

SYLLABUS
BIOL 635 Neurophysiology, Spring 2018

GENERAL INFORMATION

Schedule:

Lecture/Discussion: Tuesdays and Thursdays 11:40 AM – 12:55 AM; Coker Life Sciences 303

Lab: Tuesdays and Thursdays 1:15 AM – 4:00 PM; Coker Life Sciences 303

Instructor: Dr. Daniel I. Speiser

Office: CLS 606

Phone #: 803-777-6597

Email: speiser@mailbox.sc.edu

TA: TBD

Office: CLS 606

Email: TBD

Note: Your Instructor and TA would prefer to be contacted by email or in person. If you email us between 9am and 5pm, we will do our best to respond the same day. Do not expect immediate responses to emails sent after normal work hours (i.e. later than 5pm) or on weekends.

Website: See Blackboard for documents and announcements.

Office Hours: Dr. Speiser will be available to talk during and after lab on Tuesday and Thursday. If a separate appointment is necessary, please email Dr. Speiser with a proposed time and an outline of the topic you would like to discuss.

Required Text: Text (mostly PDFs of primary literature) will be made available on Blackboard.

Other Required Resources: You will need some sort of calculating device that can handle logs, exponents, and roots. A graphing calculator will work, so will a smart phone or a tablet with the appropriate app(s).

Students with learning disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, contact the Office of Student Disability Services: 777-6142, TDD 777-6744, email sasds@mailbox.sc.edu, or stop by LeConte College Room 112A. All accommodations must be approved through the Office of Student Disability Services.

COURSE DESCRIPTION

Neurophysiology (BIOL 635), taught by Dr. Daniel Speiser, is a discussion- and lab-based course that introduces students to the form, function, and evolution of the molecular and cellular components that comprise the nervous systems of animals, as well as the simple circuits that underlie many observable behaviors. The seminar portion of the course will be dedicated to lectures, discussions, problem sets, and writing assignments concerning such topics as the resting potentials of cells, the generation and transmission of action potentials, synaptic connections between neurons, simple neural circuits, and the evolution of nervous systems. In lab, students will learn how to take electrophysiological recordings from live animals (invertebrates only) and how to design, conduct, interpret, present, and evaluate experiments in the field of neurobiology.

Neurobiology should establish a foundational knowledge for students continuing in a variety of professional careers, ranging from biological research to engineering to medicine. It is my hope that the course helps students appreciate the past, present, and future of neurophysiology, as well as the attention to detail and creativity that it takes to design and conduct neurophysiological experiments successfully.

LEARNING OUTCOMES

Upon successful completion of the lecture component of BIOL 635, undergraduates should be able to:

1. **Recognize** the fundamental molecular and cellular components of nervous systems and **identify** and **describe** their functions.
2. **Explain** how information is integrated by neurons, transmitted across neurons, and communicated between neurons.
3. **Diagram** how simple neural circuits contribute to sensory perception, learning and memory, and observable behaviors in animals.
4. **Summarize** and **evaluate** the findings of scientific papers in writing and through oral presentations.

Upon successful completion of the lab component of BIOL 635, undergraduates should be able to:

1. **Practice** hands-on skills working with live animals and electrophysiological instrumentation.
2. **Design** and **conduct** experiments, **interpret** the data collected, and **assess** the results of these experiments in writing and through oral presentations.
3. **Apply** the skills and knowledge gained in lecture and lab to self-directed projects including a mock grant proposal (on a topic of their choice) and an independent lab-based project (again on a topic of their choice).

Upon successful completion of the lab component of BIOL 635, graduate should be able to:

1. **Defend** the intellectual merit and broader impacts of their mock grant proposal in a separate document.

COURSE EXPECTATIONS

Fundamentals: Neurobiology builds on a foundation of general biology, mathematics, physics, and chemistry. Beyond covering the mechanisms underlying the function of nerves and nervous systems, BIOL 635 will help students develop their skills as writers and presenters of science. Students will also gain experience formulating hypotheses, reviewing primary literature, designing experiments, and taking electrophysiological recordings.

Schedule: A *tentative* timeline for the course will be posted on Blackboard. Any changes or clarifications will be announced in class and on Blackboard. The first half of the course will involve looking back at the field of Neurobiology from where we stand today. What do we think we know and why do we think we know it? In lecture, Dr. Speiser will lead discussions delving into the mechanisms underlying action potentials, synapses, and simple neural circuits. In lab, students will learn the basics of neurophysiology by following a series of guided exercises. The second half of the course will involve looking forward into the unknown. What are the next big questions in neurophysiology and how might we go about exploring them? In lecture, students will develop original research proposals. In lab, they will design and conduct an independent research project and then report on their findings.

