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NEUR 281.01: Fundamentals of Neuroscience II - Cognition

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NEUR 281

Spring

Fundamentals of Neuroscience II

Cognition, Perception, and Neural Processing

Course information:

Time: 2:00-3:20 TR

Course: 3 credits

Room: HS 207

Prerequisites: NEUR 280

Course Instructors:

Dr. Katie M. Holick

Email: katie.holick@umt.edu

Office Phone: (406) 243-6486

Office Location: Skaggs 395C, 3rd Floor

Office Hours: By appointment (I am happy to Zoom or chat whenever fits both of our schedules)

Textbook:

Required: *Principles of Neural Science*, edited by **E.R. Kandel** et al. **5th edition**

(Available in the bookstore. One copy available for short term use in library, but access to a copy is assumed for the course). E-copies may be available through third-party providers.

Course Overview

This course will focus on a foundational understanding of the sensory systems, cognitive processing, perception, and memory. Specific topics include: the organization of sensory systems, the control of movement; mechanisms for learning, memory, and complex behaviors. In addition, disease states as a result of disruption of homeostasis of these processes will also be discussed.

Learning Outcomes: Through lectures and discussion, the course is designed to ensure that you will learn general principles applicable to many questions that will arise about the human brain and behavior. The primary outcomes for students are to effectively:

1. Outline each of the sensory systems (auditory, visual, gustation, olfactory, and proprioception): from molecular signaling to brain processing and integration.
2. Apply fundamental neuronal principles to understand the higher-level organization and cognitive operations of the brain.
3. Explain how memories are encoded, stored, and recalled by the brain.
4. Illustrate an understanding of cognitive neuroscience as applied to modern research.

Course Assignments:

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1. **Class Study Guide Questions:** Each week a set of questions will be posted for each lecture. These questions will be discussed during class meeting time and we will go over the structure the first day of class. Each person will be responsible for a question (could be on any day) to earn their 10 points for the week. If you fail to answer a question in any given week, you will not receive your 10 points. Each student will receive one pass to use this semester, so use it wisely. If you are unable to make class for a legitimate reason and you e-mail me before class, it will count as an excused absence.
2. **Weekly Quizzes:** Each week an online quiz will be given for the Chapters covered within that week via the Moodle website. The purpose of these quizzes is to assess your understanding of the material presented that week in class. These quizzes will be due by midnight Friday of each week.
3. **Exams:** Three semester exams and one final exam will be given. Test formats will include multiple-choice and short answer questions plus occasional short essays. The final examination is cumulative and must be completed to receive a final grade.

Exam Make-Up Policy: If you miss a semester exam, it will be your responsibility to schedule a time to re-take the exam with the course TA. You will be given two days to re-schedule and take the exam. Between days 2 and 7 post original exam date the exam format will be switched to entirely essay questions. If not taken within one week of the original exam, your exam will be graded as a zero. Failure to take the final exam will result in a failing grade. *All students are expected to take all exams when they are scheduled.* Students are expected to notify the instructor prior to missing an exam. Students are responsible for any changes in dates of scheduled exams, quizzes, or assignments or any other administrative announcement made during lectures.

4. Semester Long Project:

Your project will consist of several parts spread across the semester to aid in your professional development as a neuroscientist (or related field).

1. "What I want to be and the steps to get there" essay – 20 points

This purpose of this essay is for you to outline what your future goals and professional aspirations are. Although you may be keeping your options open, I will ask that you choose 1 specific career then work backwards. Outline the steps you would need to take to achieve this career. Min. 2 pages, double-spaced.

2. Find an internship/experience outside of class – 20 points

For this part of the project, you will put together a list of at least 3 different internships, research experiences, volunteer opportunities that you could do outside of your classwork that would help advance your career. You will post them on a discussion board on Moodle, just in case a fellow classmate may also be interested. Your written submission of these should also include a description of why you would participate in this activity and what you would hope to gain from it.

3. Resume/CV creation – 20 points

I will provide you with several examples of resumes and CVs. You will complete yours and submit it on Moodle. I will be happy to provide any feedback (you would submit via e-mail) you may need prior to the final due date.

4. Personal Essay – 20 points

A hallmark of medical school (and sometimes other professional schools). This is a chance to tell me *why* you want to do what you want to do with your life. I will provide some outline material and examples on Moodle to help get you started. 5-pages, double spaced.

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5. Meet with me 1-on-1 and discuss your total project – 20 points

This is the most low-key “interview” you will ever have. Really, I just want you to put all of your materials from this project together, bring a hard copy of them to our meeting, and you will schedule a time to meet with me outside of class to discuss it.

Project Component	Points	Additional Info	Due Date
“What I want to be and the steps to get there” essay	20	<ul style="list-style-type: none">• 2 pages• Double Spaces• Turn into Moodle	Feb 4 th
Find an internship/experience outside of class	20	<ul style="list-style-type: none">• 3 opportunities• Why you are interested• Post to Moodle discussion board	Feb 25 th
Resume/CV creation	20	<ul style="list-style-type: none">• Turn into Moodle	March 11 th
Personal Essay	20	<ul style="list-style-type: none">• Turn into Moodle	April 1 st
Meet with me 1-on-1 and discuss your total project	20	<ul style="list-style-type: none">• Schedule with me• Bring hard copies to meeting	April 29 th

Total Course Points

<i>Your performance will be evaluated as follows:</i>	%	#	Points/Item	Total Points Awarded
Study Guide Materials	15.3%	13	10	130
Quizzes	14.1%	12	10	120
Semester Exams	35.3%	2	150	300
Semester Project	11.8%	1	100	100
Comprehensive Final Exam	23.5%	1	200	200
Total	100%			850

Accessibility Statement:

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and the Office for Disability Equity (ODE). If you anticipate or experience barriers based on disability, please contact the ODE at: (406) 243-2243, ode@umontana.edu, or visit www.umt.edu/disability for more information. Retroactive accommodation requests will not be honored, so please, do not delay. As your instructor, I will work with you and the ODE to implement an effective accommodation, and you are welcome to contact me privately if you wish.

Detailed Schedule Spring

Week	Topic	Chapter(s)
1	Synaptic Integration in the Central Nervous System	13
2	Experience and Refinement of Synaptic Connections	49

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3	Learning and Memory	52
4	Cellular Mechanisms of Learning The Hippocampus	53 54
5	Sensory Coding Receptors of the Somatosensory System	17 18
6	Review Session Exam 1	
7	Touch Pain	19 20
8	Visual System	21-25
9	Auditory System	26/27/28
10	Smell and Taste: The Chemical Sense	29
11	Review Session Exam 2	
12	The Sensory, Motor, and Reflex Functions of the Brain Stem	30/31/32
13	Language Emotion	55 42
14	Motivation, Reward, and Addictive States	43
15	Decision-making and Consciousness Review Session for the Final	56
Finals Week	COMPREHENSIVE FINAL	