**NEUROBIOLOGY**

**Biology/Neuroscience 256**

## Fall 2020

Lecture Tuesday/Thursday 9:30-10:45 pm

Laboratory Wednesdays 9 am-4 pm

Professor Elaine Reynolds, she/her

office: 318 RISC lab: 310 RISC

phone: 330-5654

email: [reynolde@lafayette.edu](mailto:reynolde@lafayette.edu) (best way to reach me)

office hours: T/Th 11 am-1 pm

I will be available to answer questions during lab times or at office hours. A *Moodle* web page will be used with this course and it has materials essential for your success in this course. It contains some general information about the course as well as readings, videos, resources, worksheets and practice tests for exams. The URL for the site is <http://moodle.lafayette.edu>

**Moodle privacy statement**:

Moodle contains student information that is protected by the Family Educational Right to Privacy Act (FERPA).  Disclosure to unauthorized parties violates federal privacy laws.  Courses using Moodle will make student information visible to other students in this class.  Please remember that this information is protected by these federal privacy laws and must not be shared with anyone outside the class.  Questions can be referred to the Registrar’s Office.

**Compliance statement:**

The student work in this course is in full compliance with the federal definition of a four credit hour course. Please see the Registrar’s Office web site (<http://registrar.lafayette.edu/additional-resources/cep-course-proposal/>) for the full policy and practice statement.

**Course Objectives and Outcomes**

This course examines the field of neurobiology from a cellular and molecular perspective with the neuron, the functional cellular unit, and the circuit, the informational unit, as the focus of discussion and experimentation. After a review of basic neuronal cell biology, the course will examine the means by which this highly differentiated cell mediates information flow through synaptic transmission and circuitry. Finally we examine the development of the nervous system and the interaction of genetics and environment that constantly fine-tunes the functioning of synaptic connections and circuits throughout life. These objectives will be meet through class discussions, readings and simulations: discussion of primary literature articles; and the application of our knowledge in the laboratory. Prerequisites for this course are Biology 101 and it is intended for intermediate science students. This course is a core requirement for the BS in Neuroscience major. This course also serves as a prerequisite for Neuroscience 410 Advanced Neuroscience.

**Students at the end of the course will be able to:**

Demonstrate an understanding of the following concepts:

The cell biology of neurons

The electrical properties of the neuron

Propagation of action potentials

Process of synaptic transmission between neurons

Roles of neuronal molecules such as ion channels, neurotransmitters and receptors

The role and organization of circuits.

The development of the nervous system

Postnatal modification of the nervous system with experience and its underlying mechanisms

The interaction of genetic and environmental factors that lead to the constant reorganization

of synaptic connections during postnatal developmental stages

Be able to provide evidence that the diversity of life and the neuronal molecules, circuits and tissues evolved over time by processes of genetic change

Develop a hypothesis, and then design, conduct, and analyze an experiment that utilizing modeling or database tools

Understand how evidence supports our current knowledge of neuroscience

**Text**

There is no required textbook for the class. I will be posting readings, simulations, videos etc for the course on Moodle. We will be using a SimUText simulation of neurological processes as a text for the first part of the course. I have posted a link on Moodle for you to obtain this program for your personal computer ($6). If you would like to read a textbook in conjunction with the material presented in class, I would suggest a copy of Neuroscience: Exploring the Brain by Bear, Connor and Paradiso or any introductory textbook. These texts are designed for undergraduate coursework requiring only an elementary knowledge of biology. I will post Chapters and page numbers from the latest edition that cover materials relevant to the topics we cover in class.

**Course Mechanics**

The course has been organized to include two components. Class sessions will discuss the essential material required for an understanding of neurobiology. The laboratory component will enhance what you have learned in the class section of the course through computer simulation, models, and database exploration.

**Class topic sessions**

You will need to prepare for class by viewing or reading the assigned material listed under the topic for each week (we will cover one Topic a week). A video or Powerpoint, set of takeaway points, and some resources will be available on Moodle and you should work on the material to develop your own understanding of it outside of class time. There will be two classes a week that will start at 9:30 promptly. The first 5 minutes or so will be a check in period. On Tuesdays I will answer any questions you have on the material. On Thursdays, we will cover a worksheet with questions to assess your understanding of the topic. We will work on either questions or the worksheet for about an hour and I will leave a few minutes at the end of class to again check in with people. I also have office hours from 11-1 on Tuesdays and Thursdays so you can switch to the office hours zoom link if you have more questions.

