

**BIO 154/ NEU 114/ PSY 135
FUNDAMENTALS OF NEUROSCIENCE**

**T, TH 10:05-11:20 pm
Soc/Psy 130 (Zener Auditorium)**

PROFESSOR

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Welcome to Fundamentals of Neuroscience! I hope you will find this course challenging, interesting, and enjoyable. This document describes your responsibilities in the class and also what you should expect from me. It also includes class and university policies and dates that you are responsible for knowing and understanding, so please read the whole thing over and refer to it throughout the semester.

COURSE CATALOG DESCRIPTION

"Introduction to neuroscience, including: basic physiology; microstructure and anatomy of neural tissues; mechanisms of neuronal development and integration; sensory-motor control; auditory, visual, and olfactory systems; the neural foundations of animal behavior; and the evolution of nervous systems. Emphasis on the development and critical evaluation of neuronal theories of brain function using biochemical, mathematical, and/or deductive/inductive models of reasoning & experimentation. Particular emphasis on environmental influences on brain development and synaptic plasticity."

PREREQUISITES

- ◆ You must have completed Biology 101L, 102L or equivalent, and Chemistry 31L or equivalent, prior to taking this course. NEU/PSY 101 is also strongly encouraged **prior** to this course.

COURSE GOALS

1. Gain a basic understanding of the structure and function of the nervous system.
2. Develop the ability to think critically about current conceptual issues within the field, and to evaluate the claims made by others about these issues.

COURSE MATERIAL

The course will depend on the text in addition to primary research papers.

Required Textbook: Purves, D., Augustine, G.J., Fitzpatrick, D., Hall, W.C., LaMantia, A-S., McNamara, J.O., & White, L.E. (Eds.) Neuroscience (4th Ed.), Sinauer Assoc., Sunderland, MA. 2008

Readings and other course materials will be available on Blackboard.

ATTENDANCE AND GRADING

Class attendance and participation is required and expected. Please e-mail me if you anticipate any conflict with scheduled exams, assignments, or required attendance due to religious obligations.

There will be 3 in-class exams: Exams will consist of questions from the lecture, textbook, readings, and discussion sections. Exams are not cumulative. Lecture and discussion section portions of the course will each contribute equally (50%) to your final course grade. Grading guidelines for Discussion sections will be provided by your TA.

A **question and answer review session** will be held prior to each exam --note that this will *NOT* be an overview of what will be on the test-- you should come to class prepared to ask questions and I will do my best to answer them. This class period will also be a time to catch up on material that we may not get to, or fall behind on during the term.

MISSED EXAMS: Students must notify Dr. Bilbo by email about missing an exam (for serious illness, family emergency, etc.) before the exam begins. These students will be allowed to attend a make-up within 1 week of the original exam. For those students unable to attend the make-up, Exam 3 will cover both the missed exam material and the final material, and will count 70% of your grade.

FINAL GRADE:

A+	=	96.7 - 100%
A	=	93.4 - 96.6%
A-	=	90 - 93.3%
B+	=	86.7 - 89.9%
B	=	83.4 - 86.6%
B-	=	80 - 83.3%
C+	=	76.7 - 79.9%
C	=	73.4 - 76.6%
C-	=	70 - 73.3%
D+	=	66.7 - 69.9%
D	=	63.4 - 66.6%
D-	=	60 - 63.3%

ABOUT THE COURSE

This is an advanced undergraduate course. If you do not have the time or motivation this semester for a major commitment to this course, I urge you to drop it now. However, if you are looking for a challenge, and really want to know how your brain works on a physiological basis, you have come to the right place.

About the textbook: The assigned textbook is not only perfect for this course, (and edited by some of your very own Duke professors!) but is also an excellent and valuable reference. If you plan to continue in any area of neuroscience, biological psychology, medicine, or any pursuit that requires the brain, I suggest you hang on to this book.

