

BIOLOGY 351 Spring 2017
PRINCIPLES OF NEUROBIOLOGY
Tuesday, Thursday 9:25-10:40 am Robert Scott Smalls (RSS) 252

Instructor: Dr. Jeffrey D. Triplehorn

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Office location: Off-campus (SCRA facility); office hours held in SSM 148

Phone: 953-5848

Office hours: Thursday 11:00-12:00 am or by appointment

Weekly Review Session:

Tuesdays 6:00-7:00 pm

Room SSM 141

Sessions will start on Tuesday, January 17

1. Course requisites

Prerequisites

PSYC 103 – Introduction to Psychology

BIOL 111 – Introduction to Cell and Molecular Biology

BIOL 112 – Evolution, Form, and Function of Organisms

BIOL 211 – Biodiversity, Ecology and Conservation Biology

or

PSYC 214 – Behavioral Neuroscience

Co-requisites or Prerequisites

MATH 250 or equivalent course in statistics

Cross-listing: PSYC 351

2. Course description

The principle goal of this course is to provide a rigorous introduction to cellular and molecular neuroscience. The course will cover topics that include the ionic basis of neuronal excitability, the principles of neural communication and neural interactions, and neurotransmitter systems. During the course, you will develop an understanding of how processes occurring at the cellular level form the basis of functioning nervous systems, including how these processes relate to normal behavior and neural pathologies.

3. Instructional objectives and student learning outcomes

- a. Identify and explain the cellular and molecular principles underlying the function of neurons.
- b. Describe how the historical contributions of neuroscience research contributed to the current understanding of the nervous system.
- c. Describe techniques employed in neuroscience research.
- d. Relate how the cellular and molecular principles of neuronal function relate to disorders of the nervous system.
- e. Demonstrate written skill sets by applying course material to current issues in neuroscience and neuroscience research.

4. Required reading and materials

From Neuron to Brain, 5th ed., Nicholls, Martin, Fuchs, Brown, Diamond, Weisblat; Sinauer, 2012
Any additional required readings will be posted on OAKS. There may also be videos that are required for viewing outside of class. These will expand upon the material presented in class.

5. Course and attendance policies

The class will meet for 75 minutes, twice per week. **Class attendance is mandatory.** Students that do not attend regularly will not do well on exams. Class time will be used to present lectures, give demonstrations, show video clips, and discuss material. Discussion in class will be designed to stimulate thought about the material we are covering. Additionally, it will be extremely difficult to keep up with the amount of information presented in this course if you do not attend class. **You are responsible for all material that is covered in the lectures and in the text.** Material and topics will be discussed in class that is not in the textbook.

During lectures, I will be making use of PowerPoint slides, the white board, and videos. Slides (including links to internet videos shown in class) will be posted on OAKS *after* lecture. *Lecture notes will not be posted.*

6. Technology Policy

There will be no use of cell phones, computers, iPads, iPhones, etc. during class. These devices are disruptive to other students in the classroom and to my teaching. If your cell phone goes off during class, you may be asked to leave for the day. All devices are to be turned off and put away (not left on your desk) until class is dismissed.

7. Review/Q&A Sessions

In addition to office hours, I will have a weekly review/Q&A session on Tuesdays 6-7 pm in SSM 141. Bring questions.

8. Evaluation

Grades will be based on **quizzes, take-home assignments, three exams and a comprehensive final.** Quizzes and exams will consist of multiple choice, fill-ins, figure completions, short answers, and short essay questions. Material will be drawn from lectures, class discussions, and the readings.

> Quizzes will be given at the beginning of class and will be timed. **If you miss a quiz, you will not be able to make it up under any circumstance (emergency or otherwise).** If you come in late, you will not get extra time to finish the quiz. The dates for the quizzes and material covered on each quiz are indicated on the class schedule.

> The exams will be given on the dates indicated in the class schedule. Each student is responsible for knowing when the exams will be given as well as taking the exams on those dates.

> **Each student is responsible for bringing one or two Number 2 pencils to each of the exams.**

> If you are an athlete and know that you will be unable to attend an exam, please notify me **at least one week in advance**; I will make arrangements for you to take the exam.

> If you are a student with special needs (i.e. a documented learning disability) and you require special arrangements for the exam, please see me as soon as possible so that I have additional time to accommodate your needs. **You must provide documentation of your special need in writing at the beginning of the semester.**

9. Exam policies

There will be no make-up exams.

Students must be present for all exams. You may petition to have an excused absence for an exam if:

1. A death in the immediate family.
2. An illness or emergency that results in a visit to a hospital emergency room or to a physician.

I expect to be notified by phone or e-mail immediately if it will affect your presence at an exam. This **must** be followed up by documentation in writing (i.e. you must provide an obituary or provide a letter from an Emergency Room physician).

In the event that I excuse your absence, your missing grade will be replaced by the average of your other exams.

If your absence is unexcused, you will receive a "0" for the exam.

10. Grading policy

Grades will be assigned on the basis of the number of points that you earn at the completion of the course. The number of points and the approximate percentage of the grade are indicated below.

