

BIO 250 (PSY 250): Neurobiology

Instructors

Dr. Stacey Dutton
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BSC 203 East
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Office Hours: Tuesday 10:00 AM – 11:00 AM
or by appointment

Dr. Larimore:
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Office Hours: Monday or Wednesday
11:30 AM-12:30PM or by appointment

Class:

Tuesday & Thursday 11:30-12:45
BSC 210 East

Labs:

Monday Dr. Larimore 2:00 – 5:00 PM
Tuesday Dr. Dutton 2:00 – 5:00 PM

Required Text and Materials:

1. Foundations of Behavioral Neuroscience. Carlson. 9th edition. Pearson Publishing
2. Neuroscience Basics. Larimore. 1st Edition. Academic Press
3. A Handbook of Biological Investigation. Ambrose, Ambrose, Emlen and Bright. 7th Edition

Course Description:

This class examines brain development, the types of cells found in the human brain, and the various extracellular and intracellular messages utilized in our brain to communicate.

Course Objectives:

Upon successful completion of this course, the student will achieve the following objectives:

- Demonstrate knowledge of the different types of cells, how individual brain cells work and communicate.
- Design an experiment, analyze the results, draw conclusions, and report on the research both with scientific writing and an oral presentation.
- Critically read and evaluate scientific literature.
- Utilize effective teamwork to problem solve in an inquiry-based research lab.

Grading Policy:

The final grade for this course will be based on the following:

Exams	100 points (50 points each x 2 tests)
Class Final Project	100 points
Article Analysis	50 points (5 points each x 10 articles)
Article Presentations	40 points (20 points each x 2 presentations)
Directed Reading Quest.	28 points (2 points each x 14 assignments)
Experimental Designs	20 points (2 points each x 10 assignments)
Total	points total

93 -100	A
90 - 92.9	A-
87 - 89.9	B+
83 - 86.9	B
80 - 82.9	B-
77 - 79.9	C+
73 - 76.9	C
70 - 72.9	C-
67 - 69.9	D+
63 - 66.9	D
60 - 62.9	D-
Below 60	F

*additional points or assignments may be added by the instructors

Lectures: Class lectures will be interactive. Therefore reading the assigned chapters *prior* to class arrival will further your understanding of the material and will prove beneficial to your overall experience within the class. Lecture power points will be posted to Moodle a few hours prior to class.

Directed Reading Questions (DRQs) are part of your grade. They function as review questions for each chapter and can assist you in learning the information covered in the lecture. They highlight what the professor believes is the important information in the chapter. Each DRQ will be posted to Moodle prior to the lecture. Answer these questions as you read the assigned chapters prior to lecture. Turn these questions in for 2 points per worksheet – 1 point for all questions being answered and 1 point for the quality of the answer. These are all or nothing points. No partial credit will be given. No late work will be accepted for DRQs.

Exams (see schedule for tentative dates): There will be exams spaced throughout the semester. The exams will be written to assess your understanding of the information covered in class and your ability to **apply** and **analyze the information using higher order thinking skills** by answering short answer and essay questions.

Article Analysis: A peer-reviewed article from primary literature will be assigned (see Moodle for articles). Everyone in the class will submit an article analysis to Moodle prior to the article class day. The form is available on Moodle. Answer the questions and load the analysis to Moodle as a PDF.

Article Presentations: The group preparing the article presentation will need to create a PPT or keynote with the following information:

- a. Introduction section – give background information to help our class understand your topic. Why is this experiment important? What background information will help us understand what was done (reference the papers cited in the introduction)? State the hypothesis.
- b. Results – Each piece of the results must cover the 3 points below or points will be taken off. Include a figure legend and a figure title. Any time you present a piece of data, always explain (1) what the audience is looking at, (2) what you did to arrive at the data you are seeing (what method you used – if the method is new to the class, explain it in a clear way, potentially using videos or graphics), and (3) what the data mean (your interpretation) and why they are important.
- c. Conclusions – simple statements to describe the key, take-away points from the experiment and their importance in the field of study. How did the study contribute to the hypothesis?

ANY information on your slide is FAIR GAME for a question. If you put it on a slide, BE ABLE TO EXPLAIN IT!! I will take off points if you cannot explain something on your slide.

Things to consider: less text is better, diagrams are always helpful, keep the background info relevant, keep all additional information relevant, if it's boring to you, it's boring to your audience. Additional information on the specifics of the presentation can be found on Moodle.

Experimental Design Questions: At the end of each article presentation, we will be breaking into the assigned presentation groups. Each group will turn in an experiment at the end of class that takes the article one step further, with a hypothesis, model system, control variables and experimental variables clearly defined.

