Syllabus and Course Requirements
CISS 199: Introduction to Neuroscience
Fall 2016

Meeting time: MWF 11-11:50, Swords 209
Instructor: Prof. Alo Basu
Contact Information: Beaven 403A, Tel. (508) 793-3750, E-mail abasu@holycross.edu
Office hours: T 9:30-11:30, F 1:30-3:30, and by appointment

Textbook: Bear, Connors, and Paradiso, ***Neuroscience: Exploring the Brain***, 4th ed., Wolters Kluwer, 2016.

Course Description: This course will be a broad introduction to neuroscience including topics in comparative vertebrate and invertebrate neuroanatomy, neurophysiology, sensory and motor systems, behavioral neurobiology, neuropharmacology, and neural basis of cognition. Important general principles of nervous system structure and function will be emphasized, as well as broad scientific proficiency as a foundation for further interdisciplinary study of the neural basis of behavior.

Preparation between class meetings: Required readings from the textbook are listed below in the course schedule. ***Additional readings and video instructional material will be posted in the detailed syllabus and on the course Moodle page.***

Flipped classes and Lab days: There will be "flipped" classes and lab days as noted in the class schedule. These classes will require significant prior preparation in the form of assignments to be submitted at the beginning of class. "Flipped" course material, provided on Moodle, will cover basic concepts from biology, chemistry, physics, mathematics, and neuroscience. Students will be responsible for studying this material, completing associated problem sets, and being prepared to apply, in class, what they have learned to understanding nervous systems.

**Problem Sets*:* Students will be required to submit problem sets on the dates noted in the course schedule, and to discuss their answers in class.

Quizzes: Brief quizzes will be administered on Moodle on the dates noted in the class schedule.

Exams: There will be 3 midterm exams during the semester and a cumulative final exam during the final exam period.

Grading: The final grade will be based on problem sets, quizzes, participation in class discussion, and exams.

Class Participation	5%
Quizzes	10%
Problem Sets	20%
Exam 1	15%
Exam 2	15%
Exam 3	15%
Final Exam (cumulative)	20%

Attendance, participation and classroom etiquette: Students are expected to attend all class sessions and to participate in class discussions and activities. Two unexcused absences will result in notification of the student's Class Dean. Use of laptop computers, cell phones, and other mobile devices is not permitted while class is in session. Specific permission may be granted in some cases.

Office Hours and inquiries outside of class: Students are encouraged to make proactive use of office hours to clarify their understanding of course material on an ongoing basis. If need be, appointments can be made outside of the normal office hours. Students should expect a delay of up to 1 weekday in response to e-mails.

A note on plagiarism: If students have any questions about the correct use of materials that are not their own (e.g., text, images, data, ideas, theories, etc.), they should contact the professor. You are encouraged to study in groups, but the work you hand in must be original, and Moodle quizzes and exams must be completed independently. See college policies regarding academic honesty at:
http://catalog.holycross.edu/node/1381#AHP.

Student learning objectives:

- **Familiarity with principles of nervous system structure and function:** Students should gain basic knowledge of how nervous systems are organized and how they work.

- **Understanding of methods, approaches, and levels of analysis:** Students should become aware of the tools applied to the study of nervous systems, and the different levels at which nervous system structure and function are analyzed.

- **Interdisciplinary awareness:** Students should develop an appreciation of how concepts and methods developed in multiple different disciplines are applied to the understanding of nervous systems.

- **Quantitative reasoning:** Students should gain facility with applying, and identifying opportunities to apply, basic quantitative reasoning skills.

Suggested study strategies:

- Complete reading and assignments prior to the associated lectures and identify questions to ask in class. Lecture slides will be available on the Moodle site prior to each lecture. Review your class notes and related readings soon after class.

- On a weekly basis, take half an hour to look ahead 2 weeks in the syllabus, and skim the topics that will be covered by browsing the images and reading the subheadings in the assigned portions of the text book. This practice will help you plan ahead for the time and effort you will need to study each topic, and also help you make connections between topics.

