

BIOL/PSYC 4421: Advanced Topics in Neuroscience

Fall 2024

Instructor Information

Instructor:

Qing Lin, MD, PhD

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Faculty Profile:

<https://www.uta.edu/academics/faculty/profile?username=qilin>

Office Hours:

An office hour is available every Thursday between 9:30 -10:30 AM in ERB room 434. You are welcome to bring questions and interact with me for Q&A regarding the course learning. If you request a virtual meeting in “Microsoft Teams”, please make an appointment.

Teaching Assistant for lab session: Blake Brady, blake.brady@uta.edu

Course Information

Section information: BIOL/PSYC4421-001

Times and Places of lecture, exams, and lab session:

This is an on-campus (“face-to-face”) class (For a full definition of the course modalities, please visit www.uta.edu/academics/courses-and-schedules).

a. All lectures and exams are held at the SH129 from **12:30 – 1:50 PM** every Tuesday and Thursday. **Please note:** The time and date for exam 3 (final exam) follow the “UTA final exam schedules”.

b. All lab sessions are held at the LS318 from **2:00 – 3:50 PM** every Wednesday.

Description of Course Content and Learning Outcomes:

This course will cover advanced topics in neuroscience using an integrative and participatory format that includes a lecture portion and a laboratory section. The course is favorable for individuals who have a general background in neuroscience (BIOL/PSYC3322) and/or neuropharmacology (BIOL/PSYC4309) and will focus on specific content that is especially relevant to gain a deeper understanding of how the nervous system works and what underlying mechanisms control behaviors. The lecture portion will be combined with a lab discussion, which will provide a forum to discuss neuroscience research-related issues.

Students are expected to develop a deeper understanding of the nature of neurobiology and learn how neuroscience is linked to clinical uses. Completion of the course is essential for students who are interested in pursuing a career in neurobiology research or clinical practice of neurological and neurosurgical sciences.

Required Textbook and Other Course Materials:

A. Textbook: Purves D. et al. Neuroscience, 6th Edition. Sinauer, Oxford University Press, 2018. ISBN 978-1-60535-380-7. You may look up the costs of the textbook at UTA Bookstore <https://www.bkstr.com/texasatarlingtonstore/home>. Cost varies depending on the quality, e.g., new or used. The cost to print on campus can be found at <https://libraries.uta.edu/services/technology/printing>. **Note:** It is highly recommended that you have the 6th edition of the textbook because you will need to read and study from it to get much detailed information in order to pass the course.

B. PowerPoint slides provide the course outlines that help students to understand materials of the textbook while interacting with the instructor in class and guide students to review for exams. The slides are uploaded at “Modules” in the Canvas available for students to download.

C. Reading and writing for lab sessions are guided and managed by the Teaching Assistant.

Technology Requirements:

Since all information and course materials are provided via the Canvas, it is strongly suggested that students access the Canvas Help and/or tutorials to familiarize themselves and download these tools prior to the class.

Other Requirements:

The course prerequisites of this class are BIOL/PSYC4309 and/or BIOL/PSYC3322.

Descriptions of Lectures, Reading assignments, Exam Schedule, and Lab Assignments:

This is an advanced course that covers most aspects of neuroscience. You are required to know much detailed information. To this end, please read the textbook and lecture slides before and after attending lectures. Critically, students are strongly suggested to do an intensive review by focusing on those “Critical contents” indicated on the last page of PowerPoint slides for each chapter.

There will be *three* closed-book exams, and each exam covers 5-6 chapters. The 3rd exam will NOT be comprehensive. The format for exams is short-answer questions.

As the instructor for this course, I reserve the right to adjust lecture schedule and lab assignments in any way that serves the educational needs of the students enrolled in this course.

