UNIVERSITY OF TEXAS AT ARLINGTON

Department of Psychology

PSYC 4301 Syllabus for Spring, 2026

Principles of Neuroscience

Instructor Information

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- **Faculty Profile**: Lomber Faculty Profile
- **Office Hours**: By appointment

Course Information

Section Information

PSYC 4301 Section 001

Course Description

Course Title: Principles of Neuroscience

An in-depth understanding of the mechanisms underlying the function of the nervous system. Topics include cellular mechanisms of neural communication, nervous system development, neuroanatomy and neurophysiology of sensory, motor, and autonomic systems, cellular mechanisms of learning and memory, and neuropathological conditions that contribute to neurological disorders.

Prerequisites: Grade of "C" or better in PSYC 3322 or BIOL 3322.

Time and Place of Class Meetings

Tuesday and Thursday, 5:30PM – 6:50PM, LSB 100

This course operates on Central Time. All times listed for class meeting times, exams, and assignment deadlines are in Central Time (CT).

Classroom/Lecture Recording Policy

Faculty maintain the academic right to determine whether students are permitted to record classroom and online lectures. Recordings of classroom lectures, if permitted by the instructor or pursuant to an ADA accommodation, may only be used for academic purposes related to the specific course. They may not be used for commercial purposes or shared with non-course participants except in connection with a legal proceeding.

Recording classroom and online lectures in this course **is not** allowed without permission from the instructor.

Student Learning Outcomes

This course is an overview to the field of neuroscience, covering scientific approaches to understand the brain and nervous system. This course is organized in four parts: (1) Neuronal Communication, and Nervous System Structure and Development, (2) Sensory Systems, (3) Motor Systems, and (4) Emotion and Cognition. Students will learn how neuroscience addresses broad questions in these areas:

• Neuronal Communication, and Nervous System Structure and Development: How do nervous system cells function and communicate information? How is the nervous system organized? How does the nervous system develop?

• Sensory Systems: How does information from the outside world enter the brain and how is itrepresented?

• Motor Systems: How do the brain and nervous system control movement of the body and skill learning? How does the nervous system control basic motivational drives such as eating? How does the brain evaluate and select potential actions?

• Emotion and Cognition: How do the brain and nervous system enable learning, memory, and language? How are emotional experiences represented and regulated? What happens during sleep and how does it influence cognition?

Throughout each part of this course, students will learn about the research methods and tools that have been used to advance our understanding, how disorders affect typical function of the brain and nervous system, about new frontiers in neuroscience research, and about the wide variety of professions that involve neuroscience.

By the end of the course, you will be able to:

- Locate, name, and describe the basic functions of major brain regions and systems.
- Explain the basics of how neurons fire and communicate with other neurons, including: resting potentials, action potentials, sensory transduction, and receptive field structure.
- Describe how neurons and synapses are modified with experience, and how neural activity correlates with aspects of perception and behavior.
- Apply neuroscience principles to explain features of basic human behavior including eating, drinking, sleeping, sex, aggression, language, and learning.
- Describe what is known about the neural basis of various neurological diseases including: schizophrenia, depression, and addiction, and to identify environmental contexts that have an impact on brain health and function.

Course Materials & Technology

Textbook Information

Required: *Neuroscience: Exploring the Brain*
(5th Edition), 2025
By Mark Bear, Barry Connors, and Michael A. Paradiso
Jones & Bartlett Learning
ISBN: 978-1284286878
$139.39 (Amazon)

Technology & Equipment Requirements

This course will use various online teaching tools, including Canvas. Students access lecture notes by clicking the "Getting Started" module on the Canvas Homepage. All students should have reliable access to high-speed internet.

Visit the OIT Services page for a list of Applications and Software available through UTA.

Visit the UTA Libraries Technology page for a list of items that can be checked out or used at the library.

Assignments & Exams

Exams (80%)

There will be four exams during the course. Each exam will be worth 20% of your final grade and will cover the material from the quarter of the course preceding the exam. There will be no cumulative final exam. Material covered on the exams will be taken from the assigned readings and class lectures, as well as any additional material that may be provided. The exams will be administered in class and may include multiple choice, matching, or true/false questions. include a combination of question types. All exams must be completed during the class period.

Quizzes (20%)

During the semester, eight quizzes will be given. Quiz dates are provided on the lecture schedule. A quiz will only cover material presented in the two lectures prior to the quiz. Each quiz will be given at the beginning of class and will consist of ten questions (multiple choice and true/false). Your lowest four quiz grades will be dropped, and the remaining 4 quizzes will be used to calculate your overall quiz grade. As two quiz grades will be dropped, no make-ups are provided for a missed quiz.

Grading Information

Assignments	Values (**percent**)
Exam 1	20%
Exam 2	20%
Exam 3	20%
Exam 4	20%
Quiz 1	5%
Quiz 2	5%
Quiz 3	5%
Quiz 4	5%
	Total: **100%**

Students are expected to track their performance throughout the semester, which Canvas facilitates, and seek guidance from available sources, including the instructor, if their performance drops below satisfactory levels. Refer to the Student Support Services section below.

