

BIO/PSY 251: Foundations of Neuroscience II

Instructors

Dr. Blatchley

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Office Hours: M-T 10-11 AM or by appointment
or by appointment

Dr. Larimore

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BSC 201W

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Office Hours: M or W 12:00PM – 1:00PM or by appointment

Class:

Tuesday & Thursday 11:30-12:45

BSC 112 West

Labs:

Tuesday Dr. Blatchley 2:00 – 4:00 PM G15.2

Wednesday Dr. Larimore 2:00 – 4:00 PM G15.2

Required Text and Materials:

1. Foundations of Behavioral Neuroscience. Carlson. 9th edition. Pearson Publishing
2. Neuroscience Basics. Larimore. 1st Edition. Academic Press

Course Description:

Students will understand the basic structure, function and organization of the mammalian nervous system and how sets of cells in the CNS and PNS operate in systems to produce both simple and complex behavior. Students will also be able to present their research findings in an oral presentation as well as in a written, APA style research report.

Course Objectives:

This course is the second in a two course sequence required for the Neuroscience major. The first course (Foundations I) introduces students to the structure and function on the cellular elements of the nervous system. This course (Foundations II) introduces students to the function and properties of neural circuits and systems. In this class, students will explore the organization of the mammalian brain, examine the function of sensory systems, neural regulatory circuits that govern behaviors like sleeping/waking and eating, and the circuits that allow us to learn and remember. In addition, students will use a case study describing the symptoms of a patient suffering from a neurological problem to complete a final project. The project will include diagnosing the problem, describing the location of the neurological damage, discussing a treatment plan, and presenting their conclusions to the class in both an oral presentation and a written report.

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

Exams	100 points (50 points each x 2 tests)
Class Final Project (LOI)	100 points
Project Outline	10 points
Article Analysis	50 points (5 points each x 10 articles)
Article Presentations	40 points (20 points each x 2 presentations)
Directed Reading Quest.	55 points (5 points each x 11 assignments)
Experimental Designs	20 points (2 points each x 10 assignments)
Pre-Labs	30 points (10 points each x 3 assignments)
Lab Practical	50 points
Case Studies	35 points (5 points each x 7 assignments)
Total	405 points total

*additional points or assignments may be added by the instructors

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

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. DRQs are due the day before lecture (typically Monday) at noon.

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:

- 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.
- Results – the graphs, the tables, figures, etc - should include a figure legend and a figure title. Any time you present a piece of data, always explain what the audience is looking at (this is a western blot or images of a cell), what method was used to obtain the data (and explain it if we haven't covered it in class), and what the data mean (your interpretation), how does that tie back to the hypothesis, and why the data are important to the paper and our understanding. Each person in the group should present at least one figure. If there is not enough figures in a paper, look up figures from either previous research and present those in the introduction or look up figures from studies after the paper and present those in the conclusion.
- 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: BIO 251 Final Project

Grant Pre-proposal Project is your final project for this class. The Grant Pre-proposal should include:

An outline of the project will be do part way through the semester. This outline must include some of the information that you will include in each of the following sections.

1. **The Background** - 5 paragraphs of background with citations. The challenge here is choosing your background data. There is bound to be a lot of background. The background information should explain why you are making the hypothesis you are making. Somewhere in this section, you should also explain why this project is significant to the field of study and innovative.
2. **Hypothesis.** The end of the last background paragraph should be your hypothesis.
3. **Specific aims.** Transition from the hypothesis to the specific aims "This hypothesis leads me to make the following predictions. 3 specific aims - 3 testable predictions based on your hypothesis. The specific aim is one sentence (below it is bolded). Then describe what techniques (yes, plural) you will use to assess your prediction (shown for specific aim #1). It is generally best to use more than one technique because that will further support any claim you make. Discuss the # of test subjects used and the number of trials needed to obtain clean stats.

Example:

1. Cocaine use will decrease the number of stable spines in the hippocampus

In order to determine the structural alterations that may impact learning and memory due to cocaine use, I will measure the three classifications spine morphology in the dentate gyrus and the CA3 regions of the hippocampus of 6 naïve and 6 SA rats at Day 0 and Day 14 in the addiction protocol described by (REFERENCE, year). I will also compare the protein levels via immunoblotting of spine-specific proteins PSD-95 and SHANK3 compared to control proteins actin and beta-tubulin between in the 6 naïve and 6 SA rats at Day 0 and Day 14.

2. Cocaine use will decrease the rat's ability to form memories.

3. Cocaine use will decrease the electrophysiological representations of learning and memory (LTP and LTD).

4. References. For a grant pre-proposal, after the 2 - 3 aims comes the references. You need at least 8 references for this LOI.

5. Figure of previous data leading to the hypothesis. After the references comes a figure 1. This is your preliminary data that lead you to the hypothesis. Generally, you can talk about it in the background as you near introducing your hypothesis. Use a figure from a primary literature article.

Grant Pre-Proposal Grading Rubric

10 points Overall Impact of the research
on the field of study and significance of the research.