**In order to succeed in this class,** you will need to work on the material on your own, assess your learning with the worksheets, and then work on the material some more. You will also need to complete the labs discussed below. I will also provide a practice exam before the assessment to give you more feedback on your learning.

The worksheets are an important part of your learning process and will help you to gauge how well you are doing in learning the material. They are also an important part of your grade in the course. We will complete 10 worksheets for the course. To encourage you to work on the questions on your own, if you turn the worksheet in before 9:30 am before Thursday’s class, you will receive a maximum of 12 points. Otherwise you can attend Thursday’s class where we work on the problems and then thoughtfully write the answers out in your own words and receive a maximum of 10 points if I receive the worksheet by 12 midnight Friday.

I encourage you to collaborate with each other on learning the material and on the worksheet. It’s ok to do the worksheet together. Just list all the names of the people that collaborated on the sheet and you will all receive the same grade. **No more than 3 people should be working together** on the worksheets and the work should be carried out independently between groups. Please talk to me if you would like to be granted an exception. If you would like to collaborate together in a breakout room, I can arrange for that before, during, or after class.

Please don’t distribute answers to other students. They will not be able to assess their own learning unless they do the worksheets themselves. This will likely lead to them doing poorly on the assessment. The worksheets are designed to be a low stakes assessment where you can try and succeed or fail, without a huge hit to your grade. I will be looking for effort here, not necessarily correct answers.

**Laboratory**

The theories, techniques and protocols presented during the laboratory period are a vital component of your learning experience. A Lab handout for the labs we will be doing are posted to the topic week that the lab will start. Some labs will take more than one week (see the syllabus below). To **prepare** for your lab you should carefully read the handout.

Labs can be done asynchronously, but I am going to encourage you to work with a learning group that can do the labs together during the lab times scheduled, any time between 9am-4pm on Wednesdays. I will be available on the lab zoom link to consult with you and to set up breakout rooms for you to work in small groups if you like. Whether you are working independently or in a group, I expect you to **check in with me at least once during the 9am-4pm time period** to discuss your progress on the lab. I will be asking about your working group and about your plans to complete the labs during that Wed time period. Lab due dates are in the syllabus.

Most labs are either a simulation or a scientific exploration of a database. For one of the labs you will create an infographic on a particular neurotransmitter. The handout lays out what is expected for you to do, but please ask any questions if you are not sure. You will be required to take pictures with a phone and to paste some images to the handout document. Or for the inforgraphic project you will work on creating visual images that convey information about a neurotransmitter. All your pictures, drawings, answers to questions, and observations should be recorded in the lab handout as directed. If you collaborated on completing the lab, this should be indicated at the beginning by listing the collaborators and you will all receive the same grade on the assignment. No more than **three people** should collaborate. **Individuals or groups should work independently.** Attempts to share lab results, observations and answers will be met with grade penalties or be referred to the Dean in the case of academic dishonesty. Most of the simulations have alternative forms built in and will be randomly assigned.

**General Policies**

**Diversity, Inclusion and Equity Statement**

In this class we will respect and appreciate the background and perspective of every student regardless of their race, ethnicity, gender, social class, sexual orientation, religion, political affiliation, ability, and learning style. I am committed to providing an atmosphere for learning that respects diversity and inclusion, as well as promotes equality by removing educational barriers in our classroom. Please feel free to engage with me on how we might create an inclusive classroom together. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records.

In compliance with Lafayette College policy and equal access laws, I am available to discuss appropriate academic accommodations that you may require as a student. Requests for academic accommodations need to be made during the first two weeks of the semester, except for unusual circumstances, so arrangements can be made. Students must register with the Office of the Dean of the College for verification and for determination of reasonable academic accommodations.

**Attendance**

Attendance in class is encouraged for each class session. As stated above you are required to check in with me during the lab class times and I will be available to answer questions.

*If you must miss an assessment/exam because of a reasonable conflict, you must make arrangements in advance with me. I am the sole arbitrator of what is reasonable.*If you miss an exam because of sickness or emergency, please notify me as soon as possible. A Dean’s excuse will be required if an exam or laboratory is missed without prior arrangement because of sickness or any other conflict.

