BIOL 3352/55452: SYSTEMS NEUROSCIENCE – FALL 2020

TEMPLE and COVID-19
Temple University’s motto is Perseverance Conquers, and we will meet the challenges of the COVID pandemic with flexibility and resilience. The university has made plans for multiple eventualities. Working together as a community to deliver a meaningful learning experience is a responsibility we all share: we’re in this together so we can be together.

Instructor
Eleni Anni, Ph.D.
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Class meetings
https://temple.zoom.us/j/97726536026
Tuesday/Thursday 3:30-4:50 pm
August 25 – December 10

Office hours (in Zoom)
Friday 2:00 pm - 5:00 pm by appointment

Technology specifications for this course
Limited resources are available for students who do not have the technology they need for class. Students with educational technology needs, including no computer or camera or insufficient Wifi-access, should submit a request outlining their needs using the Student Emergency Aid Fund (https://deanofstudents.temple.edu/news/student-emergency-aid-fund) form. The University will endeavor to meet needs, such as with a long-term loan of a laptop or Mifi device, a refurbished computer, or subsidized internet access.

Note that some software is available for free download on the ITS Academic Support page (https://its.temple.edu/tech-students). Other specialty software may be available for remote access through ITS.

Prerequisites
BIOL/Chem/MATH as per bulletin https://bulletin.temple.edu/courses/biol/ or equivalent experience as determined by the instructor.

Textbook
“Neuroscience: Exploring the brain”
Bear et al.,
Wolters Kluwer, Inc.
ISBN: 978-0781778176
The textbook will be available through electronic reserve of the Charles Library.

Power point slides with notes of each lecture and supplementary materials (scientific articles, reports, videos etc.) will be posted on Canvas.

Course Description
In this course we will examine how the flow of ions provides the foundation for membrane potential and the generation of electric signals in neurons (action potential), in concert with the diverse groups of ion channels, transporters and pumps. In addition, we will discuss how neurons communicate with each other (synaptic transmission) and nonneuronal cells. Finally, we will explore the circuits that underlie simple and complex behaviors (sensory and motor systems), as well as how circuitry defects cause neurological diseases.

This course includes an *in silico* lab with three components (Simbio), which explores the principles of electrical excitability of neurons.

Course Objectives
Students taking this course will learn how nerve cells develop excitability and electrical properties, how synaptic function is generated, and how those properties are used for encoding information received from the environment, decoding the input signal and support higher order function in the nervous system. Moreover, cellular and molecular processes in neurological pathologies in humans will be discussed.

Learning Outcomes
By the end of this course students should be able to

- Understand the specifics of ion flow and contribution to electrical signaling in the nervous system.
- Appreciate the role of ion channels, transporters and receptors.
- Explore the differences in the mechanisms of synaptic transmission.
- Understand how these basic cellular and molecular components integrate to encode and decode information about the outside world and internal states, as in the sensory system (taste, smell, vision, hearing, touching) and motor system (movement).

Course Requirements
The course requires engagement of students in class through group discussions, review sessions, presentations and peer-evaluations for active learning. Readings of assigned chapters and related material (articles, reports, videos, etc.) should be done before class meetings. *Graduate students are required to make a presentation in class based on current high-impact scientific literature.*

Students are encouraged to attend all classes in order to participate in class activities. Attendance will be taken at the beginning of the class and students will be marked tardy if not available within 5 min of class start. If circumstances prevent a student from attending a class, or joining the class on time, please notify the instructor in advance, if possible.
**Attendance Protocol and Your Health**

If you feel unwell, you should not come to campus, and you will not be penalized for your absence. Instructors are required to ensure that attendance is recorded for each in-person or synchronous class session. The primary reason for documentation of attendance is to facilitate contact tracing, so that if a student or instructor with whom you have had close contact tests positive for COVID-19, the university can contact you. Recording of attendance will also provide an opportunity for outreach from student services and/or academic support units to support students should they become ill. Faculty and students agree to act in good faith and work with mutual flexibility. The expectation is that students will be honest in representing class attendance.

Recordings of the Zoom class sessions will be done by the instructor and uploaded to Canvas for the academic success of the class as a whole.

- Students may use the recordings as a study aid outside of class to review material.
- Students who have spotty internet service will be able to access the recording at times other than normal class times.

Students are not allowed to take audio or video recordings of class sessions, except in cases of an approved accommodation from the Office of Disability Resources (DRS).

**Statement on recording and distribution of recordings of class sessions**

Any recordings permitted in this class can only be used for the student’s personal educational use. Students are not permitted to copy, publish, or redistribute audio or video recordings of any portion of the class session to individuals who are not students in the course or academic program without the express permission of the faculty member and of any students who are recorded. Distribution without permission may be a violation of educational privacy law, known as Family Educational Rights and Privacy Act (FERPA) ([https://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html](https://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html)), as well as certain copyright laws. Any recordings made by the instructor or university of this course are the property of Temple University.

**Tests**

Quizzes and exams consist of a combination of short answers, multiple choice, true-false, and fill-in-the-blank questions. *Tests for graduate students include 20% additional questions.* Tests will be given on Canvas, and reviewed in class the following week. Grades for the course will be posted on Canvas. Missed tests will NOT be rescheduled.

