

Neuroscience 252  
Physical Neuroscience  
**COURSE SYLLABUS**  
Spring 2008

**Instructor:** Darin J. Ulness, ulnessd@cord.edu, Ivers 334H

**Materials:**

- John H. Byrne, James L. Roberts *From Molecules to Networks: An Introduction to Cellular and Molecular Neuroscience*
- The Course Notes

**Meeting time:**

- Lecture: MWF 11:50–1:00, Ivers 262A
- Recitation: W 8:00–10:00 pm, Chemistry Tables

**Grades:**

The grade for the course will be based equal on the following six things.

- Exam I, II, III and IV (15% each)
- Consortium Challenges (15%)
- Quizzes (15%)
- Homework (5%)
- Reports (5%)

**Lecture Schedule:** on back

<b>Date</b>	<b>Topic</b>
01/07/2008	The context of neuroscience
01/09/2008	Basic biochemistry
01/11/2008	Calculus in a nutshell
01/14/2008	Basic electronics
01/16/2008	Equivalent circuits
01/18/2008	Thermodynamics
01/21/2008	The Nernst equation and beyond
01/23/2008	The action potential
01/25/2008	The Hodgkin-Huxley model
01/28/2008	Catch-up
01/30/2008	Exam 1
02/01/2008	Survey of ion channels
02/02/2008	Chemical kinetics
02/04/2008	Mechanisms of action of ion channels
02/08/2008	Neurotransmitters (part 1)
02/11/2008	Neurotransmitters (part 2)
02/13/2008	Calcium influx and diffusion
02/15/2008	Calcium and vesicle exocytosis
02/18/2008	SNAREs and vesicle exocytosis
02/20/2008	Catch-up
02/22/2008	Exam 2
03/03/2008	Ligand gated receptor
03/05/2008	Mechanisms of action of ligand gated ion channels
03/07/2008	The NMDA and AMPA receptors
03/10/2008	The NMDA receptor (digital logic)
03/12/2008	Intracellular signaling
03/14/2008	Postsynaptic potentials: Statistical approach
03/17/2008	Statistics project
03/19/2008	Dendritic integration
03/26/2008	Review
03/28/2008	Exam 3
03/31/2008	Computational neuroscience
04/02/2008	Information processing
04/03/2008	The neural code
04/07/2008	Facilitation, Augmentation, and post-tetanic potentiation
04/09/2008	Long term potentiation/depression (part 1)
04/11/2008	Long term potentiation/depression (part 2)
04/14/2008	The NMDA and AMPA receptors and plasticity
04/16/2008	Hebbian learning
04/18/2008	Catch-up
04/21/2008	Exam 4
04/23/2008	Reports
04/25/2008	Reports
04/28/2008	Reports