

Advanced Neuroscience Bisc 533

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Class: MWF 1-1:50, Shoemaker 219

Office Hours: M & W 2-3

Course Description: This course is designed to familiarize you with some of the basic tenets of neuroscience and their application in seminal or current research. For several topics in neuroscience, we will review basic concepts in lecture form and then discuss papers that address contemporary problems or review research in this area.

Learning Objectives:

1) To reinforce several core concepts of neuroscience 2) To help students understand these concepts and speak intelligently about how these concepts have been explored in research. Graduate students will, in addition, learn to efficiently summarize literature and practice writing a literature review.

Assignments and Grades:

Undergraduates: You will be graded on your participation in discussion sections and presentation of 1-3 papers (40%). You must turn in three questions or discussion points for each discussion section. There will be one in class exam and a final (each 30%). Exams will cover material presented in lectures and discussion sections and will consist of essay questions.

Graduate students: In addition to the above, you will be required to complete a one page summary and evaluation for each paper presented. For your assigned discussion section you will need to present this summary and then lead the discussion rather than the instructor. You will also need to submit a 5-7 page research paper on a topic of your choosing (with consent of the instructor) that will be due two weeks before the final exam.

A(90-100%); B(80-89%); C(70-79%); D(60-69%); F(59% and below)

Attendance: Attendance is mandatory and you must sign the attendance sheet to be counted as present. It will be very difficult to do well in this course if you do not attend both lectures and discussions. If you have a verifiable excused absence you will not have points deducted from your participation grade. When absent, you will still be held responsible for material covered so please do not hesitate to come see me during office hours if you have questions.

Accommodations: Students with disabilities, which have been verified through the Office of Student Disability Services, are encouraged to contact the instructor to discuss their individual needs for accommodations.

Make-up Exams: If you miss the first exam, you must contact the instructor within one week or you will be given a zero for the exam. Make up exams will be given only for reasonable and documented excuses. Make-up exams will cover the same material as that given during the scheduled time but will not contain the same questions. There will be no makeup exam for the final.

Reading: Please purchase "Neuroscience: Exploring the Brain," Bear, Connors, and Paradiso, third edition. I will have similar text on reserve at the library. Other readings for lectures and discussions will be available on blackboard or handed out in class. Discussion topics may change if exciting new research in the area appears. Please note that some of the readings will be very dense material and will require a good deal of thinking on your part. Make sure you give yourself enough time to digest the material. It will be very obvious in discussions if you have not read the papers or have given them only a quick read.

Topic Schedule

- Aug 24 What Is Neuroscience?
Discussion: Is Neuroscience the Study of the Mind or the Brain?
- Aug 26 Lecture 1: Cells of the Nervous System and How They Work
- Aug 28 Lecture 2: Cells Of the Nervous System and How They Work.
- Aug 31 Lecture 3: Cells of the Nervous System and How they Work
- Sep 2 Discussion 4: Disorders of Glia
- Sep 4 Discussion 5: Disorders Caused by Abnormal Channels
- Sep 7 Labor Day
- Sep 9 Lecture 6: Neuroanatomy
- Sep 11 Lecture 7: Neuroanatomy, Localization of Function
- Sep 14 Discussion 8: Hippocampus and Spatial Memory in Rats.
- Sep 16 Discussion 9: Hippocampus and Spatial Memory in Humans
- Sep 18 Discussion 10: Do We Have “Grandmother Cells”?
- Sep 21 Lecture 11: Nervous System Development
- Sep 23 Lecture 12: Nervous System Plasticity
- Sep 25 Discussion 13: Adult Neurogenesis: Canary/Human
- Sep 28 Discussion 14: Adult Neurogenesis: Functional
- Sep 30 Discussion 15: Developmental Disorders: Maternal Stress
- Oct 2 Lecture 16: Evolution of the Nervous System
- Oct 5 Discussion 17: Does Having More Brain Make You Smarter? (LAST DAY TO DROP)
- Oct 7 Lecture 18: Neurotransmitters
- Oct 9 Discussion 19: 5HT and aggression, DA and Reward, or CB1 and learning
- Oct 12 Lecture/Discussion 20: Sex in the Brain?
- Oct 14 **Mid-Term Exam**
- Oct 16, Oct 19, Oct 21 No CLASS Professor: Society for Neuroscience Meeting**
- Oct 23 Lecture 21: Sensory Systems
- Oct 26 Lecture 22: Olfactory System
- Oct 28 Discussion 23: Why Memories of Scent Differ From Other Memories?
- Oct 30 Discussion 24: Pheromones In Mice And Men
- Nov 2 Lecture 25: Visual System.
- Nov 4 Discussion 26: What The Frog’s Eye Tells The Frog’s Brain.
- Nov 6 Discussion 27: Visual System Plasticity
- Nov 9 Lecture 28: Audition
- Nov 11 Discussion 29: This is Your Ear on Loud Music.
- Nov 13 Lecture 30: Learning and Memory: Neural Mechanisms
- Nov 16 Discussion 31: Aplysia and beyond
- Nov 18 Lecture 32: Learning and Memory: Types and the Search for the Engram.
- Nov 20 Discussion 33: Hippocampus and Memory.
- Nov 23 – 27 Thanksgiving**
- Nov 30 Lecture 34: The Little Brain: Cerebellum
- Dec 2 Discussion 35: What does the cerebellum do?
- Dec 4 Lecture/ Discussion: How Brains Recover From Damage/ When is it Time to Pull the Plug?
- Final Exam Thursday Dec 10, Noon**