Final (letter) grade will be based on the following and calculated according to the CST grading scale (see course Canvas)

- Quiz (5 min): 70 points
  - 9/3, 9/17, 10/1, 10/29, 11/12 350 points
- Midterm exam (1 hr)
  - 10/15 150 points
- Final exam (2 hrs)
  - 12/10 (1:00-13:00 pm) 280 points
- Submitted (qualified) test questions 120 points
- In silico lab (9/10, 9/24, 10/8) 100 points

Total 1000 points

- Discussion posts (optional) 120 points

**Remote proctoring statement**
Zoom will be used to proctor exams and quizzes in this course. These tools verify your identity and record online actions and surroundings. It is your responsibility to have the necessary government or school issued ID, a laptop or desktop computer with a reliable internet connection, a webcam/built-in camera and microphone, and system requirements for using Zoom.

**Expectations for Class Conduct**
In order to maintain a safe and focused learning environment, we must all comply with the four public health pillars: wearing face coverings, maintaining physical distancing, washing our hands and monitoring our health.
It is also important to foster a respectful and productive learning environment that includes all students in our diverse community of learners. Our differences, some of which are outlined in the University's nondiscrimination statement, will add richness to this learning experience. Therefore, all opinions and experiences, no matter how different or controversial they may be perceived, must be respected in the tolerant spirit of academic discourse. Treat your classmates and instructor with respect in all communication, class activities, and meetings. You are encouraged to comment, question, or critique an idea but you are not to attack an individual. Please consider that sarcasm, humor and slang can be misconstrued in online interactions and generate unintended disruptions. Profanity should be avoided as should the use of all capital letters when composing responses in discussion threads, which can be construed as “shouting” online. Remember to be careful with your own and others’ privacy. In general, have your behavior mirror how you would like to be treated by others.

**Course Policies**
Cell phones should be turned off during class meetings.
A number of surveys and studies suggest that cell phones use in class is a distraction for the user but also to other students. Data show that cell phones use in class results in decreased ability to paying attention, taking lower quality notes, retaining less information and doing worse on tests about the material (see e.g. Mayer and Moreno, 2010; Rosen et al., 2011; Kuznekoff & Titsworth, 2013).

**Student and Faculty Academic Rights and Responsibilities**
Freedom to teach and freedom to learn are inseparable facets of academic freedom. The policy can be accessed through the following link: [http://policies.temple.edu/PDF/99.pdf](http://policies.temple.edu/PDF/99.pdf)
Academic Honesty and Plagiarism
Any form of academic dishonesty — plagiarism and cheating — is as unacceptable in this course as it is across the University and throughout higher education. The policy can be accessed through the following link: https://secretary.temple.edu/sites/secretary/files/policies/03.70.12.pdf

Disability Disclosure Statement
Any student who has a need for accommodation based on the impact of a documented disability, including special accommodations for access to technology resources and electronic instructional material required for the course, should contact me privately to discuss the specific situation as soon as possible. You may also contact Disability Resources and Services (DRS) at 215-204-1280 in 100 Ritter Annex to learn more about the resources available to you. Reasonable accommodations for all students with documented disabilities will be provided by the DRS in coordination with the instructor. The policy can be accessed through the following link: https://disabilityresources.temple.edu/

Technology Usage Policy
Read Temple University’s Technology Usage policy which includes information on unauthorized access, disclosure of passwords, and sharing of accounts. The Temple University Technology Usage Policy can be accessed at https://computerservices.temple.edu/technology-usage-policy

Resources
Access class sessions in Zoom https://temple.zoom.us
For Zoom support check https://support.zoom.us/hc/en-us/categories/200101697

Access your course materials at canvas.temple.edu.
For Canvas support email support@instructure.com 24/7 or call the Student Hotline 1-844-683-6439 or the Student Live Chat https://cases.canvaslms.com/liveagentchat?chattype=student.

Access databases, books, journals and more at http://library.temple.edu.

Obtain 24/7 technology assistance at the Information Technology Services Help Desk (https://its.temple.edu/technical-support).

For academic support check the Student Success Center (studentsuccess.temple.edu) services, such as the Writing Center, the Peer Assisted Study Sessions (PASS) program, Academic Coaching, STEM tutoring, the Conversation Partners program, and more. Services are offered exclusively online this semester. Students can make same day appointments, and the cap on the number of tutoring sessions students can access per week is raised. More information is available by calling 215-204-0702, or by visiting the “Front Desk” Zoom room via the Meeting ID at 929-916-654.

Additional resources
Tuttleman Counseling Services: https://counseling.temple.edu/access-services
CST Professional Development Services including resume review, LinkedIn profile, interview practice, internships, full-time and temporary jobs, summer jobs, volunteering opportunities and more: 
https://cst.temple.edu/virtualprodevservices

Career Center: https://www.temple.edu/life-at-temple/students/careers-and-internships/career-center
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<td>Introduction to Neuroscience: Timeline Literature Search (tentative)</td>
<td>Chapter 1</td>
<td>Workshop</td>
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<td>9/1 - 9/3</td>
<td>Cells: Neurons and glia</td>
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<td>Neuronal membrane at rest</td>
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<td>9/15 - 9/17</td>
<td>Excited neuronal membrane Action potential</td>
<td>Chapter 4</td>
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<td>9/22 - 9/24</td>
<td>Synapse Synaptic transmission</td>
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<td>9/29 - 10/1</td>
<td>Neurotransmitters</td>
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<td>Chemical senses: Olfaction</td>
<td>Chapter 8</td>
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<td>10/27 - 10/29</td>
<td>Visual system</td>
<td>Chapters 9-10</td>
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<td>Auditory system</td>
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<td>Vestibular system</td>
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<td>Somatic sensory system: Touch</td>
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<td>Movement: Spinal control, Brain control</td>
<td>Chapters 13-14</td>
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<td>12/8 - 12/10</td>
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