**Cell Phone/Computer policy**

Cell phones and computers should be silenced during class/lab sessions. Cell phones should be put away during exams. Use of a cell phone during an exam will be considered a violation of our academic honesty code and will be pursued with the Dean’s office.

**Academic Honesty**

I expect that you will perform this work honestly and independently except where collaboration is allowed. The academic honesty policy is laid out in the student handbook, this syllabus, and the departmental statement on academic honesty that is attached to this syllabus and it is your responsibility to understand this policy. Please ask if the policy is unclear to you. The handbook states:

“To maintain the scholarly standards of the College and, equally important, the personal ethical standards of our students, it is essential that written assignments be a student’s own work, just as is expected in examinations and class participation. A student who commits academic dishonesty is subject to a range of penalties, including suspension or expulsion. Finally, the underlying principle is one of intellectual honesty. If a person is to have self-respect and the respect of others, all work must be his/her own.”

At Lafayette College, all course materials are proprietary and for class purposes only. This includes posted recordings of lectures, worksheets, and other course items. Such materials should not be reposted. Any out-of-class sharing, distribution or posting of any remote instruction materials associated with this course is not allowed. Doing so constitutes a violation of Academic Honesty and of the policies of this class. In using remote instruction materials you commit to NEVER sharing these materials. Any Lafayette student not enrolled in during Fall 2020 who is willingly in receipt of remote instruction materials from this class is also in violation of Academic Honesty.

Online discussions should also remain private and not be shared outside of the course. I will **not** be recording our class sessions to ensure your privacy. You must request my permission prior to creating your own screen capture or recordings of class materials as an accommodation, and any screen capture and recordings are not to be shared or posted online even if permission is granted to record. If you have any questions about proper usage of course materials feel free to ask me. Also, if you have any concerns with being recorded during the course please let me know.

**Top 10 Tips for Good Zoom Hygiene and Etiquette in Education**

[**Thomas G. Plante Ph.D., ABPP**](https://www.psychologytoday.com/us/experts/thomas-g-plante-phd-abpp) Viewed Aug. 3, 2020. <https://www.psychologytoday.com/us/blog/do-the-right-thing/202003/top-10-tips-good-zoom-hygiene-and-etiquette-in-education>

1. Be sure to mute your mic (lower-left corner of your screen) as soon as you sign on and whenever you are *not*speaking. This is important and perhaps the most critical tip on this list to avoid background noise and distractions for others.

2. Consider muting your video (also on the lower left of the screen) if you doing something that might be distracting to others.

3. Close unneeded applications on your computer to keep the video optimally functioning.

4. You might want to use a headset with an external mic for best hearing and speaking capabilities.

5. When you are speaking, let others know that you are finished by saying one of these sign-offs: “That’s all.” “I’m done.” “Thank you.” So that everyone knows you have finished your comments.

6. If you want to speak, physically raise your hand or use the “raise hand” feature that is available at the bottom center of your screen.

7. You can ask questions and make comments silently if desired using the “Chat” feature (also on the bottom and center of your screen).

8. Be mindful of your background lighting. If you are sitting in front of a window, you may be completely darkened by the light coming through the window. Your overhead light also might need to be turned off or dimmed as well.

**Evaluation**

Three assessment/examinations will be given, two during the semester and one during the finals period covering material from **both** the lecture sessions and the laboratory.

In summary, grades will follow these guidelines:

