

Fundamentals of Neuroscience PCB 4843-01 Fall 2018

Course credit: 3 hours

Lecture: Tuesday Thursday 11:00 am - 12:15pm

Meeting place: 115 Sandels Building (SAN 115)

Professor: Dr. Tom Houpt Email: *houpt@bio.fsu.edu*

Office Hours: Thursday, 1- 3pm, King 3013, or by appointment.

TA: Durba Mukherjee Email: *dmukherjee@bio.fsu.edu*

Office Hours: Wednesday, 1- 3pm, King 3004, or by appointment.

Course Description

Neuroscience is the study of neurons and their networks. The focus of this course is mammalian nervous systems with an emphasis on human brain and nervous function. Topics include the function of nerve cells and how they communicate, sensory systems, control of movement, learning and memory, and diseases of the brain.

Prerequisites

General chemistry and 2,000-level core sequence in Biological Science and PCB 3134 Cell Structure & Function. PCB 4701 Human Physiology is highly recommended.

Course Objectives

By the end of this course, the student will be able to:

- describe the anatomy of neurons and how neurons generate electrical and chemical signals, and be able to analyze mechanisms such as the action potential and neurotransmitter release, and the action of drugs on neuronal receptors.
- describe major sensory systems and motor output pathways by which the nervous system responds to stimuli and produces behavioral responses.
- summarize the role of major components of the mammalian nervous system, such as the peripheral nervous system, spinal cord, brainstem, hypothalamus, limbic system, and sensory/motor cortices; and the effects of damage to these different components.
- explain the symptoms and causes of some major neurological diseases, such as Parkinson's, Alzheimer's, and Huntington's Diseases, both from class lectures and from completing an individual project.

Expectations & Requirements

Attendance at lecture will not be recorded. However, the examinations will cover the lecture material, including material not in the posted Powerpoint presentations and not in the book. Therefore, attendance at the lectures is highly recommended! The text is also required reading, and may be covered on the exams.

Please turn off pagers, cell phones, etc. and refrain from talking when attending lecture (although questions are always welcome).

Text

Neuroscience: Exploring the Brain, Fourth Edition, Mark F. Bear, Barry W. Connors, Michael A. Paradiso, Lippincott Williams and Wilkins, ISBN 978-0-7817-7817-6

Website

Syllabus, lecture outlines, handouts, and practice exams will be posted on Canvas. Lectures may be updated on the evening before class, so it's worth checking. Lectures will also be posted at my website, <https://houptlab.org/courses/fns>

Top Hat

We will be using the Top Hat (www.tophat.com) classroom response system in class. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, laptops, or through text message. You can visit the Top Hat Overview

<https://success.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide>

within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system.

An email invitation will be sent to you by email, but if don't receive this email, you can register by simply visiting our course website: <https://app.tophat.com/e/634384>

Note: our Course Join Code is **634384**

Top Hat will require a paid subscription, and a full breakdown of all subscription options available can be found here: www.tophat.com/pricing.

Should you require assistance with Top Hat at any time, due to the fact that they require specific user information to troubleshoot these issues, please contact their Support Team directly by way of email (support@tophat.com), the in app support button, or by calling 1-888-663-5491.

University Attendance Policy

Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor Policy

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to "...be honest and truthful and...[to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at <http://fda.fsu.edu/Academics/Academic-Honor-Policy>)

Americans with Disabilities Act

Students with disabilities needing academic accommodation should: (1) register with and provide documentation to the Student Disability Resource Center; and (2) bring a letter to the instructor indicating the need for accommodation and what type. Please note that instructors are not allowed to provide classroom accommodation to a student until appropriate verification from the Student Disability Resource Center has been provided. This syllabus and other class materials are available in alternative format upon request. For more information about services available to FSU students with disabilities, contact the: Student Disability Resource Center 874 Traditions Way 108 Student Services Building Florida State University Tallahassee, FL 32306-4167 (850) 644-9566 (voice) (850) 644-8504 (TDD) sdrc@admin.fsu.edu <http://www.disabilitycenter.fsu.edu>

Free Tutoring from FSU

On-campus tutoring and writing assistance is available for many courses at Florida State University. For more information, visit the Academic Center for Excellence (ACE) Tutoring Services' comprehensive list of on-campus tutoring options at <http://ace.fsu.edu/tutoring> or contact tutor@fsu.edu. High-quality tutoring is available by appointment and on a walk-in basis. These services are offered by tutors trained to encourage the highest level of individual academic success while upholding personal academic integrity.

Syllabus Change Policy

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.

Grade Determination

Top Hat Participation (4% of final grade)

Beginning the 2nd week of class, periodic quizzes or discussion points will be raised in class using Top Hat. Because these in-class questions are designed to help track your understanding of the lecture, you won't be graded on your correct/incorrect responses -- but you will get credit just for participating. Because not everyone can attend every lecture every day, you can miss 1 out of every 5 lectures without penalty.

Problem Sets (10% of final grade)

Beginning the 2nd week of class, there will be periodic Problem Sets handed out in class and/or posted on the course website on Canvas. Answers to Problem Sets will be due at 11:59pm on Mondays.

Written Project (10% of final grade)

A 5-page written project describing a neurological disease. A template will be provided for describing the symptoms of the disease, the typical patient population, the known or suspected causes at the neuronal or molecular level, and typical treatments. You will be expected to cite at least 4 papers from <https://www.ncbi.nlm.nih.gov/pubmed>.

There will be 3 deadlines:

Date	Task
Oct 26	select a disease and submit it using the list and form provided on Canvas:
Nov 9	submit a 3-page draft for comments by Dr. Houpt (including references for the 4 papers you'll be citing). This won't be graded, but will be returned with comments.
Nov 20	Comments on draft returned by Dr. Houpt
Dec 7	submit a final copy for grading

Exams (76% of final grade)

There will be four exams throughout the semester. Exams may include short answer or multiple choice questions.