The attached syllabus should be used as an approximate guide to the sequence of lecture material so that you can coordinate your reading. Any modifications will be announced in class. I have

coordinated the lecture material so that its organization generally follows that of the assigned chapters in the textbook. It cannot be emphasized enough that it is critical to read textbook chapters before relevant material is presented in class! Similarly, it is critical to attend all lectures. *Sometimes the lectures will follow the text closely, and at other times they will be supplementary.* **You are 100% responsible for all material presented in lecture, even if it is not in the reading.**

ACADEMIC POLICIES

A list of all Duke University Academic Policies and Procedures can be found here: <http://trinity.duke.edu/academic-requirements>. You should make yourself familiar with this site.

Disabilities: I encourage students with disabilities, including non-visible disabilities such as chronic diseases, learning disabilities, head injury, attention deficit/hyperactive disorder, or psychiatric disabilities, to contact me to discuss appropriate accommodations.

Honor Code: I believe that a person's integrity is one of their most important attributes. Consequently, I fully support Duke University's Honor Code: if I find that someone has cheated on any aspect of the course I will give that person a failing grade for the course and file a report of academic dishonesty with the Office of Student Conduct.

You should be familiar with the Duke Community Standard: <http://www.integrity.duke.edu/new.html>

DISCUSSION SECTIONS

<u>TIME</u>	<u>INSTRUCTOR</u>
1. Tues: 3:05 – 3:55 pm Old Chem 101	Jessica Bolton Email: jl74@duke.edu Office hours: Tu 4-5 Bostock library 1 st floor reading room, Wed 12-1, GSRB II Rm 3023 Or by appt (email)
2. Tues: 6:15 – 7:05 pm Allen 103	Jessica Bolton
3. Wed: 10:20 – 11:10 am Soc Sci 124	Tina Tognoni Email: cmt28@duke.edu Office hours: Wed/Th 12-1, GSRBII rm 3083
4. Wed: 4:40 – 5:30 pm Perkins LINK 2-087 Classroom 3	Tina Tognoni

Date	Topic	Reading
1/12	Introduction to course; Neurons and glial cells, Hot topics in Neuroscience	Chap. 1
1/17	Resting membrane potential; Action potential	Chap. 2, 3
1/19	Channels and transporters; Synaptic transmission	Chap. 4, 5
1/24	Neurotransmitters & receptors; Molecular signaling	Chap. 6, 7
1/26	Synaptic plasticity I	Chap. 8
1/31	Synaptic plasticity II, synaptic tagging	<i>Handout</i>
2/2	Addiction	<i>Handout</i>
2/7	-- Question and Answer Review --	
2/9	-- EXAM 1 --	
2/14	Somatosensory system; Pain	Chap. 9, 10
2/16	Vision: The eye	Chap. 11
2/21	Visual pathways	Chap. 12
2/23	Auditory system; Vestibular System	Chap. 13, 14
2/28	Taste and olfaction (Dr. Craig Roberts Guest)	Chap. 15
3/1	Brain and spinal cord control of movement	Chap. 16, 17
3/5--	--SPRING BREAK--	
3/13	Basal ganglia, Cerebellum	Chap. 18, 19
3/15	Sensory-motor integration, visceral motor	Chap. 20, 21
3/20	-- Question and Answer Review --	
3/22	-- EXAM 2 --	
3/27	Early brain development/wiring the brain	Chap. 22, 23
3/29	Modification of circuits by early experience; Perinatal Programming	Chap. 24; <i>Handout</i>
4/3	Role of immune system in development (JB Guest)	<i>Handout</i>
4/5	Repair and Regeneration	Chap. 25
4/10	Sleep and Biological Rhythms	Chap. 28
4/12	Sex and Reproduction (CT Guest)	Chap. 30
4/17	Learning and Memory	Chap. 31
4/19	-- Question and Answer Review --	
4/24	-- EXAM 3 --	

THERE IS NO CUMULATIVE FINAL EXAM