

Foundation of Neural Engineering

BME 4931 Section 0064

Class Periods: T Period 7 (1:55-2:45 p.m.), R Period 6-7 (12:50-2:45p.m.)

Location: CHE 0237 (Turlington Hall)

Academic Term: Spring 2018

Instructor:

Dr. Brandi K. Ormerod
bormerod@bme.ufl.edu

Office Hours:

Tuesday from 2:45-3:45 p.m. or by email appointment.

Teaching Assistants:

N/A

Course Description

This course will introduce Biomedical Engineering students to the brain, neurotransmitter systems, behavioral neuroscience and CNS diseases. Each lecture and accompanying textbook chapter focuses upon a central question (i.e., "How Does the Nervous System Function?"). Topics will incorporate a distinctive clinical perspective that critical to Biomedical Engineers' ability to drive clinical translation and examples showing students what happens when common neuronal processes malfunction will be discussed (3 Credits).

Course Pre-Requisites / Co-Requisites

Students enrolled in the Biomedical Engineering undergraduate program will be able to register for the course. Students in other departments who have successfully completed BSC 2010 and PCB 3731C may obtain permission from the instructor to enroll in the class.

Course Objectives

- To teach the student about the fundamentals of brain structure and function
- To teach the student how cognitive ability is tested
- To teach the student about CNS diseases and current treatments for CNS diseases

Materials and Supply Fees

None

Professional Component

The course will contribute to the student's ability to apply knowledge, understand how to conduct experiments, communicate, and to understand societal impacts and contemporary issues in BME.

Required Textbooks and Software

Title: An Introduction to Brain and Behavior
Authors: Brian Kolb, Ian Q. Whishaw and G. Campbell Teskey
Published: 2016
ISBN number: 1-4641-0601-0

Recommended Materials

None

Course Schedule (Subject to change at the discretion of the professor)

Date	Week	Class	Lecture Topic	Chapter
Tuesday, January 9, 2018	1	1	Introduction	
Thursday, January 11, 2018		2	Perspective organization for student discussions	
			What are origins of the brain and behavior?	1
Tuesday, January 16, 2018	2	3	What is the nervous system's functional anatomy?	2
Thursday, January 18, 2018		4	What are the nervous system's functional units?	3
			Student Perspective Discussions Chapters 1 and 2	
Tuesday, January 23, 2018	3	5	How do neurons communicate and adapt?	4-1, 2
Thursday, January 25, 2018		6	How do neurons integrate and transmit information?	4-3, 4
			Student Perspective Discussions Chapter 3 and 4	
Tuesday, January 30, 2018	4	7	How do neurons use electrical signals to transmit info?	5-1, 2
Thursday, February 1, 2018		8	Neurotransmitter Systems, Behavior and Memory	5-3, 4
			Student Perspective Discussions Chapter 4 and 5	
Tuesday, February 6, 2018	5	9	Test 1	
Thursday, February 8, 2018		10	Test Review	
			How do drugs and hormones influence the brain?	6
Tuesday, February 13, 2018	6	11	How do we study the brain's structures and functions?	7
Thursday, February 15, 2018		12	How does the nervous system develop and adapt?	8
			Student Perspective Discussions Chapter 6 and 7	
Tuesday, February 20, 2018	7	13	How do we sense, perceive and see the world?	9-1, 2, 3
Thursday, February 22, 2018		14	Seeing the visual world	9-4, 5
			Student Perspective Discussions Chapter 8 and 9	
Tuesday, February 27, 2018	8	15	How do we hear, speak and make music?	10-1,2,3
Thursday, March 1, 2018		16	Language, Music and non-human communication	10-4,5
			Student Perspectives Chapter 10	
Tuesday, March 6, 2018	9	Spring Break		
Thursday, March 8, 2018				
Tuesday, March 13, 2018	10	17	Test 2	
Thursday, March 15, 2018		18	Review	
			How does the nervous system sense and produce movement?	11-1,2,3
Tuesday, March 20, 2018	11	19	Somatosensation	11-4,5
Thursday, March 22, 2018		20	What causes emotion and motivated behavior?	12
			Student Perspectives Discussions Chapter 11 and 12	
Tuesday, March 27, 2018	12	21	Why do we sleep and dream?	13
Thursday, March 29, 2018		22	How do we learn and remember?	14-1,2,3
			Plasticity and recovery from brain injury	14-4,5
Tuesday, April 3, 2018	13	23	Student Perspectives Discussions Chapter 13 and 14	
Thursday, April 5, 2018		24	How does the brain think?	15-1,2,3
			Cerebral assymetry and cognitive organization	15-4,5
Tuesday, April 10, 2018	14	25	Student Perspectives Discussions Chapter 15 and 16	
Thursday, April 12, 2018		26	What happens when the brain misbehaves?	16-1,2,3
			Understanding and treating psychiatric disorders	16-4,5
Tuesday, April 17, 2018	15	27	Test 3	
Thursday, April 19, 2018		28	Review	
			Class summary/Evaluations	
Tuesday, April 24, 2018	16	29	Wrap Up	