A. Schedules of tentative lectures, reading assignment, exams and lab sessions

WK	Date (Lecture)	Lecture topics and reading assignment (Tuesday and Thursday) at SH129 (12:30 – 1:50 PM, 80 min)	Lab Wed, LS318 2-3:50PM	Lab Discussion & Presentation	Lab Assignment due
1	8/20, 22	Neural Signaling: (Ch 2,3,4) Voltage-dependent membrane permeability Channels and transporters	8/21	Introductory Lab	
2	8/27, 29	Neural Signaling: (Ch 4,5,6) Channels and transporters Synaptic transmission Neurotransmitters and their receptors	8/28	Lab 1	8/27 (Tue) before 11:59p
3	9/3, 5	Neural Signaling: (Ch 6) Neurotransmitters and their receptors	9/4	Lab 2	9/2 (Mon) before 11:59p
4	9/10, 12	Neural Signaling: (Ch 6,7) Neurotransmitters and their receptors Molecular signaling within neurons	9/11	Lab 3	9/9 (Mon) before 11:59p
5	9/17 9/19	Neural Signaling: (Ch 8) Synaptic plasticity Exam 1: 9/19, Thu, 12:30-1:50PM, (80 min) covers chapters 2,3,4,5,6 & 7.	9/18	Lab 4	9/16 (Mon) before 11:59p
6	9/24, 26	Neural Signaling: (Ch 8) Synaptic plasticity Sensation/Sensory Processing: (Ch 9) Somatic sensory system	9/25	Lab 5	9/23 (Mon) before 11:59p

7	10/1, 3	Sensation/Sensory Processing: (Ch 10,11) Pain Vision	10/2	Lab 6	9/30 (Mon) before 11:59p
8	10/8 10/10	No lecture Sensation/Sensory Processing: (Ch 11) Vision	10/9	Lab 7	10/7 (Mon) before 11:59p
9	10/15, 17	Sensation/Sensory Processing: (Ch 12) Vision pathways	10/16	Lab 8	10/14 (Mon) before 11:59p
10	10/22 10/24	Movement/Its Central Control: (Ch 16) Lower motor neurons circuits and motor control Exam 2: 10/24, Thu, 12:30-1:50 PM (80 min) covers chapters 8,9,10,11 & 12.	10/23	Lab 9	10/21 (Mon) Before 11:59p
11	10/29, 31	Movement/Its Central Control: (Ch 17,18) Upper motor neurons control of the brainstem and spinal cord Modulation of movement by the basal ganglia	10/30	Lab 10	10/28 (Mon) before 11:59p
12	11/5, 7	Movement/Its Central Control: (Ch 18,19) Modulation of movement by the basal ganglia Modulation of movement by the cerebellum	11/6	Lab 11	11/4 (Mon) before 11:59p
13	11/12, 14	Movement/Its Central Control: (Ch 19) Modulation of movement by the cerebellum	11/13	Lab 12	11/11 (Mon) before 11:59p
14	11/19, 21	The visceral motor system (Ch 21)	11/20	No lab	
15	11/26 11/28	The visceral motor system (Ch 21) No lecture (Thanksgiving holiday)	11/27	No lab	
16	11/29- 12/4	Backup and Review Makeup test on Dec 3 (Tuesday)			
17	12/5-11 Final exam	Exam 3: 12/10, Tue, 11 AM-1:30 PM (150 min) covers CHs 16,17,18,19 & 21. Please also get update for dates of exams from https://www.uta.edu/administration/registration/calendars/final-exams			

B. Lab sessions

a. Weekly papers

A research article or material assigned by the TA is provided to everyone via the Canvas. A paper should be generated based on the readings, which should include the following portions:

1) The first part will be a 1-2-page summary of the article set for that week. For a research article, your summary should include (a) a description of the theoretical background and the applied setting of the research; (b) summary of methods; (c) major findings of each individual experiment; (d) you will also need to summarize the “take-home message” from the article as a whole, and (e) offer some suggestions for future, related research.

2) The second part of each paper will be a list of 3-4 substantive questions from the reading for that week. “Substantive” means that your questions indicate a mature thoughtfulness and a critical examination of the paper. It also means that you must attempt to offer some kinds of a response to your own questions, based on your individual efforts to discover the answer. Please submit your questions on the last page of your summary and also bring them to the lab for further discussion.

Please note:

1) Weekly papers are individual (not group) projects. Please work alone, and do not plagiarize from other people or readings.

2) These will be due by **11:59 PM** on **MONDAY** of each week (**Note:** The first paper may be due on **TUESDAY**, August 27, 2024). Delayed submissions will not be accepted. Papers must be uploaded via Canvas.

