

SYLLABUS: Advanced Neurophysiological Psychology

Psychology 410, Winter 2015; in Lincoln Hall, Room 339

Course meets M/W/F, January 5th – March 20, 10:15 – 11:20am

Instructor: Bill Griesar, Ph.D. griesar@pdx.edu

Teaching Assistant: Michael Miller, mjm7@pdx.edu

Teaching Assistant: Lindsay Miller, craver@pdx.edu

Teaching Assistant: Jessica Kostman, jkostman@pdx.edu

Graduate Teaching Assistant:; Gil Brady, gpb@pdx.edu

Office hours: On review days and by arrangement (and *any time* by e-mail!)

Books:

1. *Phantoms in the Brain*, by V.S. Ramachandran;
2. *Portraits of the Mind*, by Carl Schoonover (NOT required)

Objectives: The primary objectives of this course are:

- (1) To teach you to gather, evaluate and present scientific information; and
- (2) **For PSU undergraduates:** to offer you a better understanding of the nervous system through discussion and presentation of current topics in neuroscience research, a visit to the Oregon National Primate Research Center, and exposure to graduate students involved in original research
- (3) **For OHSU graduate students:** to provide you with the opportunity to organize and present current topics in neuroscience research, and gain experience teaching and assessing undergraduate students

The course begins with a review of key topics in physiological psychology, including neurons, synapses, neural networks, gross anatomy, the neocortex, and various neuroanatomical, electrophysiological and imaging techniques.

We then focus on a book by neurologist V.S. Ramachandran (“Phantoms in the Brain”), and examine case studies of patients experiencing a host of neurological disorders, from phantom limb pain to anosognosia, temporal lobe epilepsy and hemispatial neglect. Undergraduate students will research and prepare presentations on individual chapters for delivery in class.

We will then concentrate on two topics: **Learning & Memory**, and **Neuroimaging**. Behavioral neuroscience graduate students will choose one review article for each topic, and research and prepare introductory presentations on these topics for delivery as class lectures. Grad students will lead seminars to discuss current research on the topic, and will also develop assessments for undergraduates (quizzes, short assignments), and grade these assessments.

PSU undergraduate students will read the review article/chapter chosen by the graduate students, and find one additional article about each topic for discussion in class. These articles must come from peer-reviewed scientific journals. Students will write summaries of these articles, and be prepared to discuss the aims, methods, findings and conclusions in class.

Grades: Grades are based on a point system: 90 points or higher = A, 80 – 89 points = B, 70 - 79 = C, and 60 - 69 = D. Available course points (which will total 110) are accumulated in the following ways:

1. **Basic brain review exam (15):** From material covered in lectures.
2. **Ramachandran questions and participation (10):** You should post (on d2l) *at least one* question about the book chapters to be discussed *24 hours before class*. You will receive points for these question(s) and for class participation each day.
3. **Ramachandran presentations (15):** Students will form six groups, and each group will orally present a series of chapters from the book (15 points per student).
4. **Ramachandran exam (15):** From material covered in the Ramachandran book.
5. **Article summaries (20):** For each of the two topics, you will submit a *well-written* summary of an article you select (5 points memory; 10 drugs; 15 points epigenetics). A copy of the article must be submitted with your summary. Your summary must do *four* things: (a) state the **objective** of the article (i.e., Why did the author(s) write the article? What questions were they trying to answer?); (b) describe the **techniques** that were used; (c) summarize the **main points** or findings; and (d) **evaluate/critique** the article. *Please e-mail the instructor (and the OHSU grad student) the title of the article 24 hours before the article summary is due.*
6. **Learning/Memory exam (10):** From material covered in lectures and discussion.
7. **Imaging Exam (15):** From material covered in lectures and discussion.

