

Fall 2019 | Biology 4395 (CRN 16577) | Systems Neuroscience
Tue/Thurs, 3:00–4:20 pm, Location: Liberal Arts Bldg., Room 319

Instructor

Dr. Arshad M. Khan. *Office hrs: BRB 2.171 by appointment (Tel: x8436; E-mail: amkhan2@utep.edu)*

Definitions and Objectives

Systems neuroscience is the study of how nerve cells are organized as functional circuits, thereby permitting organisms to sense stimuli, control their internal state, and execute movements.

In this course, we will explore how neural systems are organized within mammalian brain, spinal cord and peripheral ganglia. While the focus is on mammals, examples from other vertebrates as well as invertebrates will also be provided. We will discuss how sensory systems (visual, auditory, vestibular, olfactory, gustatory, somatosensory) provide information that allows the organism to execute voluntary (somatomotor) and involuntary (autonomic) movements. If time permits, we may also discuss neural systems underlying language, memory and cognition.

The course is intended for advanced undergraduate students pursuing careers in neuroscience research, medicine, or allied health fields. It is also a useful adjunct for students interested in pursuing studies in field biology, natural history, and ecology/evolution; where animal behavior is emphasized.

Course Organization and Grading

Attendance is strongly recommended, since posted lecture slides are not enough to prepare you for the exams. Of your total grade, a Team Project = 10%, Exam 1 = 15%, Exam 2 = 25%, Exam 3 = 25%, and Exam 4 = 25%. Note that there is no “final exam”, just four exams, each non-overlapping and non-cumulative. Grading is strictly on a % scale: A (90–100), B (80–89), C (70–79), D (60–69), F (below 60). Note that the last day to drop the class is **November 1, 2019**.

Text

Neuroscience, 6th Edition by Dale Purves, *et al.*; Sinauer Publishers. (Fifth edition is acceptable)

Prerequisites

Students must be senior-level undergraduates in good standing, and the completion of *ZOOL 4384/Biol 5301: Neurobiology* is preferred.

UTEP Policy on Academic Dishonesty

Any student who commits an act of scholastic dishonesty is subject to discipline and will be reported to the Dean of Student Affairs. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

Accessibility

If you have or suspect you have a disability and need accommodations, contact the Center for Accommodations and Support Services (CASS) at (915) 747-5148 or e-mail their office at cass@utep.edu. The office is located in Union Building East, Rm. 106; and on the web at <https://www.utep.edu/student-affairs/cass/>. You are responsible for presenting to Dr. Khan any CASS accommodation letters and instructions.

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Systems Neuroscience
 Arshad M. Khan, Ph.D.

<u>Week</u>	<u>Date</u>	<u>Lecture</u>	<u>Topic Covered</u>	<u>Chapters (5th/6th Ed.)</u>
UNIT I: INTRODUCTION				
1	27 Aug	1	Introduction & Gross Anatomy of the CNS	<i>Ch. 1/Appendix</i>
	29 Aug	2	Gross Anatomy of CNS	<i>Appendix</i>
UNIT II: SENSORY SYSTEMS				
2	3 Sep	3	Touch, Pressure & Proprioception I	9
	5 Sep	4	Touch, Pressure & Proprioception II	9
3	10 Sep	5	Pain & Temperature I	10
	12 Sep	6	Pain & Temperature II	10
4	17 Sep	7	Visual I: Photoreception, 1	11
	19 Sep		EXAM 1 (Lectures 1–6; 15% of grade)	
5	24 Sep	8	Visual II: Photoreception, 2	11
	26 Sep	9	Visual III: Photoreception, 3	11
6	1 Oct	10	Visual IV: CNS Pathways, 1	12
	3 Oct	11	Visual V: CNS Pathways, 2 Visual Plasticity	12, 25
7	8 Oct	12	Auditory I: Peripheral	13
	10 Oct		EXAM 2 (Lectures 7–11; 25% of grade)	
8	15 Oct	13	Auditory II: Central Vestibular	13, 14
	17 Oct		<i>No class [work in teams on project]</i>	
9	22 Oct		<i>No class [work in teams on project]</i>	
	24 Oct	14	Chemical Senses: Olfaction I	15
			[PROJECT DUE] (10% of grade)	
10	29 Oct	15	Chemical Senses: Olfaction II and Taste	15
UNIT III: MOTOR SYSTEMS				
	31 Oct	16	Overview of Motor Systems Motor Neurons I	16
11	5 Nov		EXAM 3 (Lectures 12–15; 25% of grade)	
	7 Nov	17	Motor Neurons II	17
12	12 Nov	18	Basal Ganglia I	18
	14 Nov	19	Basal Ganglia II	18
13	19 Nov	20	Cerebellum I	19
	21 Nov	21	Cerebellum II	19
14	26 Nov	22	Eye Movements	20
	28 Nov		<i>No class – Thanksgiving</i>	
15	3 Dec	23	Visceral Motor System I	21
	5 Dec	24	Visceral Motor System II	21
	12 Dec		EXAM 4, 4:00 – 6:45 pm	
	(Thurs)		(Lectures 18–24; 25% of grade)	