Class Final Project: For the final in this class, you will be completing a paper that integrates the information you have learned in this class, BIO 110, and BIO 111 under a Neuroscience theme. The goal of this project is to be able to make connections between the major concepts from these courses. Final papers will be uploaded to your D-portfolio to demonstrate mastery of the topics. See Moodle for Guidelines.

**An outline of your project is due on 10/17 before class.
This project will be due before class on 11/21.**

Your project should include the following topics/concepts:

- Genetics
- Mutations
- Subcellular Organelles
- Action potentials
- Neurotransmitters
- Neurotransmitter release
- Ion channels

All these concepts should be covered in a paper with a theme of your choosing. Here are some suggested themes:

- Disease (break down a specific disease that is controlled by the nervous system and cover each of the topics/concepts)
- Behavior (break down a specific behavior that is controlled by the nervous system and cover each of the topics/concepts)
- Evolution of the Human Brain

Any additional themes must be approved by the instructors.

Expectations:

Each of the listed topics/concepts should be covered in your paper. Knowledge of each topic should be demonstrated in your writing. Each topic should be fully explained as to how it relates to your theme. It is expected that your document will be well written and well organized. Therefore, critical attention must be given to transitions from one topic/concept to another, word choices, grammar, formatting and spelling. Be sure to properly cite any literature used to construct your document.

Grading Rubric:

20 points	Inclusion of the topics/concepts
20 points	Integrating the topics/concepts with the theme
10 points	Grammar and Formatting
30 points	Mastery of the subject matter
20 points	Overall Cohesion in the Paper

e-mail: Instructors will make announcements regularly via e-mail. *It is your responsibility to check your Agnes Scott email account daily.* When responding to a professor over email, take care that your email is professional. Examples here: <https://medium.com/@lportwoodstacer/how-to-email-your-professor-without-being-annoying-af-cf64ae0e4087#.jldd3bxes>

Technology: Cell phones should be in the silence mode prior to entering the classroom or lab. Minimize potential distractions if you are using a laptop or tablet in class to take notes. This would include refraining from ‘surfing the web’ during class. You will be asked to leave class or lab if you are using your cell phone or laptop to conduct business other than that of the class.

Course Evaluations: At the end of the semester you will receive an e-mail asking you to submit an evaluation of the course. Please give feedback! Your input is important to the college as a whole and to us as instructors. We take your comments very seriously.

Honor Code: All work performed in this course must be in accordance with the Agnes Scott College Honor Code.

ADA If you have a disability that may have some impact on your work in this class and for which you may require accommodations, please see Kelly Deasy (x6174) in the Office of Academic Advising to register for services. Students that receive accommodation checklists, please meet with me to discuss the provisions of those accommodations as soon as possible.

Title IX: For the safety of the entire community, any incidence of or information about sexual misconduct must be reported immediately to Title IX Coordinator Karen Gilbert (kgilbert@agnesscott.edu, 404-471-6435) or Deputy Title IX Coordinator Kristian Contreras (kcontreras@agnesscott.edu, 404-471-6394).

Inclusion: This course adheres to the principles of diversity and inclusion integral to the Agnes Scott community. We respect people from all backgrounds and recognize the differences among our students, including racial and ethnic identities, religious practices, and gender expressions. We strive for our campus to be a safe space in which all students feel acknowledged and supported. At the same time, we understand that course content, critical inquiry, and classroom dialogues give us opportunities to examine topics from a variety of perspectives. Such discourse is a defining feature of a liberal arts education, and can compel debates that challenge beliefs and positions, sometimes causing discomfort, especially around issues related to personal identities. While we uphold and preserve the tenets of academic freedom, we request and invite your thoughtful and constructive feedback on ways that we can, as a community of learners, respectfully assist and challenge one another in our individual and collective academic work.

Content Warning: This course will explore the human brain and behavior, which might raise issues of racism, sexism, classism, heterosexism, cissexism, ableism, and other kinds of privilege. I invite you to come see me if you want more information. If you feel you will be unable to fully participate in the course requirements, set up a meeting with the course instructor to determine appropriate accommodations.

Deadlines: Attendance and participation will be assessed periodically to determine your engagement and commitment to this class. Students are expected to attend all class periods, except in cases of documented illness or emergency. If a missed class cannot be avoided because of illness or emergency, it is STRONGLY recommended that you contact the instructor IN ADVANCE, or within 24 hours of the class period. Should an emergency or crisis arise, such that you miss class, you must provide legitimate documentation in order for the instructor to consider allowing you to make up missed work.

It is your responsibility to keep up with the class material. Thus, if you miss class, it is up to you to find out from a reliable source if you missed an assignment. It is also your responsibility to stay on top of presentation, quiz and exam deadlines. In-class assignments (such as the experimental design projects), presentations, and quizzes will NOT be available to make up later, unless you have a documented excuse, OR you have contacted me ahead of time.