Source	% of Grade	Number of Points
Exam #1	15%	150
Exam #2	15%	150
Exam #3	15%	150
Final Exam (comprehensive)	30%	300
Quizzes (8, drop lowest)	16%	160
Take-home Assignments (3)	9%	90
		1000

10. Grade assignment

The combined total for all of the above will be 1000 points. Your final grade in the course will be based on a percentage of points based on the College of Charleston grading scheme:

% of Total Points	Point Range	Grade Earned
93% and higher	930-1000	A
90-92.9%	900-929	A-
87-89.9%	870-899	B+
83-86.9%	830-869	B
80-82.9%	800-829	B-
77-79.9%	770-799	C+
73-76.9%	730-769	C
70-72.9%	700-729	C-
67-69.9%	670-699	D+
63-66.9%	630-669	D
60-62.9%	600-629	D-
<60%	<600	F

11. Late policy

You are expected to turn in the take-home assignments on time. Failure to do so is equivalent to failing to meet a deadline. If you fail to meet the assignment deadline, the highest grade you can earn is the lowest of the assignments turned in on time, minus one point. For example, if the lowest grade in the class was a 20 points on the assignment (out of 30 possible points), you would get 19 points if the assignment was perfect. I will not accept an assignment after I have returned the graded assignments to the class. If you have a personal or family emergency, the same policy listed above for the exam (with respect to the documentation) applies. **Electronic copies of take-home assignments will not be accepted!**

12. Expectations of the students

Remember that you have a responsibility for you own education. I am here to facilitate you in this process. You accept this responsibility by being prepared, being attentive and participating in class, and reviewing materials prior to class. This course will cover a lot of material. I encourage you to attend the weekly review sessions. If you are having difficulties with the material, seek help early. I can only help you if you come see me so that we can work together.

13. College of Charleston Honor Code and Academic Integrity

Lying, cheating, attempted cheating, and plagiarism are violations of our Honor Code that, when identified, are investigated. Each incident will be examined to determine the degree of deception involved.

Incidents where the instructor determines the student's actions are related more to a misunderstanding will handled by the instructor. A written intervention designed to help prevent the student from repeating the error will be given to the student. The intervention, submitted by form and signed both by the instructor and the student, will be forwarded to the Dean of Students and placed in the student's file.

Cases of suspected academic dishonesty will be reported directly by the instructor and/or others having knowledge of the incident to the Dean of Students. A student found responsible by the Honor Board for academic dishonesty will receive a XXF in the course, indicating failure of the course due to academic dishonesty. This grade will appear on the student's transcript for two years after which the student may petition for the XX to be expunged. The F is permanent. The student may also be placed on disciplinary probation, suspended (temporary removal) or expelled (permanent removal) from the College by the Honor Board.

Students should be aware that unauthorized collaboration--working together without permission-- is a form of cheating. Unless the instructor specifies that students can work together on an assignment, quiz and/or test, no collaboration during the completion of the assignment is permitted. Other forms of cheating include possessing or using an unauthorized study aid (which could include accessing information via a cell phone or computer), copying from others' exams, fabricating data, and giving unauthorized assistance.

Research conducted and/or papers written for other classes cannot be used in whole or in part for any assignment in this class without obtaining prior permission from the instructor.

Students can find the complete Honor Code and all related processes in the *Student Handbook* at <http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php>

14. Accommodations for students with disabilities

The College of Charleston abides by Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act. Any student eligible for and needing accommodations because of a disability is requested to speak with the professor during the first two weeks of class or as soon as the student has been approved for services so that reasonable accommodations can be arranged. Students should apply for services at the Center for Disability Services/SNAP (843-953-1431) located on the first floor of the Lightsey Center, Suite 104.

15. Center for Student Learning

I encourage you to utilize the Center for Student Learning's (CSL) academic support services for assistance in study strategies, speaking & writing skills, and course content. They offer tutoring, Supplemental Instruction, study skills appointments, and workshops. Students of all abilities have become more successful using these programs throughout their academic career and the services are available to you at no additional cost. For more information regarding these services please visit the CSL website at <http://csl.cofc.edu> or call (843)953-5635.

16. Schedule

The following schedule represents a tentative plan for the course. **Topics and dates are subject to change. Quizzes occur at the beginning of class.**

Lecture	Date	Pages	Quiz/Exam	Topic
1	January 12	3-22 159-179		Course Introduction Cells of the Nervous system
2	January 17			Cells of the nervous system Nervous system organization
3	January 19	99-111	Quiz 1 (L 1-2)	Nervous system organization Electrophysiological techniques
4	January 24			Electrophysiological techniques
5	January 26		Quiz 2 (L 3-4)	Membrane potential
6	January 31	112-128		Membrane potential Action potential generation
7	February 2		Quiz 3 (L 5-6)	Action potential generation
8	February 7			Action potential generation
	February 9		Exam I	Lectures 1-7
9	February 14	129-141		Neural adaptation Passive properties of neurons
10	February 16	185-211		Passive properties of neurons Action potential propagation
11	February 21	243-272		Action potential propagation Current spread in dendrites
12	February 23		Quiz 4 (L 8-11)	Synaptic transmission
13	February 28	213-241	Assignment #1 due	Synaptic transmission Synaptic integration
14	March 2	299-316	Quiz 5 (L 12-13)	Synaptic integration Indirect synaptic transmission
	March 7			SPRING BREAK
	March 9			SPRING BREAK
15	March 14			Indirect synaptic transmission
16	March 16		Quiz 6 (L 14-15)	Introduction to neurotransmitters
17	March 21	273-281		Neurotransmitter receptors and research techniques
	March 23		Exam II	Lectures 8-16
18	March 28			Neurotransmitters: The three "G's" GABA, Glycine, and Glutamate
19	March 30	286-298		Neurotransmitters: The Monoamines Dopamine
20	April 4		Assignment #2 due	Dopamine and Parkinson's Disease Dopamine and Schizophrenia
21	April 6		Quiz 7 (L 17-20)	Norepinephrine and ADHD
22	April 11			Serotonin Major Depressive Disorder
23	April 13	317-333	Quiz 8 (L 21-22)	Acetylcholine and Alzheimer's Disease Synaptic plasticity Long term potentiation
24	April 18			Long term potentiation Neuromodulation and Metamodulation
	April 20		Exam III	Lectures 17-23
25	April 25		Assignment #3 due	Excitotoxicity
Thursday	May 4		FINAL	8-11 AM (comprehensive)