

BIO/BME 595: Neural Mechanisms of Health and Disease
Spring 2019, 1:30-2:45 PM, MJIS 1083

Professor: Edward L. Bartlett, Ph.D.

Office: MJIS 2023 ext. 61425, or 765-496-1425 from off-campus

Office Hours: TBD or by appointment (in person or via Skype/Blackboard Discussion forum)

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Course Emails:

Emails received after 9 pm will often be responded to the following day. Please call me (765-496-1425) or come to my office if something requires immediate attention.

Textbooks for reference:

I will obtain figures from a number of different sources, including some of the neuroscience books listed below, as well as journal articles.

Principles of Neural Science, Fifth Edition. Eric Kandel et al. This is more of an encyclopedia or reference book for graduate students in neuroscience. We will not cover some of the topics, particularly those in molecular neuroscience.

Fundamental Neuroscience, Fourth or Fifth Edition. Larry Squire et al.

Upper-undergraduate/graduate texts:

From Neuron to Brain, Fifth Edition. John Nicholl et al.

Neuroscience, Fifth or Sixth Edition. Dale Purves.

More specialized texts (a couple of examples, there are many more, just ask me):

Spikes: Exploring the Neural Code. Fred Rieke et al.

Biophysics of Computation: Information Processing in Single Neurons. Christoph Koch.

Learning Objectives:

1. Describe the organization of the mammalian nervous system, cellular neurophysiology, and neural plasticity
2. Apply neural information processing principles to determine how external and internal variables drive neural activity and behavior
3. Design experiments by selecting appropriate techniques and measurements in order to address an experimental question or hypothesis
4. Analyze and interpret neural data, mainly neurophysiological data, to answer questions about neural coding and with respect to an experimental hypothesis
5. Develop preliminary therapeutic solutions to neural disorders based on understanding neural mechanisms and devices used to measure or treat these disorders

Website: There is a web site for Bio/BME 595 on Blackboard Learn. The Bio/BME 595 course website will have essential information related to the course, such as lecture slides, syllabus, problem sets, problem set answers, lecture recordings and useful neuroscience sites. You will log onto the site with your Purdue career account that has been assigned to you. For problems accessing the website please contact me.

Classes: Tuesday and Thursday at 1:30-2:45 pm in MJIS 1083.

Class slides: Preliminary class slides will probably be available in the late evening or early morning before class only. The class slides that are actually delivered during class will be posted on Blackboard Learn following the class.

Exams. There will be one exam in class and one take home exam during the semester.

Exam dates:

February 7, 2019 (in class)

March 8 (assigned for take-home), March 22 (due), 2019

Final Exam: Similar to the second exam, there will be a take home final covering the last section of material, mainly neuropathologies and neurotechnologies. **It will be assigned April 23 and will be due May 1.**

Research Grant Proposal: You will write the specific aims for one grant proposal in the format of an NIH F31 grant (NRSA pre-doctoral fellowship). After review of the aims by myself and peers, a revised aims and experimental methods and design will be submitted. The preliminary aims will be due **April 5, 2019**. The revised aims and the methods are due **April 26, 2019**.

Neural coding project: This assignment will be to conduct analysis of neural data, either provided to you or from a project in your lab. Further details will be given during the semester. The proposed experiment topics will be due **Feb 15, 2019**, and the report based on the experiments is due **March 8, 2019**.

Neural disease mini-review Teams of 3-4 people will create a technical summary and synthesis regarding what is known and what outstanding questions there are for a neurological disease, disorder or pathology. Full details TBA. This will be due **April 18, 2019**.

Re-grade: A graded exam will be considered for re-grades. You must submit a written request to the instructor within **one week** of receiving the graded document. Your request must contain a justification for the re-grade request. Keep in mind that the entire question being considered will be re-graded, so it is possible that the score for the re-graded question could be higher or lower than the original. The final exam will not be re-graded.

Grading. Grades will be based upon the scores acquired on exams, assignments, and the final exam.

Exams I-II	17% each
Final Exam	18%
Research Grant Proposal preliminary	3%
Research Grant Proposal final report	5%
Peer review of grants and assignments	10%
Homework, disease mini-review smaller assignments/participation	20%
Neural data analysis project	10%
Total	100%

Grades will be guaranteed for the following scores, but may be curved by the instructor.

A+	>93 %
A	>90 %
B+	>85 - 90 %
B	>80 - 85%
B-	>77- 80 %
C+	>74- 77 %
C	>70 - 74 %
C-	>67 - 70%
D	>60-67 %

Attendance. Attendance is strongly encouraged in lecture, and participation in class activities is included in the course grade. You are responsible for all of the material and announcement covered in class. If you miss an exam for a **legitimate** reason, you must notify the instructor in advance, and the instructor reserves the right to decline a request to miss an exam. Otherwise, you must have an official excuse from the Dean of Students.

Statement of Academic Integrity

The commitment of acts of cheating, lying, and deceit in any of their diverse forms such as: the use of substitutes for taking examinations, use of illegal cribs, plagiarism and copying during homework, projects, or examinations is dishonest and will not be tolerated.

Definition of Academic Dishonesty

Purdue University prohibits dishonesty in connection with any University activity. Cheating, plagiarism or knowingly furnishing false information to the University are examples of dishonesty. Students caught cheating will receive a zero for the assignment or exam and possibly additional punishments depending on the severity of the infraction. If a student is caught violating the academic integrity code a second time, then the student will automatically receive a failing grade in the course. Furthermore, individual case(s) may be referred to the Dean of Students office.

Emergency Information

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances.

Here are ways to get information about changes in this course: 1. Message via the Blackboard site for the course. 2. Email.

MJIS specific instructions: In case of fire, evacuate the building preferably via the EAST doorways (towards So. Russell St.) if they are free of hazards. DO NOT use the West doorways as a primary exit as those will be the doors accessed by emergency responders and fire personnel. In case of a tornado warning, proceed to the basement hallway via the East stairwell, nearest the classroom. In the case of a civil disturbance, such as an active shooter, seek a safe location, preferable a room without windows that can be locked or secured by barriers. Lab areas (second and third floors) or basement animal facilities, which are both locked, could be used.

Prof. Bartlett reserves the right to alter the course in order to fulfill course learning objectives and further student understanding.