Academic Honesty: The Agnes Scott College honor code embodies an ideal of character, conduct, and citizenship, and is an important part of the College's mission and core identity. This applies especially to academic honesty and integrity. Passing off someone else's work as your own represents intellectual fraud and theft, and violates the core values of our academic community. To be honorable, you should understand not only what counts as academic dishonesty, but also how to avoid engaging in these practices. You should:

- review each course syllabus for the professor's expectations regarding course work and class attendance.
- attribute all ideas taken from other sources; this shows respect for other scholars. Plagiarism can include portraying another's work or ideas as your own, buying a paper online and turning it in as if it were your own work, or not citing or improperly citing references on a reference page or within the text of a paper.
- not falsify or create data and resources or alter a graded work without the prior consent of your professor. This includes making up a reference for a works cited page or making up statistics or facts for academic work.
- not allow another party to do your work/exam, or submit the same or similar work in more than one course without permission from the course instructors. Cheating also includes taking an exam for another person, looking on another person's exam for answers, using exams from previous classes without permission, or bringing and using unauthorized notes or resources (i.e., electronic, written, or otherwise) during an exam.
- not facilitate cheating, which can happen when you help another student complete a take home exam, give answers to an exam, talk about an exam with a student who has not taken it, or collaborate with others on work that is supposed to be completed independently.
- be truthful about the submission of work, which includes the time of submission and the place of submission (e.g., e-mail, online, in a mailbox, to an office, etc.).

You should understand that penalties result from dishonest conduct, ranging from failure of the assignment to expulsion from the college. You should speak with your professors if you need clarification about any of these policies.

	Date	Reading Assignment	Quiz or Assignment	Class Topic
Tues		No Class - Class Starts 8/23		
Thurs	8/24/17	Syllabus + Chapter 1, pages 12-16	DRQ	Syllabus
Tues	8/29/17	Chapter 1 in Pearson and Chapter 14 in Ambrose et.al.	DRQ	1. Origins of Behavioral Neuroscience
Thur	8/31/17	Sousa et.al., 2017	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment
Tues	9/5/17	Neuroanatomy PDF, Chapter 1 in Larimore	DRQ	2. Neuroanatomy 101
Thur	9/7/17	Wong et. al. 2016	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment
Tues	9/12/17	Chapter 2 in Pearson pages 19-28, Chapter 2 in Larimore	DRQ	3. Types of Cells
Thur	9/14/17	Larimore et.al. 2017	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment
Tues	9/19/17	Chapter 3 and pages 9-11 in Pearson	DRQ	4. Anatomical organization of the NS
Thur	9/21/17	Dutton et. al. 2011	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment
Tues	9/26/17	Chapter 2, pages 23-24, 38-39 in Pearson, and Horton et.al., 2005	DRQ	5. Cytology of a Neuron
Thur	9/28/17	Test #1 in Class	on Lectures 1-5	
Tues	10/3/17	Chapter 2, pages 28 - 44 in Pearson	DRQ	6. Ion Channels
Thur	10/5/17	Martin et. al. 2010	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment
Tues	10/10/17	Chapter 2, pages 28 - 44, pages 113-116 in Pearson	DRQ	7. Membrane Potential
Thur	10/12/17	FALL BREAK	FALL BREAK	FALL BREAK
Tues	10/17/17	Chapter 2, pages 28 - 44 in Pearson and Chapter 3 in Larimore	DRQ + outline	8. The Action Potential
Thur	10/19/17	Ogiwara et. al. 2007	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment
Tues	10/24/17	Bonifacino and Glick 2004 and Gandhi and Stevens 2003	DRQ	9. Transmitter Release
Thur	10/26/17	Chen et.al., 2008	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment
Tues	10/31/17	Chapter 2 pages 39-47 and Chapter 4 in Pearson, Chapter 4 in Larimore	DRQ	10. Neurotransmitters
Thur	11/2/17	Talbot et.al., 2004	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment
Tues	11/7/17	Chapter 2 pages 39-47 and Chapter 4	DRQ	11. Second Messenger Systems
Thur	11/9/17	Kubota et.al., 2009	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment
Tues	11/14/17	Rough Draft of your Manuscript		group review session on manuscript
Thur	11/16/17	Test #2 in class	Lectures 6 - 11	
Tues	11/21/17	Neurogenetics PDF	DRQ + final paper	12. Neurogenetics
Thur	11/23/17	No Class	No Class	Thanksgiving Break
Tues	11/28/17	Dutton et. al. 2013	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment
Thurs	11/30/17	Embryology Neurulation Video	DRQ	13. Development
Tues	12/5/17	Reading day	Reading day	Reading day