10 points Innovation of the project and approach.

30 points Background

- background supports the predictions and hypothesis
- background is clear and flows well
- background information is correct

10 point Hypothesis

- solid, testable hypothesis
- clearly stated and supported by background information

30 points Specific Aims (3 of them, 10 points each)

- clear and stated well
- contain a summary of the experiments.
- predictions support the hypothesis

10 points Figures

- supports the hypothesis and predictions
- is labeled
- has a legend

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#.jld3bxes>

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	Prof	
	Tues	1/9/2018	Syllabus	DRQ	Syllabus	both
	Thurs	1/11/2018			Group projects/final project pre-planning	both
LAB DAY	no lab				No Lab	
	Tues	1/16/2018	Chapter 2 Pearson	DRQ	1. Highlights of 250	JL
	Thur	1/18/2018	<i>Ajram et al, 2017</i>	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment	JL
LAB DAY	no lab				No Lab	
	Tues	1/23/2018	Chapter 2 Brumenfeld	DRQ	2. Neuroanatomy 201	JL
	Thur	1/25/2018	<i>Courchesne et al 2011</i>	Article Analysis	Technique Lecture, Article Discussion, and write an abstract	JL
LAB DAY	Lab #1		Pre-Lab		Sheep Brain Dissection	
	Tues	1/30/2018	Chapter 2 Brumenfeld	DRQ	3. Neuroanatomy 202	JL
	Thur	2/1/2018	<i>Kotagiri et al 2013</i>	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment	JL
LAB DAY	Lab #2		Pre-Lab		Comparative Anatomy+ Dissection + work on outline	
	Tues	2/6/2018	Chapter 6	DRQ	4. Vision	BB
	Thur	2/8/2018	<i>Bronsan et al 2012</i>	Article Analysis	Technique Lecture, Article Discussion, and write an abstract	BB
LAB DAY	Lab #3				case study	
	Tues	2/13/2018	Chapter 7	DRQ	5. Senses	BB
	Thur	2/15/2018	<i>Kern et al 2008</i>	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment	BB
LAB DAY	Lab #4				Case Study	
	Tues	2/20/2018	Chapter 8	DRQ	6. Sleep	BB
	Thur	2/22/2018	<i>Daoust et al 2008</i>	Article Analysis	Technique Lecture, Article Discussion, and write an abstract	BB
LAB DAY	Lab #5				Case Study	
	Tues	2/27/2018			Test Study Groups	Both
	Thur	3/1/2018	Outline	Outline of final project due	Drafting of Final Project	Both
LAB DAY	Test #1				TEST #1 (Lectures #1 - #6)	
	Tues	3/6/2018	PEAK WEEK	PEAK WEEK	PEAK WEEK	N/A
	Thur	3/8/2018	PEAK WEEK	PEAK WEEK	PEAK WEEK	N/A
	Tues	3/13/2018	SPRING BREAK	SPRING BREAK	SPRING BREAK	N/A
	Thur	3/15/2018	SPRING BREAK	SPRING BREAK	SPRING BREAK	N/A
	Tues	3/20/2018	Chapter 12	DRQ	7. Learning and Memory	JL

	Date	Reading Assignment	Quiz or Assignment	Class Topic	Prof
Thur	3/22/2018	<i>Desai et al 2017</i>	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment	JL
LAB DAY	Lab #6			Case Study	
Tues	3/27/2018	Chapter 10	DRQ	8. Emotion	BB
Thur	3/29/2018	<i>Deschamps et al 2015</i>	Article Analysis	Technique Lecture, Article Discussion, and write an abstract	BB
LAB DAY	Lab #7			Case Study	
Tues	4/3/2018	Chapter 13	DRQ	9. Human Communication	BB
Thur	4/5/2018	paper	Article Analysis	Technique Lecture, Article Discussion, and Design an Experiment	BB
LAB DAY	Lab #8			Case Study	
Tues	4/10/2018	Chapter 6 & Brumendfeld	DRQ	10. Motor Systems	JL
Thur	4/12/2018	<i>Barbeau, et al 2015</i>	Article Analysis	Technique Lecture, Article Discussion, and write an abstract	JL
LAB DAY	Lab #9			Case Study	
Tues	4/17/2018			Grant Review Panel	Both
Thurs	4/19/2018	Chapter 14 - 16	Final Project Due	11. Disorders	JL
LAB DAY	Test #2			TEST #2 (Lectures #7 - #10)	
Tues	4/24/2018	SpARC	SpARC	SpARC	SpARC
Thurs	4/26/2018			LAB PRACTICAL	LAB
LAB DAY	no lab	no lab		no lab	
Tues	5/1/2018			Hand back Test #2 and Final projects with comments	
	5/2/2018	Last Day of Classes	Last Day of Classes	Last Day of Classes	
Thurs	5/3/2018	Reading Day and Senior Finals	Reading Day and Senior Finals	Reading Day and Senior Finals	