

## BIOL 2020/PSYC 2610: Introduction to Neurobiology

Office: TBA

Email: TBA

**Office hours: TBA**

**Required reading:** Neuroscience: Exploring the Brain by Mark F. Bear, Barry W. Connors and Michael Paradiso. \*Fourth Edition. Wolters Kluwer 2016. \*Students are responsible for new information in this latest edition.

**Course Description:** Introduction to the structure and function of the nervous system at molecular, cellular, systems, and behavioral levels. Topics will include electrical and chemical signaling of nerve cells, neuroanatomy, neurochemistry, motor and sensory systems, neural plasticity, and current methodologies in neuroscience research.

**Method of evaluation:** The final grade will be based on three exams (each 25%), neuroanatomy quiz (10%), written report on a primary literature article in neurobiology (10%), attendance and participation (5%).

Class day	Subject and reading	Chapter
	Neuroscience: past, present, future	1
	Cellular biology of neurons and glia	2
	Physiology of the neural membrane I (resting potential)	3
	Physiology of the neural membrane II (action potential)	4
	Interneuronal communication: chemical synaptic transmission	5
	Neurotransmitter systems and tools to study them	6
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	Organization of the nervous system	7
	Exam 1 (chapters 1-6)	
	Brain development	7
	Neuroanatomy quiz (chapter 7)/ begin chapter 11	11
	Sensory systems: auditory and vestibular systems	11
	Sensory systems: the eye	9
	Sensory systems: central visual system	10
	Sensory systems: chemoreception	8
	Sensory systems: somatosensory system	12
	Motor systems: spinal control	13
	Motor systems: brain control of movement	14
	Exam 2 (chapters 8-14)	
	Chemical control of brain and behavior	15
	Motivational and Reward Circuitry	16
	Sex differences and sexual differentiation of the brain	17
	Organizational and activational effects of steroid hormones on brain and behavior	17

	Cellular and molecular mechanisms of brain development	23
	Neural plasticity	23
	Molecular mechanisms of learning and memory I	25
	Molecular mechanisms of learning and memory II (reports due)	25
	Review for the Finals	
	Final Exam	

**Report:** Each student will choose **one** primary research article in neurobiology related to subjects covered in the course from few provided by the lecturer and will write a 1-2-page (1.5 spacing) summary in their *own words*. *There is no opportunity to revise or resubmit this assignment.* **See additional instructions below. Due after Thanksgiving break 12/5.**

The faculty and administration of Brooklyn College support an environment free from cheating and plagiarism. **Each student is responsible for being aware of what constitutes cheating and plagiarism and for avoiding both.** The complete text of the CUNY Academic Integrity Policy and the Brooklyn College procedure for implementing that policy can be found at this site: <https://www.cuny.edu/about/administration/offices/legal-affairs/policies-procedures/academic-integrity-policy/> **Cheating will result in 0 points for any exam or assignment with additional major penalties at the discretion of the instructor**

**Hints to do well in class: Attend lecture.** Skim main points of chapter ahead of time and reread the parts of the chapter that are emphasized in lecture. In lectures, **practice active note taking.** Note taking is one way of making learning active. Good note taking skills require that you formulate the concepts and ideas in your own words. Avoid simply passively copying what is written on a slide or spoken. Instead, listen for the key points and make note of them in your own words. Highlight really important concepts that you know you need to come back to for better understanding. Copying slides takes too much time and does not enhance learning. Avoid it. By writing things down you have a hope of making the bridge between short-term and long-term memory. Slides are posted after the lecture is given. **While there is some memorization involved, it is very important to understand the concepts in neuroscience.** Understand the figures in the book that are explained in class. Use the online material from the publisher and links in the lecture slides and other outside resources. Do the practice questions at the end of the chapter and seek help if you are confused about the material. Ask questions during class- it is likely others have the same questions!

**Other useful resources:**

<http://www.brainfacts.org/>

**Make up exams are only given for those with a documented medical excuse as reason for missing exams**

## Report Score Guide

STUDENT NAME: \_\_\_\_\_

Paper turned in on time	0	.5				
Full reference cited	0	.5				
Appropriate paper (year, topic, primary article)	0	.5	1			
Introduction / background information leading to study	0	1	1.5	2	2.5	3
Hypothesis of study stated	0	.5	1			
Methods described briefly with minimal jargon	0	1	1.5	2		
Major results of the experiments	0	1	1.5	2	2.5	3
Conclusions and significance of study	0	1	1.5	2		
Critical evaluation of study including acknowledgement of study limitations	0	.5	1			
Writing style/ evidence of proofreading	0	.5				
Appropriate length of report	0	.5				

*\*Note: 1 additional point will be deducted for each day paper is turned in late, including weekend days.*

TOTAL SCORE (10 points maximum): \_\_\_\_\_

## Report Guidelines.

Each student will choose a **primary research article in neurobiology published within the last 5 years.**

**A primary research article contains** a defined study with an **introduction, methods, results, and discussion** and is the type of article that you will choose for your report.

**A review article summarizes many primary articles and is NOT acceptable for your report,** although you may find a recent review to be helpful in understanding the primary article.

The idea is to use the knowledge you gain from the course to understand the primary literature. You should **only choose articles that relate to the levels of analysis covered in the course: cellular, molecular, genetic, systems- these can be in combination with behavior but purely behavioral study (including behavioral pharmacology) is not appropriate.** Also **NOT appropriate: fMRI studies, studies on higher cognition and human subject studies.**

You will write a 1-2-page summary (1.5 spacing; 10-12 pt font) in your *own words* (assume you are writing this for a general audience, like the NY Times Science section) on 1) the background (what is the context for the study- what information from previous studies led to the question they want to answer), 2) the hypothesis that was tested, 3) methods used to test the hypothesis, 4) results of the experiments, 5) conclusions of the study and why the study is significant and 6) a critical evaluation and comment on study limitations. Make sure you include the full citation of the article (authors, year, title, journal name, volume and page numbers). ***There is no opportunity to revise or resubmit this assignment.***

**Because the directions are stated here you do not need to send me the article ahead of time for approval.** There will be a report assignment submission section on Blackboard where you can submit your reports. **Please do not send me the pdf** as my mailbox cannot accommodate that many files from the class. ***If you do not read the instructions and submit a summary of a totally inappropriate paper you will most likely fail this assignment and miss an easy opportunity to improve your grade.***

**The report is due after Thanksgiving break on 12/5 and should be uploaded at that time. DO NOT hand in to the biology department. A point will be deducted each day it is late. In addition, it is required to submit the report via blackboard (by 5:05pm 12/5) where they will be checked for plagiarism via safe assign. Plagiarism (see attached policy) will result in major penalties at the discretion of the instructor.**

Pubmed and Google Scholar are good search engines to find articles.

<http://www.ncbi.nlm.nih.gov/pubmed>

<http://scholar.google.com/>

If you search from a computer on campus or log onto the library website from off campus you will have access to journal subscriptions of Brooklyn College. <http://library.brooklyn.cuny.edu/resources/?service=off-campus#c474> If you really want an article that is not available at BC, you'll need to use interlibrary loan through the BC library (online) but I don't recommend this