Attendance Policy, Class Expectations and Make-Up Policy

Foundations of Neural Engineering, BME 4931
Ormerod, Spring 2018

Students will sign an attendance sheet each class. Class attendance will count for 10% of the final grade (the student may miss up to 3 classes without penalty).

Students will be tested on all material presented in lectures and in the textbook. Students attending lectures will acquire insight about topics that the professor deems important and will be likely to focus upon in tests. Tests can only be made up if an absence is excusable according to university policies in the graduate catalog (<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance>). Note that conference attendance, training course enrollment or any other personal choice to miss class is at the discretion of the student and is not an excusable reason for missing class.

Appropriate documentation for illness (i.e. a doctor's note STATING that the student could not attend class on the specific day the class was held because of illness) or a copy of the family member's death certificate will be required to consider a test or student discussion makeup. Without valid documentation, the total amount that a student missing the original test or discussion date will be able to obtain on a rewritten test will be reduced by 20% per day after the test or discussion date specified in the syllabus. **NOTE: Students attending class may follow lecture slides on an electronic device, but will be asked to leave the class if using a laptop, cell phone, tablet or any other electronic device for any other reason.**

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Attendance	30	10%
Student Discussions (3)	150	30%
Test 1	50	20%
Test 2	50	20%
Test 3	50	20%
Total		100%

Grading Policy

Percent	Grade	Grade Points
≥ 92	A	4.00
90-91	A-	3.67
87-89	B+	3.33
83-86	B	3.00
80-82	B-	2.67
77-79	C+	2.33
73-76	C	2.00
70-72	C-	1.67
67-69	D+	1.33
63-66	D	1.00
60-62	D-	0.67
< 60	E	0.00

I spend a LOT of time grading to ensure that grading is fair. I do not negotiate grades given for test answers to improve your GPA. Students who do not return their graded tests after review will receive zero for that test.

I will round your grade to the nearest 10th of a point and then assign your letter grade based upon the table. I do not curve grades. The test criteria are very clearly stated. If a test question is not answered correctly by at least one student in the class, I will throw out the test question. Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. Graduate students, in order to graduate, must have an Foundations of Neural Engineering, BME 4931
Ormerod, Spring 2018

overall GPA of 3.0 or better (B or better). Note: a B- *average* is equivalent to a GPA of 2.67, and therefore, it does not satisfy this graduation requirement.

More information on UF grading policy may be found at:

<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, **“We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code”**. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: **“On my honor, I have neither given nor received unauthorized aid in doing this assignment.”**

As such, Gators do not cheat, plagiarize, bribe, misrepresent, conspire, or fabricate. Furthermore, as part of your obligation to uphold the Honor Code, you should report any condition that facilitates academic misconduct to appropriate personnel.

If a student is found responsible for the alleged violations of the Student Conduct Code, one or more of the following sanctions may be imposed:

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|--|--------------------------------------|
| - Written Reprimand | - Community Service |
| - Conduct Probation w/o Loss of Privileges | - Educational Sanctions |
| - Conduct Probation w/ Loss of Privileges | - Loss of Privileges |
| - Deferred Suspension | - Reduced or Failing Grades |
| - Suspension from the University | - Restitution for Damages |
| - Expulsion from the University | - Room Transfer/Removal from Housing |

The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TA in this class.

Students may study for their tests in groups, but tests must be written **INDEPENDENTLY** without the assistance written, verbal, electronic or other aides. No electronic devices will be permitted during tests. Students who engage

in any activity other than answering quiz questions independently during a quiz will be removed from the room, given zero on their test and reported to the Office of Student Conduct and Conflict Resolution.

Campus Resources:

Health and Wellness

U Matter, We Care:

If you or a friend is in distress, please contact umatter@ufl.edu or 352 392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.