3) Papers including content of the questions will be discussed in the lab session on Wednesday of each week.

b. Lab presentation

Everyone enrolled in this course is required to give one *30-minute* presentation using PowerPoint slides to the lab on the topic of the article assigned in that week.

c. Lab participation

Lab participation is required for everyone in this course (please refer to “**Grading information**”).

Grading Information

Grading policies:

1. Three exams for lectures are worth **300** points (100 points for each exam): You are required to take all three exams. Additional **60** points as bonus are added, which include:

- i. 30 points are additional for bonus questions added to three exams (10 in each exam).
- ii. 30 points are additional added to encourage students to attend the lectures. There will be **25** lectures; each lecture attendance is worth **1.2** point.

2. Assessments for Weekly Papers, Lab Presentation and Lab Participation are worth **155** points:

a. Weekly papers (96 points)

A total of 12 weekly papers are required, corresponding to each of the 12 research articles. Papers will be worth 8 points each, for a total of 96 points.

b. Lab presentation using PowerPoint (20 points)

Presentation will be judged by five criteria: Slide preparation (4 points), Clarity (4 points), Critiques (4 points), Presentation (4 points), and Understanding (4 points) for a total of 20 points.

c. Lab participation (39 points)

Lab participation points: Earn 3 points per session (13 Lab participations) by speaking in the lab, including (but not limited to) asking questions based on articles that are assigned to read, respectfully responding to another member of the class, raising a relevant issue for discussion, etc. Remaining silent earns zero points. 39 points are for 13 lab sessions (3 points x 13).

Grade calculation:

The final course grade will be determined by dividing the total number of earned points (including earned bonus points) on your exams, lecture attendance, papers, presentation and participation by the total number of points (**455**).

Three exams:	300 (100 each)
Papers:	96
Lab presentation:	20
Lab participation:	39
Total:	455

For examples, if you earn 380 points, your final grade will be $380/455 \times 100 = 84.4\%$. If you earn 480 points, your final percent score will be $480/455 \times 100 = 105.5\%$. This is a way to calculate the final percent score yourself. This also the way to keep track of your performance.

Grades will be determined as follows:

A \geq 90%, B \geq 80%, C \geq 70%, D \geq 60%, F < 60%.

Please note: There will be **no** extra credit work to make up the grade. Please do not ask. UTA policy does not allow distribution of grades over the phone call or email. Please also note: Do not rely on percentages and letter grades provided in the Canvas. Those largely may not reflect all calculations. Your grade is based on this section (**Grading information**).

Make-up Exams:

If you miss an exam, a grade of zero will be given. There is no provision for taking a makeup exam in this course *unless* documentation for a University-approved excuse is received. (<https://catalog.uta.edu/academicregulations/studentresponsibility/#attendancetext>).

Please read the details about taking makeup tests as below:

A. Makeup tests can be approved and offered for students who are absent of exams usually due to **1)**. Unpredictable or emergent events, like illness of the student or the people in the student's family; **2)**. Calls for jury duty; **3)**. UTA-sponsored activities. The request for a makeup test must be submitted along with valid documentation within five business days of the exam date. A makeup test cannot be approved without valid documentation. Delayed submission is not accepted unless a justification email for the delayed submission is sent to the instructor within five business days of the exam date.

B. Please note that the absence of exams cannot be excused due to participating in party, wedding, or festival, taking vacation, doing school interview or job interview, and taking courses scheduled by other universities (or colleges).

C. All makeup tests will be offered during the "dead week", i.e., the week before the Final Exam Week unless a special approval by the instructor.

D. Make-up test is **ONLY** for those students who miss the first two tests for the above valid reasons.

E. The instructor will schedule the dates/times for taking makeup tests and then informs the students involved.

Expectations for Out-of-Class Study

Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 12 hours per week of their own time in course-related activities, including intensive reviews of required materials taught in class (guided by PowerPoint sides and Critical contents), completing lab assignments, and preparing for exams, etc.

Grade Grievances:

Any appeal of a grade in this course should submit a grievance form by following the procedures and deadlines as published in the current University Catalog (<https://www.uta.edu/academics/schools-colleges/science/departments/psychology/degree-programs/graduate/graduate-resources/student-grievance-form>).