Attendance: I expect that students will be present for **all lectures and labs**. Due to the small size of the class and the collaborative nature of the labs, missing class is detrimental not only to you, but to your classmates as well. Please take this responsibility seriously. Any absences must be discussed with me and any unexcused absences may be penalized. If you miss more than 10% of the classes for this course, whether excused or unexcused, your grade will be dropped one letter grade. If I have inadvertently scheduled an exam or major deadline that creates a conflict with your religious observances, please let me know as soon as possible so that we can make other arrangements.

Academic Integrity: You are expected to practice the highest possible standards of academic integrity. Any deviation from this expectation will result in a minimum academic penalty of your failing the assignment, and will result in additional disciplinary measures including referring you to the Office of Academic Integrity. Violations of the University's Honor Code include, but are not limited to improper citation of sources, presenting another student's work as your own, and any other form of academic misrepresentation. For more information, please see the Honor Code.

Participation: I expect you to participate actively during lecture, discussion, and lab.

Late Assignments: Assignments are always due before class starts on the day noted. Overdue assignments will be penalized a full grade per day that they are late.

Extra Credit: There will be no opportunities for extra credit. Please focus your efforts on the assignments and lab projects.

Blackboard: Please check Blackboard frequently for updates.

Graduate Students: As this is a 600-level class, it is available to graduate students as graduate credit. Graduate students will be expected to prepare and be evaluated on an additional specific assignment in which they defend the intellectual merit and broader impacts of a research proposal.

GRADING

Your grade for Neurobiology will be the sum of points earned in lecture and lab (out of 400 total points possible). Details for all of these assignments will be provided as we proceed through the course. For lecture and discussion, the assignments break down as follows:

| | |
|------------------|--|
| 75 points | Problem sets and papers (15 total, 5 pts each) |
| 25 points | Participation |
| 10 points | Research proposal topic |
| 20 points | Research proposal paper presentation |
| 20 points | Research proposal rough draft |
| <u>50 points</u> | <u>Research proposal final draft</u> |
| 200 points | Total Possible |

For lab, the assignments and points break down as follows:

| | |
|-------------------|---|
| 60 points | Lab group presentations (3 of them, 20 points each) |
| 40 points | Participation and lab notebook |
| <u>100 points</u> | <u>Independent Projects</u> |
| 200 points | Total Possible |

As an additional assignment graduate students will defend the intellectual merit and broader impacts of their mock grant proposal in a separate document that is worth 100 points.

Grades are based on the accumulation of points. The numbers of points necessary to earn each letter grade are as follows:

Undergraduate Grading Scale (out of 400 points total)

| | | | |
|----|-----------|----|-----------|
| A | ≥ 360.0 | C | 280 – 299 |
| B+ | 340 – 359 | D+ | 260 – 279 |
| B | 320 – 339 | D | 240 – 259 |
| C+ | 300 – 319 | F | < 240 |

Graduate Grading Scale (out of 500 points total)

| | | | |
|----|-----------|----|-----------|
| A | ≥ 450.0 | C | 350 – 374 |
| B+ | 425 – 449 | D+ | 325 – 349 |
| B | 400 – 424 | D | 300 – 324 |
| C+ | 375 – 399 | F | < 300 |

CLASSROOM POLICIES

- Students who are engaged in distracting behaviors will be asked to stop, and if necessary, directed to leave. The instructor is the sole arbiter of what is and what is not distracting.
- **Please silence your mobile devices during lecture and lab.** You are welcome to use your mobile devices to take notes or to look up information during lab. However, do not spend your time in lab and lecture glued to your screen. Participate in discussion and interact with your instructor, TA, and classmates.
- If you are late, please enter the room quietly.
- If you have a question during lecture or discussion, please ask it! During lab, however, please try to solve problems on your own to the greatest extent possible. You can learn a lot through trial-and-error; in other words, getting better at research involves getting comfortable with failure.
- **You are expected to practice the highest standards of academic integrity.** Any deviation from the University of South Carolina Honor Code will result in a minimum of a zero score on the relevant assignment, and may result in additional, more severe disciplinary measures as determined by the Office of Academic Integrity. The Honor Code states: “It is the responsibility of every student at the University of South Carolina Columbia to adhere steadfastly to truthfulness and to avoid dishonesty, fraud, or deceit of any type in connection with any academic program. Any student who violates this Honor Code or who knowingly assists another to violate this Honor Code shall be subject to discipline.” For more information, see the Carolina Community Student Handbook.
- Please note: lying to your professors is a violation of the Honor Code. I am obligated to report any suspected violations of the Honor Code to the Office of Academic Integrity.
- If you are curious about what might or might not count as plagiarism, please ask.
- Finally, **course materials may not be redistributed** to others in any manner, including, but not limited to, electronic copies online. Video recordings are prohibited. Violations will be referred to the Office of Academic Integrity and may result in expulsion and/or legal action, even after the course is over. The only possible exceptions to these rules are those granted through the Office of Student Disability Services.