Spring 2-1-2019

BIOH 280.01: From Molecules to Mind - Fundamentals of Neuroscience

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BIOH 280 **Spring 2019**

Molecules to Mind - Fundamentals of Neuroscience

(Final copy, updated as of March 8, 2019)

Course Format: 3 credits Lectures Tu/Th 1:00-2:20 Room: ED 123

Prerequisites: None, but PSYX 250 is strongly recommended

Course Instructors:
Christopher Comer, Ph.D. Office: Room 390C Skaggs Bldg. Office Hours**:**
9:30-10:30 Tues & by appointment (406-243-2491)
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Teaching Assistants:
Nirvan Rouzbeh (nirvana.rouzbeh@umontana.edu)

Levi Zell (levi.zell@umontana.edu).

The TAs *will make office hours after tests to discuss grading; otherwise they will be available by appointment.*

Course Overview: We work upward through the levels of biologiocal organization: beginning with the cellular and genetic basis of neural function and end up with a consideration of the neural control of behavior and cognition. Specific topics include: neuronal signaling, the organization of sensory systems, the control of movement; mechanisms for learning, memory, and complex behaviors, such as language and emotion.

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

- to obtain a fundamental grounding in neuroscience thorough knowledge of the cellular and molecular properties of neurons and how they function in circuits.
- to apply these principles to understand the higher-level organization and cognitive operations of the brain.
- to build a factual basis explaining how neuroscience applies to health issues and provides an inspiration for new technologies.

Testing and grading: Materials from lectures and assigned readings will be covered in examinations. These are not always overlapping, so attendance is critical. Two in-class exams and a cumulative final exam will be given. Grades will be based on the following breakdown: 60% will come from the two one-hour exams, and 40% from the two-hour final exam. The final is a comprehensive, but weighted to emphasize what was covered since the second in-class exam. Test formats will include multiple-choice and short answer questions plus occasional very short essays. There may be some demonstrations or podcasts integrated into classes, and perhaps brief review quizzes.

Disability Considerations:
The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students. If you have a disability that adversely affects your academic performance, and you have not already registered with Disability Services, please contact Disability Services in Lommasson Center 154 or 406.243.2243. The instructors will work with you and Disability Services to provide an appropriate modification.

Textbook: 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.

Detailed Syllabus:

DATES	TOPIC(S)	Kandel
WK 1 Jan 10:	Overview, Biology of neurons and glia	Ch **1**-2
WK 2 Jan 15/17:	Genetics &Neuron Cell Biology	Ch 3-**4**
WK 3 Jan 22/24:	Ion channels, Membrane potentials	Ch 5-6
WK 4 Jan 29/31:	Action potentials	Ch 7
WK 5 Feb 5*/7:	Synaptic Integration	Ch **8**-9-10
WK 6 Feb 12:	Review / Catch-up	
WK 6 Feb 14:	**EXAM 1 (Covers Chs. 1-10)**	

WK 7 Feb 19/21:	Organization of the nervous system	Ch **15**-16
WK 8 Feb 26/28:	Sensory worlds, Somatic sensation	Ch **21**-22-23
WK 9 Mar 5/7:	Vision as a process, The eye	Ch **25**-26
WK 10 Mar 12/14:	Visual processing, cognition and action	Ch 28-29
WK 11 Mar 19/21:	Muscles and movement	Ch **33**-34-35
WK 12 Mar 26/28:	**Spring Break: NO CLASS**	
WK 13 Apr 2:	Review / Catch-up	
WK 13 Apr 4:	**EXAM 2 (Covers Chs. 15-29, as indicated)**	
WK 14 Apr 9/11:	Language	Ch **18**, 60
WK 15 Apr 16/18:	Emotion / Intro to Plasticity	Ch **48, 65**
WK 16 Apr 23/25:	Plasticity**,** Learning and Memory	Ch 66-67

*Chapters in **RED** are those we consider essential reading

**** * TUES, April 30: Final Exam, 1:10-3:10 * ****