PRINCIPLES OF NEUROSCIENCE II:

CELLULAR AND MOLECULAR NEUROSCIENCE

GMS6022 -- SPRING/2017
2 CREDITS

CLASS LOCATION: MBI BUILDING, L1-101
MEETING TIME: MONDAY, WEDNESDAY (9-11:00 AM), FRIDAY (9-10 AM)

COURSE DIRECTORS:

Tom Foster, Ph.D.
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Dr. Sara Burke
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COURSE DESCRIPTION AND OBJECTIVES:

This five-week course provides for integration of molecular and cellular techniques into learning about the fundamental principles of electrical properties and synaptic signaling in excitable cells. Students will gain an understanding of the physiological properties of the components of the nervous system, how ions and ion channels govern the membrane potential and excitability, and how signaling properties arise at the single neuron level. Following the function of individual cells, the manner in which they are connected will be covered, including synaptic signaling between neurons. We will cover the molecular make-up of synapses, and different kinds of synapses, the quantal theory of transmission, and neuromodulation. We will also discuss the different kinds of synaptic plasticity mechanisms that make synaptic strength use-dependent. The course includes a review of model systems and neural circuits in integrative neurophysiology, as well as the relation of neural circuits to behavior and cognitive processes. Modern molecular methods are incorporated in discussing functional genomics in regulating neurophysiology.

COURSE TEXTBOOK:

From Neuron to Brain, Fifth Edition by John G. Nicholls(Author), A. Robert Martin(Author), Paul A. Fuchs as well as readings assigned by lecturers

PREREQUISITE KNOWLEDGE AND SKILLS:

You are expected to be familiar with basic Neuroscience concepts before starting this course series. If you are uncertain about the sufficiency of your background, you are encouraged to read through chapters 1-7 in Neuroscience Online – an electronic textbook (Open Access)
http://neuroscience.uth.tmc.edu/index.htm

COURSE SCHEDULE:

Day	Date	Topic	Reading	Lecturer
1	March 20	Neurobiology of Glia	Ch 10	Streit
2	March 22	Neuroimmunology The Fundamentals of Electrophysiology I: Introduction to Ionic Currents and Channels.	Ch 4	Streit Dr. Tom Foster
3	March 24	Structure of Ion Channels.	Ch 5	Dr. Tom Foster
4	March 27	The Fundamentals of Electrophysiology II: The Resting Membrane Potential The Action Potential	Ch 6,7	Dr. Tom Foster
5	March 29	Synaptic transmission: Molecular mechanisms Electrophysiology of Synaptic transmission, Quantal Analysis	Ch 7, 11-13	Dr. Tom Foster
6	March 31	The Hippocampus and NMDA receptor dependent LTP and LTD.	Ch 16	Dr. Tom Foster
7	April 3	Computational models in simple circuits	*TBA papers*	Dr. Damon Lamb
8	**APRIL 5**	**MIDTERM PRACTICAL**		
9	April 7	Neuronal Metabolism	*TBA papers*	Ms. Abbi Hernandez
10	April 10	Sensory transduction and Elementary Neuronal Networks	Ch 19	Dr. Sara Burke
11	April 12	Sensory transduction and Elementary Neuronal Networks II. Signaling mechanisms.	Ch 24	Dr. Sara Burke
12	April 14	Modulation and Plasticity. Simple circuits to cognition – Student project due	*TBA papers*	Dr. Sara Burke
13	April 17	EEG, Oscillations, and Rhythmicity	*TBA papers*	Dr. Andrew Maurer
14	April 19	**FINAL EXAM**		

Disclaimer: This syllabus represents our current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.

GRADING POLICIES:

Student Projects: 10%
Class participation 10%
Midterm Exam: 40%
Final Exam: 40%

COURSE POLICIES:

ATTENDANCE POLICY: *You are expected to attend each lecture and actively participate in the student projects.*

QUIZ/EXAM POLICY: *There are two exams in this course, a mid-term and a final. They are in-class exams comprised primarily of multiple choice and short answer questions.*

STUDENT PROJECTS: *Each student will write one "Journal Club" on a paper of their choice that published within the last 12 months for 10% of final grade. This will follow the Journal of Neuroscience format (*http://www.jneurosci.org/site/misc/ifa_features.xhtml*) and should have three components: a short overview of the background of the reviewed paper, a critical data-based review of the key findings, and a brief summary of the significance of the paper. The Journal Club should focus on the most important results (it is not necessary to discuss each figure), and a successful paper will offer a critical evaluation the results in the context of other work. The length should be between 1200 and 1500 words. These papers should be emailed to Dr. Burke by 5pm on April 14, 2017.*

MAKE-UP POLICY: *You are expected to notify the course directors of any anticipated absences. You should make every effort to take the exams on the days they are scheduled. If extenuating circumstances prevent you from taking a scheduled exam, you will need to schedule an appointment to meet with the course directors to identify an alternative exam date.*

UF POLICIES:

UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES: Students requesting accommodation for disabilities must first register with the Dean of Students Office (http://www.dso.ufl**.edu**/drc/). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

UNIVERSITY POLICY ON ACADEMIC MISCONDUCT: Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at http://www.dso.ufl.edu/students.php

ABOUT THE LECTURERS

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