- Form a study group with other students in the class. Plan to meet on a weekly basis to discuss the course material. You should expect to spend 8-10 hours studying for this class each week. A study group that stays on task during meetings can make good use of those hours to prepare for the class and ensure that you are actively engaged with the material. Practicing explaining concepts aloud to each other is an excellent way to identify areas of difficulty.

- Make use of office hours and review sessions. Pay close attention to how your graded assignments and exams are marked, and make sure you understand how you can improve. Review answer keys to exams soon after they are returned, and come to office hours to clarify any questions you have about the exams, as the course is cumulative. Going over a graded assignment or exam in detail is a good practice and reflects well on you as a student. I will be happy to see you.

Tentative Class Schedule for Fall 2016

Date	Topic	Preparation	Assignments
W8/31	Neuroscience: An Interdisciplinary Subject		
F9/2	The Scientific Method	BCP pp. 4-21 Video	
Unit I: Neurons and Neuronal Membranes			
M9/5	Cells of the Nervous System	BCP pp. 24-9, 49-54	
W9/7	***Flipped: Cells and Membranes***	Video	Problem Set 1 due
F9/9	Specializations of the Neuron	BCP pp.38-48	Moodle quiz
M9/12	Overview of Excitability	Skim BCP Chs.3&4 (Read Introductions)	
W9/14	***Flipped: Ions, Biomolecules and Water *** Lab Day***	BCP pp. 57-9, 64-70	Problem Set 2 due
F9/16	Resting Potential	BCP pp.70-9	Moodle quiz
M9/19	Ion Channels	BCP pp.59-64	
W9/21	***Flipped: Current, Voltage, Resistance***	Video	Problem Set 3 due
F9/23	Action Potential Generation	BCP pp.82-99	
M9/26	**Exam 1**		
Unit 2: Excitability, Synaptic Transmission, and Gross Neuroanatomy			
W9/28	***Flipped: Functions***	Video	Problem Set 4 due
F9/30	Action Potential Propagation	BCP pp. 100-8	Moodle quiz
M10/3	***Flipped: Amino Acids and Proteins***	Video	Problem Set 5 due
W10/5	Synapses and Neurotransmitters	BCP pp.110-22	Moodle quiz
F10/7	Neurotransmitter Release	BCP pp.122-6	Moodle quiz
Fall Break 10/8-10/16			
M10/17	Neurotransmitter Receptors	BCP pp. 126-32	
W10/19	***Flipped: Central Dogma***	Video	Problem Set 6 due
F10/21	Synaptic Integration Neuroanatomy Overview	BCP pp.132-42	Moodle quiz Brain models

M10/24	Neuroanatomy and Neurodevelopment	BCP pp.179-205	Brain models
W10/26	The Cerebral Cortex and Cytoarchitecture	BCP pp.205-17	
F10/28	**Exam 2**		
Unit 3: Functional Systems			
M10/31	Chemosensation	BCP pp.266-92	
W11/2	***Flipped: Oscillations*** ******Lab Day***	BCP pp.294-6, 370-2, Video	Problem Set 7 due
F11/4	Sensory Receptors	BCP pp.304-12, 373-88, 416-26	Moodle quiz
M11/7	Sensory Systems	BCP pp. 332-8, 342-3, 388-94, 399-402, 430-4	
W11/9	***Flipped: Complex Receptive Fields***	BCP pp. 362-6	Problem Set 8 due
F11/11	Motor Systems	BCP pp.454-6, 484-5, 491-8	Moodle quiz
M11/14	Comparative Neurobiology		
W11/16	*****Lab Day: Sheep Brain Dissection**	Lab guides	
F11/18	Overview of Brain and Behavior		
M11/21	**Exam 3**		
Thanksgiving Break 11/23-11/27			
Unit 4: Brain and Behavior			
M11/28	Habituation and Sensitization	BCP pp.871-3, 827-8	
W11/30	Memory Systems and Circuits	BCP pp.835-45	Moodle quiz
F12/2	Synaptic Plasticity	BCP pp. 814-7	
M12/5	Long-term Synaptic Plasticity	BCP pp. 874-85	Moodle quiz
W12/7	*****Lab Day: Neurons**	Lab guide	
F12/9	Review and Class Project		
	Final Exam Date TBA		**Cumulative**