and what the punishment will be; each provides for an appeal process.

The main difference is that the faculty implements the AIP while the Code is implemented by the Academic Honor Council. Under the Integrity Policy, the faculty member determines whether a violation has occurred as well as the punishment for the violation (if any) within certain guidelines. Under the Code, a faculty member will (or a student may) report an alleged violation to the Academic Honor Council. It is the task of the Council to investigate, adjudicate, and assign a punishment within certain guidelines if a violation has been verified.

Students who are under the Honor Code are required to pledge all written work that is submitted for a grade: "On my honor, I have neither given nor received any unauthorized assistance on this work" and their signature. The pledge may be abbreviated "pledged" with a signature.