

**BIOLOGY 641-002: SYSTEMS NEUROSCIENCE**

<b>INSTRUCTOR:</b>	Dr. Farzan Nadim	<b>EMAIL:</b>	<a href="mailto:farzan@njit.edu">farzan@njit.edu</a>
<b>OFFICE:</b>	Central King Bldg.	<b>OFFICE HOURS:</b>	T, F: 1:30PM - 2:30PM
<b>COURSE SCHEDULE:</b>	T, F: 2:30PM – 3:55PM ▪ CKB 315	<b>COURSE WEBSITE:</b>	<a href="http://moodle.njit.edu/">http://moodle.njit.edu/</a>

**COURSE SUMMARY:** This course will examine neurophysiological phenomena from the systems perspective. After reviewing the basic concepts of cellular neuroscience such as excitability, impulse conduction, we focus on the integration of activity at the network level. The goal is to provide the basic knowledge to understand neurobiological processes at the systems level.

**TEXTBOOK:**

- ⊕ Neuroscience (Fifth Edition); Dale Purves, et al Editors, Sinauer Associates © 2012; **eText:** ISBN-10: 0-87893-587-8, ISBN-13: 978-0-87893-587-1; **Print:** ISBN-10: 0-87893-695-5, ISBN-13: 978-0-87893-695-3.

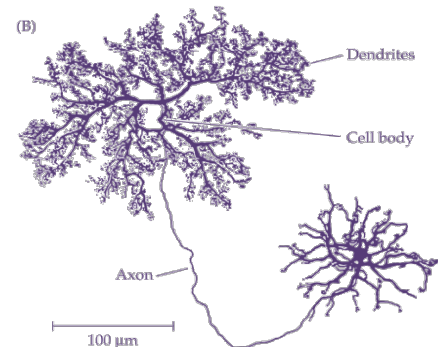
**IMPORTANT RULES AND COURSE POLICIES:**

- ⊕ **Academic Integrity:** The [Academic Integrity Code](#) strictly enforced!
- ⊕ **Electronic Devices:** The use of cell phones and other electronic devices during class or exam times is prohibited.
- ⊕ **Make-Up Exams and Quizzes:** There will be no make-up exams or quizzes. Students who miss an exam due to a valid medical excuse will need to provide a doctor’s note. The grade of any missed exam resulting from a verifiable valid excuse will be determined on a case-by-case basis. Any missed exam or quiz, with a valid excuse, will be calculated based on the student performance in other quizzes and exams.

**GRADING POLICY:** The final grade in this course is determined as follows:

COMPONENT	PERCENTAGE
Quizzes:	15%
Midterm Exams I:	20%
Midterm Exam II:	20%
Paper/Presentation:	25%
Final Exam:	20%
<b>TOTAL:</b>	<b>100%</b>

GRADE SCALE:	
A	93-100
B+	84-92
B	75-83
C+	67-74
C	60-66
F	0-59



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### REVIEW PAPER:

Each student will write a paper during the semester based on a topic related to Systems Neuroscience.

- ⊕ A draft version will be due on **Sunday, April 19**. Submit the files electronically on Moodle in Word format (NOT pdf). The draft must include Title and Author, draft Summary (abstract) and highlights of the sections in the Body (see the final version instructions below) and a brief bibliography (at least 5 references). In addition, attached as an Appendix, the draft should include a 100-200 word summary of at least three scientific research papers on this topic. These summaries may be in bullet-point format.
- ⊕ The final version will be due on **Sunday, May 3**. Submit the files electronically on Moodle in Word format (NOT pdf). The paper should consist of:
  - Title and Author
  - Summary (max 200 words)
  - Introduction (Significance and Background)
  - Body (divided into sections)
  - Conclusions
  - References (no web page references allowed)

There will be a maximum of 2,500 words (including all the above sections except references). Papers must be submitted via *Turnitin*.

### COURSE OUTLINE:

WEEK	DATES	TOPICS
1	Jan. 20 & Jan. 23	Basic Properties of Neurons / The Membrane Potential
2	Jan. 27 & Jan. 30	Action Potentials / The Hodgkin-Huxley Formalism
3	Feb. 3 & Feb. 6	Action Potential Propagation / Principles of Synaptic Transmission
4	Feb. 10 & Feb. 13	Synaptic Excitation, Inhibition and Integration
5	Feb. 17 & Feb. 20	Intracellular Signaling; <b>MIDTERM EXAM 1</b>
6	Feb. 24 & Feb. 27	Synaptic Plasticity; Functional Organization of the Nervous System
7	Mar. 3 & Mar. 6	Somatic Sensory System: Touch and Proprioception; Pain
8	Mar. 10 & Mar. 13	Vision, the Eye and Central Visual Pathways
9	Mar. 17 & 20	<b>SPRING BREAK – MARCH 16-20, 2015</b>
10	Mar. 24 & Mar. 27	The Auditory System; The Vestibular System
11	Mar. 31 & Apr. 3	The Olfactory System    ⊕ <b>Good Friday - No Classes</b>
12	Apr. 7 & Apr. 10	Development (Dr. Friedman); <b>MIDTERM EXAM 2</b>
13	Apr. 14 & Apr. 17	Lower Motor Systems; CPGs; Upper Motor Systems
14	Apr. 21 & Apr. 24	Basal Ganglia (Dr. Koos); Sleep
15	Apr. 28 & May 1	Learning and Memory; <b>STUDENT PRESENTATIONS</b>
16	May 5	Classes Follow a <b>Friday</b> schedule; <b>STUDENT PRESENTATIONS</b>
<b>FINALS</b>		<b>FINAL EXAM WEEK: MAY 8-14, 2015</b>