Date	% of Final Grade	Material Covered
27-Sep Thur	19%	Lectures 1-8
23-Oct Tue	19%	Lectures 9-15
13-Nov Tue	19%	Lectures 16-20
11-Dec Tue 8-10 pm	19%	Lectures 21-26

Please note that the Final Exam will be given during finals week on Tuesday December 11 2018 from 8pm to 10pm in Sandels Rm 115, as specified in the registrar's schedule.

Review sessions will be scheduled before each exam.

Grade Assignment

Grades will be assigned as follows:

A	100-93
A-	92-90
B+	89-87
B	86-83
B-	82-80
C+	79-77
C	76-73
C-	72-70
D+	69-67
D	66-63
D-	62-60
F	59-0

**Grades will be posted on Canvas.
Depending on class performance, a curve or across
the board adjustment may be applied.**

Examination and Grading Policies

All students will be expected to take the hour examinations and the final examination at their scheduled times, except in two circumstances: (1) when the student has obtained the instructor's permission, before the scheduled exam time, to miss the exam for valid, verifiable reasons; or (2) when the student is unable to take the exam because of a legitimate excused absence. Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Excused absences will be accepted as valid excuses only if:-

- (1) the student contacted the instructor *prior* to the examination (if the instructor cannot be reached, a message should be left with a departmental office at 644-3700 or 644-6747) and -
- (2) the student documents the fact that a legitimate absence prevented her/him from taking the examination (for example, a written notice from the Health Center).

If the above conditions are not met, the student will receive a "0" for the missed examination with no opportunity for a make-up. Any make-up exam for an exam missed for legitimate reasons must be discussed with the instructor who set the original exam, and will typically be of the "essay" type in which 3 or 4 comprehensive questions are asked.

Studying

We recommend that students download the Powerpoint slides before class and print them (2 or 3 slides to a page in “handout” format). Making notes on these printouts is an efficient way of reminding yourself about important concepts and details. You could make text notes directly in Powerpoint on your computer (IF you have a silent keyboard) but circling features on a diagram or making quick sketches is generally quicker on paper. Always ask a question if what seems to be an important point doesn’t make sense to you. Don’t get left behind because you miss one key point. Chances are good that other students have the same problem and could use a little extra help!

If things still don’t make sense after going back to the text – ask! Visits with the instructor can be as an individual or in a study group. Sometimes hearing answers to other student’s questions will clarify something you didn’t realize you had missed.

Syllabus for PCB 4843, Fundamentals of Neuroscience

Tuesday Thursday 11:00 am - 12:15pm, in Sandels Room 115

Instructor Tom Houpt Ph.D., King 3010, haupt@bio.fsu.edu

	Date	Lecture	Topic	Bear et al.
Tue	28-Aug	1	Overview of Nervous System	Chapter 7
Thu	30-Aug	2	Anatomy of Neuron, Brain Imaging	Chapter 2
Tue	4-Sep	3	Ion Channels, Membrane Potential	Chapter 3
Thu	6-Sep	4	The Action Potential	Chapter 4
Tue	11-Sep	5	Synaptic Transmission	Chapter 5
Thu	13-Sep	6	Neurotransmitters	Chapter 6
Tue	18-Sep	7	Receptors & Second Messengers	Chapter 6
Thu	20-Sep	8	Toxins	Chapter 6
Tue	25-Sep	9	Taste & Smell	Chapter 8
Thu	27-Sep	Exam 1	Covers Lectures 1-8	
Tue	2-Oct	10	Vision 1: The retina	Chapter 9
Thu	4-Oct	11	Vision 2: the cortex	Chapter 10
Tue	9-Oct	12	Ear 1: Vestibular System and Hearing	Chapter 11
Thu	11-Oct	13	Ear 2: Vestibular System and Hearing	Chapter 11
Tue	16-Oct	14	Touch and Pain	Chapter 12
Thu	18-Oct	15	Spinal Reflexes	Chapter 13
Tue	23-Oct	Exam 2	Covers Lectures 9-15	
Thu	25-Oct	16	Motor Control; Basal Ganglia & Parkin	Chapter 14
Fri	26-Oct	Topic of Disease Paper Due		
Tue	30-Oct	17	Hypothalamus & Autonomic NS	Chapter 15
Thu	1-Nov	18	Fever & Obesity	Chapter 16

	Date	Lecture	Topic	Bear et al.
Tue	6-Nov	19	Reproduction	Chapter 17
Thu	8-Nov	20	Limbic System: Stress & Depression	Chapter 22
Fri	9-Nov	3-page Draft/Outline of Disease Paper Due		
Tue	13-Nov	Exam 3	Covers Lectures 16-20	
Thu	15-Nov	21	Neural Development & Plasticity	Chapter 23
Tue	20-Nov	22	Learning 1	Chapter 24
Thu	22-Nov	--	<i>Thanksgiving -- no class</i>	
Tue	27-Nov	23	Learning 2, Alzheimers Disease	Chapter 25
Thu	29-Nov	24	Attention, Schizophrenia	Chapter 21
Tue	4-Dec	25	Attention, Schizophrenia	Chapter 21
Thu	6-Dec	26	Sleep & Rhythms	Chapter 19
Fri	7-Dec	5-page Neurological Disease Paper Due		
Tue	11-Dec	Exam 4	Covers Lectures 21-26	
		8-10pm	Sandels Room 115	

Other Important Dates

Aug 30, 2018	Drop/Add Ends
Oct 12, 2018	Last Day to drop a course w/o receiving a grade
Nov 16, 2018	Deadline for late drop with Dean's permission
Dec 19, 2018	Grades available online