Assessment I 20%

Assessment II 20%

Assessment III 20%

Worksheets (10) 10%

Completed Laboratory Reports (5) and Infographic 30%

**Important Dates**

Assessment I 9/17

Assessment II 10/22

Assessment III Scheduled during finals week

Labs Reports Due dates as shown in the syllabus

**Bio 256 Fall 2020 Syllabus**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **What’s going on?** | **Who is where?** | **How do I prepare?** |
| Every  T/Th | Office hours | Meet w/ me on Zoom  11 am -1 pm | Come with questions |
|  |  |  |  |
| 8/18 | Class logistics | Everyone is with me on Zoom  9:30 am EDT | No prep required |
| 8/19 | No lab this week |  |  |
| 8/20 | Topic 1 Organization of the nervous system | Everyone is with me on Zoom  9:30 am EDT | Topic 1 on Moodle |
|  |  |  |  |
| 8/25 | Topic 2 Cell Biology and basic electrical properties of cells/neurons | Meet w/ me on Zoom  9:30 am EDT | Topic 2 on Moodle |
| 8/26 | Lab 1: Visualization of neurons and the nervous system | Students meet in groups between 9 am and 4 pm. Everyone must check in with me during that time | Lab 1 on Moodle |
| 8/27 | Topic 2 Cell Biology and basic electrical properties of cells/neurons | Meet w/ me on Zoom  9:30 am EDT | Topic 2 on Moodle |
|  |  |  |  |
| 9/1 | Topic 3 Resting potential/Passive potential/Action potential | Meet w/ me on Zoom  9:30 am EDT | Topic 3 on Moodle |
| 9/2 | Lab 2: SimUText Action Potential Extended | Students meet in groups between 9 am and 4 pm. Everyone must check in with me during that time | Lab 2 on Moodle |
| 9/3 | Topic 3 Resting potential/Passive potential/Action potential | Meet w/ me on Zoom  9:30 am EDT | Topic 3 on Moodle |
|  |  |  |  |
| 9/8 | Topic 4 Action potential, mechanism and measurement | Meet w/ me on Zoom  9:30 am EDT | Topic 4 on Moodle |
| 9/9 | Lab 3: Leech physiology | Students meet in groups between 9 am and 4 pm. Everyone must check in with me during that time | Lab 3 on Moodle |
| 9/10 | Topic 4 Action potential, mechanism and measurement | Meet w/ me on Zoom  9:30 am EDT | Topic 4 on Moodle |
|  |  |  |  |
| 9/15 | Finish and review | Meet w/ me on Zoom  9:30 am EDT | Study Topics 1-4 |
| 9/16 | Finish labs and turn in lab reports for Lab 1 and 2 | Open hours w/me on Zoom  9-11 am and 1-3 pm |  |
| 9/17 | Open Notes Assessment | Everyone on Zoom, cameras on, 9:30 am | On Topics 1-4 |
|  |  |  |  |
| 9/22 | Topic 5 Neurocircuits and synapses | Meet w/ me on Zoom  9:30 am EDT | Topic 5 on Moodle |
| 9/23 | Lab 4: Swimmy week 1 | Students meet in groups between 9 am and 4 pm. Everyone must check in with me during that time | Lab 4 on Moodle |
| 9/24 | Topic 5 Neurocircuits and synapses | Meet w/ me on Zoom  9:30 am EDT | Topic 5 on Moodle |
| **Date** | **What’s going on?** | **Who is where?** | **How do I prepare?** |
|  |  |  |  |
| 9/29 | Topic 6 Presynaptic processes, neurotransmitters (NT) | Meet w/ me on Zoom  9:30 am EDT | Topic 6 on Moodle |
| 9/30 | Lab 4: Swimmy week 2 | Students meet in groups between 9 am and 4 pm. Everyone must check in with me during that time | Review Lab 4 on Moodle |
| 10/1 | Topic 6 Presynaptic processes, neurotransmitters (NT) | Meet w/ me on Zoom  9:30 am EDT | Topic 6 on Moodle |
|  |  |  |  |
| 10/6 | Topic 7 Postsynaptic processes, summation,NT receptors | Meet w/ me on Zoom  9:30 am EDT | Topic 7 on Moodle |
| 10/7 | Lab 5: Infographics | Students meet in groups between 9 am and 4 pm. Everyone must check in with me during that time | Infographics doc on Moodle |
| 10/8 | Topic 7 Postsynaptic processes, summation,NT receptors | Meet w/ me on Zoom  9:30 am EDT | Topic 7 on Moodle |
|  |  |  |  |
| 10/13 | Topic 8 Fast/slow interactions  Evolution of neuronal molecules | Meet w/ me on Zoom  9:30 am EDT | Topic 8 on Moodle |
| 10/14 | Lab 5: Infographics Presentations | Lab meetings 10-11 am and 2-2 pm for presentations |  |
| 10/15 | Topic 8 Fast/slow interactions  Evolution of Neuronal molecules | Meet w/ me on Zoom  9:30 am EDT | Topic 8 on Moodle |
|  |  |  |  |
| 10/20 | Finish and review | Meet w/ me on Zoom  9:30 am EDT | Study Topics 5-8 |
| 10/21 | Review- Finish and turn in Lab reports for Lab 3 and 4 | Open hours w/me on Zoom  9-11 am and 1-3 pm |  |
| 10/22 | Open Notes Assessment | Everyone on Zoom, cameras on, 9:30 am | On Topics 5-8 |
|  |  |  |  |
| 10/27 | Topic 9 Early Embryonic Neural Development | Meet w/ me on Zoom  9:30 am EDT | Topic 9 on Moodle |
| 10/28 | Lab 6: Review neural anatomy, Mouse Brain Connectivity Lab | Students meet in groups between 9 am and 4 pm. Everyone must check in with me during that time | Lab 6 on Moodle |
| 10/29 | Topic 9 Early Embryonic Neural Development | Meet w/ me on Zoom  9:30 am EDT | Topic 9 on Moodle |
|  |  |  |  |
| 11/3 | Topic 10 Late Embryonic Neural Development | Meet w/ me on Zoom  9:30 am EDT | Topic 10 on Moodle |
| 11/4 | Lab 6 Mouse Brain Connectivity Lab | Students meet in groups between 9 am and 4 pm. Everyone must check in with me during that time | Review Lab 6 on Moodle |
| 11/5 | Topic 10 Late Embryonic Neural Development | Meet w/ me on Zoom  9:30 am EDT | Topic 10 on Moodle |
|  |  |  |  |
| **Date** | **What’s going on?** | **Who is where?** | **How do I prepare?** |
|  |  |  |  |
| 11/10 | Topic 11 Postnatal Development-interaction of experience and genetics | Meet w/ me on Zoom  9:30 am EDT | Topic 11 on Moodle |
| 11/11 | Discussion of Lab 6 | Lab meetings 10-11 am and 2-3 pm for discussions |  |
| 11/12 | Topic 11 Postnatal Development-interaction of experience and genetics | Meet w/ me on Zoom  9:30 am EDT | Topic 11 on Moodle |
|  |  |  |  |
| 11/17 | Topic 12 Interaction of experience and genetics in behavior | Meet w/ me on Zoom  9:30 am EDT | Topic 12 on Moodle |
| 11/18 | Turn in Lab report for Lab 6 | Open hours w/me on Zoom  1-3 pm for review |  |
| 11/19 | Finish and Review | Meet w/ me on Zoom  9:30 am EDT | Topic 9-12 |

