

# Cellular Neuroscience Syllabus (NSC-4352)

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Weekly Review: TBA

Class Time: Tuesday and Thursday 10:00-11:15 am

Class Location: [GR 3.420](#)

Required Texts: Principles of Neural Science, 4th ed. (Kandel, Schwartz & Jessell) [K]  
Neuroscience, 3rd ed. (Purves et al.) [P].

Both should be available at Off-Campus Books (Campbell Rd.) & the UTD bookstore.

Recommended text: Neurons in Action (order from [www.sinauer.com](http://www.sinauer.com))

## Course Description

This course will cover the major issues of cellular neuroscience. Recent advances in the understanding of the molecular and cellular events underlying neural signaling, synaptic transmission, neural development, and plasticity will be discussed. Lectures will focus on the big concepts and readings will provide the necessary factual detail.

## Assessment

**Exams (90%):** There will be two exams (25% each) and a cumulative final exam (40%). Exams will be multiple choice and short answer. Material for these exams will be taken from readings, class lectures and discussion, so attendance is strongly encouraged. The format of the exam questions is designed to be challenging and to encourage integrative thought about the material. Exams will be curved such that the second highest score receives 100%.

**Questions (15%):** One week before each exam, each student will be expected to generate 5 complete multiple-choice exam questions including multiple answers with the correct answer indicated. Questions should focus on testing concepts not memorization. Up to 5 points will be earned based on the quality of the questions. Five points is guaranteed if one of your questions is used on an exam. (Note: questions may be somewhat altered.)

**Final Grade:** A: 105-90, B: 89-80, C: 79-70, Less than 70% is failing.

## Schedule:

DATE	TOPIC	ASSIGNMENTS
8/20	No Class (Kilgard in Germany)	
8/25	Introductory lecture - Neural Perspectives	Purves Ch1 (1-13)

8/27	Intro to Neurons	Kandell Ch2
9/1	Genes and Behavior	Kandell Ch3
9/3	No Class (Kilgard in Germany)	
9/8	Cytology of Neurons	Kandell Ch4
9/10	Protein Sorting	Kandell Ch5
9/15	Ion Channels	Kandell Ch6
9/17	Membrane potential	Purves 2
9/22	Membrane potential, con't	Kandell Ch7, Neurons in Action (optional)
9/24	Passive Current Flow	Kandell Ch8
9/29	Action Potential	Purves Ch3, 4
10/1	Action potential, con't	Kandell Ch9, Neurons in Action (optional)
10/6	Catch-up and Review for Exam	Neurons in Action (optional) <b>Exam Questions Due</b>
10/8	<b>EXAM (25%)</b>	
10/13	Synaptic Release	Purves Ch5, Kandell Ch10
10/15	Neuromuscular Junction	Kandell Ch11
10/20	Synaptic Integration	Kandell Ch12, Neurons in Action (optional)
10/22	Transmitter Release	Kandell Ch14
10/27	Neurotransmitters	Purves Ch6, Kandell Ch15
10/29	Neurotransmitter Receptors and Their Effects	Purves Ch7
11/3	Intracellular Signaling	Kandell Ch13
11/5	Myasthenia Gravis	Kandell Ch16, <b>Exam Questions Due</b>
11/10	Review for Exam	Neurons in Action (optional)
11/12	<b>EXAM (25%)</b>	
11/17	Primary Research Paper	Buonomano DV, et al <a href="#">Temporal information transformed into a spatial code by a neural network with realistic properties</a> . Science. 1995 Feb 17;267(5200):1028-30. ( <a href="#">figure 2</a> )
11/19	Continue with Primary Research Papers	<a href="#">Context-sensitive synaptic plasticity and temporal-to-spatial transformations in hippocampal slices</a> . Proc Natl Acad Sci U S A. 1997 Sep 16;94(19):10403-8. <a href="#">Decoding temporal information: A model based on short-term synaptic plasticity</a> . J Neurosci. 2000 Feb 1;20(3):1129-41.
11/24	Synaptic Plasticity	Kandell Ch63
12/1	Adult Plasticity and Learning	Purves Ch24
12/3	Therapeutic Plasticity	TBA, <b>Exam Questions Due</b>
12/10	Review for Final	
	<b>FINAL EXAM (40%)</b>	8:30am-10:30am

Any schedule changes will be posted at: [www.utdallas.edu/~kilgard/cellularFALL09.htm](http://www.utdallas.edu/~kilgard/cellularFALL09.htm)

Click here for the [Final Exam Review Outline](#).