INSTRUCTOR: Jorge Golowasch
EMAIL: golowasch@njit.edu
Office Hours: By Appointment Only (Email)
PHONE: 973-596-8444
COURSE SCHEDULE: T, F: 10:00 – 11:20AM in CKB 317
COURSE WEBSITE: https://canvas.njit.edu/

COURSE SUMMARY: This introductory-level course will review the basic principles of how the nervous system is organized, and how neurons, synapses and neuronal circuits function in order to produce behavior. We will work our way from the molecular level to discussing circuits, systems, and behavior, including development, sleep, memory, etc., as well as a brief look at neuronal disorders.


LEARNING GOALS: At the end of the course, students will be able to:

1) Understand and utilize basic concepts in cellular neuroscience.
2) Be able to explain how to generate electrical currents across neuronal membranes.
3) Be able to describe how neurons are built, and how the brain’s complicated structure is formed.
4) Be able to describe how a neuron interacts with others to communicate in neuronal networks.
5) Be able to explain how sensory and motor system function.
6) Explain the basic elements that enable functional and morphological plasticity of the nervous system.
7) Develop critical thinking skills.

Students will be required to participate in group discussions and instructor-led discussions of the material as they analyze problems and propose possible mechanisms used by neurons to solve them. Weekly quizzes will be used to test some of these goals and reinforce the learning of the material.

GRADING POLICY & SCALE:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Prerequisite Quiz</td>
<td>5%</td>
</tr>
<tr>
<td>Weekly Quizzes (worst grade dropped)</td>
<td>30%</td>
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<tr>
<td>Midterm Exams (16.25 x 4)</td>
<td>65%</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
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Grading Scale

- **A** 90.0 - 100
- **B+** 84.0 – 89.9
- **B** 76.0 – 83.9
- **C+** 70.0 – 75.9
- **C** 62.0 – 69.9
- **D** 55.0 – 61.9
- **F** <55

IMPORTANT RULES AND POLICIES:

- Academic Integrity Code is strictly enforced.
- The use of cell phones and other two-way electronic devices during class or exam times is prohibited.
- If you miss an exam due to a valid medical excuse you need to provide a doctor’s note or other valid & verifiable documentation. The grade of exams missed for a valid reason will be determined on a case-by-case basis.

**Course Repetition Policy:** An NJIT student may take a single course no more than four times (counting NJIT and another institutions), including withdrawals. If an undergraduate course is repeated at NJIT or the course is transferred from another institution, only then the lowest of the grades is excluded in computation of the cumulative GPA. All grades are shown on the student's transcript.

**Schedule and Course Outline:** Dates listed by week; class will meet twice every week, unless otherwise noted.

<table>
<thead>
<tr>
<th>WEEK / DATES</th>
<th>BOOK CHAP</th>
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<tbody>
<tr>
<td>Week 1</td>
<td>9/3, 9/6</td>
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| Week 2       | 9/10, 9/13| Nerve Cells, Anatomy, Cytoarchitecture • The Membrane • General electrical properties of excitable cells  
[Sept 13: Last day to Add/Drop a class] |
| Week 3       | 9/17, 9/20| Electrical properties of cells • Resting potential • Passive properties • Neuronal electrophysiology • I-V graph • Ionic channels, gating and ion currents |
| Week 4       | 9/24, 9/27| Ionic channels, gating and ion currents • Action potential generation, propagation |
| Week 5       | 10/1, 10/4| MIDTERM 1 (Oct 1)  
Action potential generation, propagation continued |
| Week 6       | 10/8, 10/11| Ionic channels, gating and ion currents • Neuronal communication: Chemical synaptic transmission • Receptors • Role of Calcium in release • Quantal release • Neurotransmitter release |
| Week 7       | 10/15, 10/18| Neurotransmitters and modulators • Receptors • Ionotropic, metabotropic actions • Post-synaptic responses |
| Week 8       | 10/22, 10/25| Metabotropic transmission, Short term synaptic plasticity  
MIDTERM 2 (Oct 25) |
| Week 9       | 10/29, 11/1| Sensory systems (Vision and Audition) |
| Week 10      | 11/5, 11/8| Motor system introduction |
| Week 11      | 11/12, 11/15| Motor systems and regulation |
| Week 12      | 11/19, 11/22| Motor systems and regulation continued |
| Week 13      | 11/27| MIDTERM 3 (Nov 27)  
Tuesday 11/26 is a Thursday: no class; Wednesday 27 is a Friday: we do! |
| Week 14      | 12/3, 12/6| Circuits and complex behaviors  
Learning and Memory |
| Week 15      | 12/10| Nervous system disorders |

**Final Exam Week:** DECEMBER 14-20. FINAL EXAM (4th MIDTERM) DATE: TBD

If you can’t access Canvas, you need to activate your NJIT UCID. [Visit: https://newacct.njit.edu/~accts/cgi-bin/new](https://newacct.njit.edu/~accts/cgi-bin/new)