Institution Information

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the Institutional Information page (<https://resources.uta.edu/provost/course-related-info/institutional-policies.php>) which includes the following policies among others:

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey
- Final Exam Schedule

Additional Information

Face Covering Policy:

Face coverings are not mandatory, all students and instructional staff are welcome to wear face coverings while they are on campus or in the classroom.

Attendance:

At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this course, I have established the attendance policy (see "**Please note**" below). However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty must report the last date a student attended their class based on evidence of academic engagement such as a test, participation in a class project or presentation, or an engagement online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

Distance education courses require regular and substantive online interaction and participation. Students must participate in online course activities to demonstrate attendance; logging into an online class is not sufficient by itself to demonstrate attendance.

Please note:

1) For the lecture session at the SH129, additional bonus points are added to encourage lecture attendance because lecture attendance is needed for success in this course (see "**Grading Information**" above). Due to much information included in the course, routinely attending the lecture will be extremely beneficial to students in grabbing and understanding the materials to improve the performance of course learning. If students miss a class meeting(s) or miss portions of classes due to tardiness or early departure, they are still accountable for the materials that are covered by those classes. If you miss a class, you are responsible for finding your classmates with whom you can share resources.

2) Lab attendance and participation at the LS318 are required in this course (please refer to "**Grading information**" above).

Note: The absence of either a lecture or lab may be excused due to events that happen unpredictably, such as illness (documentation is needed).

Emergency Exit Procedures:

Should we experience an emergency event that requires evacuation of the building, students should exit the room and move toward the nearest exit (there are three entrance doors in the LS building available for evacuation). Evacuation plans may be found at [Evacuation Route Maps \(Buildings\)](#). When exiting the building during an emergency, do not take an elevator but use the stairwells instead. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Academic Success Center:

The Academic Success Center (ASC) includes a variety of resources and services to help you maximize your learning and succeed as a student at the University of Texas at Arlington. ASC services include supplemental instruction, peer-led team learning, tutoring, mentoring and TRIO SSS. Academic Success Center services are provided at no additional cost to UTA students. For additional information visit: [Academic Success Center](#). To request disability accommodations for tutoring, please complete this [form](#).

The IDEAS Center (<https://www.uta.edu/ideas/>) (2nd Floor of Central Library) offers **FREE tutoring** and **mentoring** to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593.

The English Writing Center (411LIBR):

The Writing Center offers **FREE** tutoring in 15-, 30-, 45-, and 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Register and make appointments online at the [Writing Center](https://uta.mywconline.com) (<https://uta.mywconline.com>). Classroom visits, workshops, and specialized services for graduate students and faculty are also available. Please see [Writing Center: OWL](#) for detailed information on all our programs and services.

The Library's 2nd floor [Academic Plaza](http://library.uta.edu/academic-plaza) (<http://library.uta.edu/academic-plaza>) offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the [library's hours](#) of operation.

Librarian to Contact:

Each academic unit has access to [Librarians by Academic Subject](#) that can assist students with research projects, tutorials on plagiarism and citation references as well as support with databases and course reserves.

Emergency Phone Numbers

In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381

Library Information

Research or General Library Help

Ask for Help

- [Academic Plaza Consultation Services](http://library.uta.edu/academic-plaza) (library.uta.edu/academic-plaza)
- [Ask Us](http://ask.uta.edu/) (ask.uta.edu/)
- [Research Coaches](http://libguides.uta.edu/researchcoach) (<http://libguides.uta.edu/researchcoach>)

Resources

- [Library Tutorials](http://library.uta.edu/how-to) (library.uta.edu/how-to)
- [Subject and Course Research Guides](http://libguides.uta.edu) (libguides.uta.edu)
- [Librarians by Subject](http://library.uta.edu/subject-librarians) (library.uta.edu/subject-librarians)
- [A to Z List of Library Databases](http://libguides.uta.edu/az.php) (libguides.uta.edu/az.php)
- [Course Reserves](https://uta.summon.serialssolutions.com/#!/course_reserves) (https://uta.summon.serialssolutions.com/#!/course_reserves)
- [Study Room Reservations](http://openroom.uta.edu/) (openroom.uta.edu/)