Assessment III will be scheduled during finals



**Biology Department Statement on Academic Honesty and Plagiarism**

We expect our students to conduct themselves with honor and integrity at all times. This includes, but is not limited to, respecting your instructors and fellow students in your comportment and behavior, as well as respecting their intellectual accomplishments and contributions to your own academic work. We define academic dishonesty as any act or intention to deceive any member of the Department as to the source of your ideas when submitting any work for a grade. During tests or exams this includes failure to abide by any test-taking condition (written, audiovisual or verbal) established by the course instructor. Unless explicitly stated otherwise, it will be understood that the use of "crib sheets", copying from other students, and any use of notes, books, electronic aids or other reference materials is prohibited while taking any quiz or test in any Department course. The Lafayette Student Handbook offers a more detailed discussion of academic honesty, including the procedures followed in cases of academic dishonesty and the possible penalties arising from it.

Our insistence on academic honesty extends from traditional writing (including laboratory reports) through artwork, electronic projects, or oral presentations that you submit for a grade. Students are cautioned to be particularly vigilant against plagiarism, which is a frequent form of academic dishonesty. The Lafayette Student Handbook includes an extensive section on plagiarism and we encourage you to become familiar with this material. Among the most common, but no less serious, forms of plagiarism is re-writing someone else's work without crediting the original author. Rewording a passage from another source and failing to cite that source is a form of plagiarism and will be treated as a breach of academic honesty. In crediting the work of others, all sources are treated as equal: you must cite material produced by other students, material found in the primary or secondary literature, course handouts, and any material obtained from the Internet. Individual instructors may establish more comprehensive guidelines within their respective courses; you are responsible for knowing and understanding any such rules for courses in which you are enrolled.

If you have any questions about what constitutes academic dishonesty in general or in a specific situation, it is your responsibility to discuss the matter with your instructor.

Issued by the Biology Department, January 2011

***Department of Biology***

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