ASSIGNMENT	POINTS	DUE DATE(S)
Basic brain review exam	15	January 23
Rama. questions/participation	10	Jan 26 – Feb 6
Rama. chapter presentation	15	Jan 26 – Feb 6
Ramachandran exam	15	Feb 13
Participation (Epigenetics)	10	See D2L for details*
Epigenetics exam	10	See D2L for details*
Participation (Imaging)	10	See D2L for details*
Imaging exam	15	See D2L for details*
	+ 10 points extra credit	
TOTAL COURSE POINTS	110	* Grad students will assign

CLASSES:

PSU students only

Basic brain review

- 1. Introduction (1/5):** introductions, course information, syllabus, how to use on-line databases, library resources at PSU and elsewhere
 - READ “*Cellular Foundations of Neuropharmacology*,” by Floyd Bloom et al
- 2. The Neuron, and the Synapse (1/7):** neuron (and glial) structure/function, electrical properties of neurons, resting potential and action potentials, role of myelin; chemical transmission, neurotransmitters, network architecture
- 3. Gross Anatomy (1/9):** anatomical terminology, basic structures, cortex versus subcortical nuclei, central role of the thalamus, brainstem, limbic system
 - READ “*A Brief History of Human Brain Mapping*,” by Marcus Raichle
- 3. Techniques (1/12):** anatomical, electrophysiological, imaging, genetic...
 - READ “*The columnar organization of the neocortex*,” by V. B. Mountcastle
- 4. The Cortex (1/14):** basic structure and function (lobes, sulci, gyri), sensory vs. association, Brodmann areas, motor/somatosensory gyri, language areas, etc.
 - READ “*The brain’s default network*,” by R.L. Buckner, et al
- 5. Network example (1/16):** Distributed networks underlie complex cognition

- **** NO CLASS ON MONDAY, JANUARY 19th (MLK JR. DAY)**
- 6. **Review and brain dissection video; brain exam prep (1/21)**
- 7. **Basic brain review EXAM (1/23)**

PSU students only

Phantoms in the Brain

Students divided into six groups: Each group presents one set of chapters...

(Use overheads, handouts, and draw on related research articles from PubMed...)

- 8. **Chapters 1, 2 (1/26):** student presentations and discussion
- 9. **Chapters 3, 4 (1/28):** student presentations and discussion
- 10. **Chapters 5, 6 (1/30):** student presentations and discussion
- 11. **Chapters 7, 8 (2/2):** student presentations and discussion



Happy Groundhog Day!

- 12. **Chapter 9, 10 (2/4):** student presentations and discussion
- 13. **Chapters 11, 12 (2/6):** student presentations and discussion
- 14. **** PRIMATE CENTER TOUR! (2/9):** 10:00am – 12:30pm @ ONPRC
- 15. **Additional presentations (2/11)**
- 16. **Ramachandran EXAM (2/13)**

OHSU and PSU students

Learning & Memory (and epigenetics, and drugs...)

**CHRISTIE PIZZIMENTI, OHSU GRAD STUDENT;
christiepizzimenti@gmail.com**

NOTE: The following class dates and assignments may change, depending on what our graduate teaching participant prepares. Please check the D2L course website for explicit instructions on assignments, etc.

- 17. **Learning & Memory (2/16):** *Graduate student presentation:*

18. **Learning & Memory** (2/18): *Graduate student presentation:*
19. **Learning & Memory** (2/20): latest research articles and discussion
 - *NOTE: OHSU graduate student(s) will lead discussion...*
20. **Learning & Memory** (2/23): latest research articles and discussion
21. **Learning & Memory** (2/25): latest research articles and discussion
22. **LEARNING/MEMORY EXAM** (2/27): prepared / assessed by Christie

OHSU and PSU students

Neuroimaging Techniques, and Implications for Psychiatric Disease

BRIAN MILLS, OHSU GRAD STUDENT; mills@ohsu.edu

NOTE: The following class dates and assignments may change, depending on what our graduate teaching participant prepares. Please check the D2L course website for explicit instructions on assignments, etc.

23. **Imaging** (3/2): *Graduate student presentation:*
24. **Imaging** (3/4): *Graduate student presentation: e*
25. **Imaging** (3/6): latest research articles and discussion
26. **Imaging** (3/9): latest research articles and discussion
27. **Imaging** (3/11): latest research articles and discussion
28. **IMAGING EXAM** (3/13): prepared / assessed by Brian

29. **GRADUATE STUDENT INFORMATION PANEL** (3/18): Final exam week. Undergraduates, please bring (and post) questions about graduate school, research opportunities, application procedures, grants, etc...!

*** **WEDNESDAY, MARCH 18, 2015, 10:15 – 12:05pm** ***

For OHSU students: To participate, you must have successfully completed your qualifying exam, and have explicit approval of your dissertation advisor in Behavioral Neuroscience. If selected, you will need to enroll in BEHN 650 (Teaching Practicum)...