

# Cellular Neuroscience, NSC 4352.HN1

## Course and Contact Information

Instructor: Eva LaDow

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Office location and phone: GC 2.216A, 972-883-3526

Class Time & Location: Mondays and Wednesdays 11:30-12:45am, GC 1.208B

Office Hours: Thursdays 2-3pm, Fridays 11am-12pm, and by appointment.

## Course Description

The purpose of the course is to supply the basic notions in the field of cellular neuroscience, and the intellectual tools for understanding recent advances in cellular neurobiology. Neurons are highly specialized cells, with distinctive architecture, organization, and electrical properties. In this course, we will explore the cell biology of the nervous system, with an emphasis on the fundamental signaling properties of neurons.

## Learning Objectives

Students will identify and describe basic morphology and functions of neurons and glia, the cytology of subcellular organelles in neurons, electric neuronal models, the neuromuscular junction, central synapses, intracellular signaling mechanisms, and synaptic plasticity. Students will also identify important experimental techniques in cellular neuroscience and analyze relevant experimental data.

## Textbooks and Materials

The textbooks for this course will be:

- 1) Neuroscience, 5<sup>th</sup> Edition by Dale Purves et al. (**required**)
- 2) Principles of Neural Science, 5<sup>th</sup> Ed. by Eric Kandel et al. (recommended)

Additional reading may be assigned throughout the course at the instructor's discretion. These distributed in class or electronically. **If you are unable to attend class, you are responsible for contacting me to let me know.**

## Assignments and Academic Calendar

Please note homework assignments for the course are numbered H1, H2, and so on. They will be distributed on Wednesdays and will be due at the beginning of class the following Monday. Answer keys will be distributed at the end of class on Mondays. Review questions are for your use and will not be turned in or graded.

Date	Agenda	Reading	Assignments
22-Aug	Introduction		
24-Aug	Neuronal cytology I: organelles	Purves Ch.1, Kandel Ch. 2, 4	
29-Aug	Neurons and glia	Purves Ch.1, Kandel Ch.2	Hand out H1
31-Aug	Membrane potential I	Purves Ch.2, Kandel Ch.5, 6	H1 DUE
5-Sep	<b>LABOR DAY</b>		
7-Sep	Membrane potential II	Purves Ch.2, Kandel Ch.5, 6	
12-Sep	Action Potential I	Purves Ch.3, Kandel Ch.7	
14-Sep	Action Potential II, Pumps & Transporters	Purves Ch.3, Kandel Ch.7	Review Q's Handed out
19-Sep	In class review		
21-Sep	<b>Exam I</b>		
26-Sep	Properties of Ion Channels	Purves Ch.2, Kandel Ch.5, 6	
28-Sep	Channelopathies	Purves Ch.2, Kandel Ch.5, 6	Hand out H2
3-Oct	Synaptic transmission: electrical & chemical	Purves Ch. 5, Kandel Ch.8	H2 DUE
5-Oct	Vesicular neurotransmitter release	Purves Ch. 5, Kandel Ch.12	Hand out H3
10-Oct	The neuromuscular junction	Purves Ch.5,6, Kandel Ch. 9	H3 DUE
12-Oct	Synaptic Integration	Kandel Ch. 10	Review Qs for Exam II
17-Oct	In class review		

19-Oct	<b>Exam II</b>		
24-Oct	Neurotransmitters I	Purves Ch. 6, Kandel Ch. 13	
26-Oct	Neurotransmitters II	Purves Ch. 6, Kandel Ch. 13	Hand out H4
31-Oct	Receptors and intracellular signaling	Purves Ch. 7, Kandel Ch.11	H4 DUE
2-Nov	Intracellular Signaling II	Purves Ch. 7, Kandel Ch.11	Hand out H5, Primary Research Article
7-Nov	Synaptic Plasticity I	Purves Ch. 8, Kandel ch.55, 56	H5 Due
9-Nov	Synaptic Plasticity II	Purves Ch. 8, Kandel 56, 57	Hand out Review Qs
14-Nov	Synaptic Plasticity III	Purves Ch. 8, Kandel 56, 57	
16-Nov	Exam III		
21-Nov	<b>FALL BREAK</b>		
23-Nov	<b>FALL BREAK</b>		
28-Nov	Post translational modifications	Kandel Ch.4, TBA	Article summary due
30-Nov	Protein trafficking & RNA trafficking	Kandel Ch.4, TBA	
5-Dec	From neurites to nucleus	Purves Ch. 7, Kandel Ch.3	Hand out Review Q's
7-Dec	Class discussion of primary article, In Class Review	Primary research article (TBA)	Rewrite of summary due
TBA	<b>CUMULATIVE FINAL EXAM</b>		

### Grading Policies

Your grade for the course will be based on homework completion, exams, and a short writing assignment.

The grading scale for letters from percentages will be as follows: A+: 97-100%, A: 93-96%, A-: 90-92%, B+:87-89%, B: 83-86%, B-: 80-82%, C+: 77-79%, C:73-76%, C-: 70-72%, D: 60-69%. The contribution of each assignment/exam toward the final grade is as follows: Attendance and participation- 5%, Homework and article summary- 15%; Exam I- 17%, Exam II- 19%, Exam III- 19%, Final Exam- 25%.

**Homework:** Each homework assignment will be a short (1-2 pg) handout with problems or questions related to the previous weeks' material. Grades will be based on completeness and effort, *not correctness*. In other words, full credit will be given for an honest effort even if the answers are not correct. Assignment details for primary article summary will be distributed later in the semester. Note: Longer review question sets will be handed out before exams, but these will not be turned in or graded. They are for study purposes only.

**Exams:** In-class exams will be cumulative in nature, but focused on the most recent material. The cumulative final will draw on the material from Exams I, II, and III proportionally.

**Attendance and Class Participation:** I expect students to come to class on time, having read the material and ready to contribute to the group discussion. **If you miss class, you must notify me in advance, or in case of emergencies, as soon as is reasonable.** Bring the appropriate course reading and notes with you to class. Be respectful of your classmates. **Use of cell phones and laptops is prohibited during class.** Exceptions may be made for e-readers used for class material. Class is short; cell phones and social media are distracting.

**Nota bene:** There will be no extra credit and late work will be accepted only in documented emergency situations and at the discretion of the professor.

### UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus. Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

***The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.***