Final Grade Calculations

Earned %	Letter Grade
90-100	A
80-89	B
70-79	C
60-69	D
0-59	F

Make-Up Exams Policy

Makeup exams will only be granted for university-approved reasons (e.g., documented illness, military duty, religious observances). Students must notify the instructor as soon as possible and provide supporting documentation within 3 days of the missed exam.

Extra Credit Policy

Extra credit will not be offered in this course. Students should focus on completing all assigned work to the best of their ability.

Grade Grievance Policy

Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog: Grades and Grading Policies.

Course & University Policies

Attendance Policy

Students should review the University Class Attendance Policies on the Class Attendance Policies page. The following attendance policy will be applied in this course.

Attendance is not required but strongly encouraged. Your performance in this course will be greatly influenced by your attendance. Some material discussed in lecture is not covered in the textbook.

Cell Phones, etc.:

Cell phones, pagers, iPods, and other electronic devices, except laptops, have no place in class. Please do not bring them to class or turn them off. All ringing cell phones will be answered by Dr. Lomber.

No electronic devices, including cell phones, will be allowed during exams.

Institutional Policies

UTA students should review the University Catalog and the Syllabus Institutional Policies page for institutional policies and contact the specific office with any questions. The institutional information includes the following policies, among others:

- Drop Policy
- Disability Accommodations
- Academic Integrity
- Electronic Communication

UTA Honor Code

UTA students are expected to adhere to and observe standards of conduct compatible with the University's functions as an educational institution and live by the University of Texas at Arlington's Honor Code. It is the policy of The University of Texas at Arlington to uphold and support standards of personal honesty and integrity for all students consistent with the goals of a community of scholars and students seeking knowledge and responsibility.

Student Support Services

Student Services Page

The Student Services page provides links to many resources available to UTA students, including:

- Academic Success
- Counseling and Psychological Services (CAPS)
- Health Services
- Students with Disabilities
- Veteran Services

Students are also encouraged to check out Career Center resources to enhance their career-readiness, find student employment, search for internships, and more. We encourage Major Exploration and the use of Experiential Major Maps to keep students on track for graduation. Refer to the Graduation Help Desk for more details.

Accessibility of Course Materials

Some course materials, such as PDFs of musical scores, technical drawings, graphs, blueprints, design plans, or artworks (common in fields like drawing, painting, or construction drafting), may not fully comply with all Web Content Accessibility Guidelines (WCAG) requirements.

The University of Texas at Arlington is dedicated to ensuring all students have equal access to information. If you experience any accessibility barriers with course materials, please know that accommodations are available. You can get assistance through the Student Access and Resource (SAR) Center or by contacting your instructor directly. Please don't hesitate to reach out if you need help.

Online Academic Success Guide

Visit the Online Academic Success Guide to explore a list of helpful tips and resources to help you succeed in your online journey.

Course Schedule

The instructor reserves the right to adjust this schedule in any way to better serve the educational needs of the students enrolled in the course.

Date	Lecture	Lecture Topic	Reading
January 13	1	Course Introduction, Neurons and Glia	Chapter 2
January 15	2	The Neuronal Membrane at Rest	Chapter 3
January 20	3	The Action Potential	Chapter 4
January 22	4	Synaptic Transmission and Integration	Chapter 5
January 27	5	Neurotransmitter Systems **(Quiz #1)**	Chapter 6
January 29	6	Gross Structure of the Nervous System	Chapter 7
February 3	7	Development of the Nervous System	Chapter 7
February 5	8	The Chemical Senses **(Quiz #2)**	Chapter 8
February 10		**Exam 1**	
February 12	9	The Eye	Chapter 9
February 17	10	The Central Visual System	Chapter 10
February 19	11	The Auditory and Vestibular Systems **(Quiz #3)**	Chapter 11
February 24	12	The Somatic Sensory System	Chapter 12
February 26	13	Muscles and the Spinal Control of Movement	Chapter 13
March 3	14	Brain Control of Movement **(Quiz #4)**	Chapter 14
March 5	15	Chemical Control of Brain and Behavior	Chapter 15
March 10		**Spring Break (No Class)**	
March 12		**Spring Break (No Class)**	
March 17		**Exam 2**	
March 19	16	Motivation	Chapter 16
March 24	17	Sex and the Brain	Chapter 17
March 26	18	Brain Mechanisms of Emotion **(Quiz #5)**	Chapter 18
March 31	19	Sleep, Circadian Clocks, and Brain Rhythms	Chapter 19
April 2	20	Language **(Quiz #6)**	Chapter 20
April 7		**Exam 3**	
April 9	21	The Resting Brain, Attention, and Consciousness	Chapter 21
April 14	22	Mental Illness	Chapter 22
April 16	23	Wiring the Brain **(Quiz #7)**	Chapter 23
April 21 **(REC)**	24	Memory Systems	Chapter 24
April 23 **(REC)**	25	Mechanisms of Learning and Memory **(Quiz #8)**	Chapter 25
April 28		**Exam 4**	