

SYLLABUS: Advanced Neurophysiological Psychology

Psychology 410, Winter 2019; **NOTE: This is an advanced course, and prior exposure to neuroscience basics (neurons, synapses, resting/action potentials, receptors, large scale brain structures, techniques) is highly recommended.**

Course meets M/W/F, January 7 – March 22, 12:45 – 1:50pm

CLASSROOM: Academic & Student Rec Center, Room 240

Instructor: Bill Griesar, Ph.D., griesar@pdx.edu ** DO NOT USE d2l address

Teaching Assistant: Jordan Ray (jordray@pdx.edu)

Teaching Assistant: Sai Kiersarsky (ak36@pdx.edu)

Teaching Assistant: Michael Deveney (deveney@pdx.edu)

Graduate Teaching Assistant: Katy McMahon (km36@pdx.edu)

Office hours: Mondays, 11:30 – 12:30, Cramer 309 (Bill)

Mondays, 2:00 – 3:00, Cramer 365 (Katy)

Book: *Phantoms in the Brain*, by V.S. Ramachandran (REQUIRED) (but cheap!)

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 pursuing 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, some specific cognitive networks, and various imaging and other 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 research topics this term: (1)

Neurodegeneration and (2) The Neuroscience of Stress Reduction. Our visiting neuroscience graduate students will choose one review article for each topic, and research and prepare introductory presentations for delivery as class lectures. Our graduate students will lead seminars to discuss current research on the topic, and will develop assessments (quizzes, short assignments), and (with supervision) help score these assessments.

PSU undergraduate students will read the review article/chapters chosen by each graduate student. *Further instructions will come from our graduate participants later in the course.*

This term we also have the unique opportunity to visit the Oregon National Primate Research Center, to meet with scientists and tour the facility itself!

Grades: Grades are based on a point system: 90 points or higher = A, 80 – 89 points = B, 70 - 79 = C, and 60 - 69 = D. An A or B is an ABOVE AVERAGE grade, a C is AVERAGE, and a D is BELOW AVERAGE. Available course points (which will total 105) are accumulated in the following ways:

1. **Basic brain review exam (20):** From material covered in lectures.
2. **Ramachandran questions and participation (15):** You should post (on d2l) *at least one* question about the book chapters, along with researched answers, to the relevant discussion forum no later than *24 hours before class*. You will receive points for these question(s) and for class participation each day. *Attendance required.* **LATE POSTS RECEIVE NO CREDIT.**
3. **Ramachandran presentations (20):** Students will form six groups, and each group will orally present a series of chapters from the book (15 points per student). Students will also prepare an online youtube video presentation that will be posted to the course website (5 points)
4. **Ramachandran project (15):** From material covered in the Ramachandran book.
5. **Graduate topic assignment One (7.5):** PLEASE CHECK the course d2l site for more instruction on required assignments AS THE TERM PROGRESSES...
6. **Grad Topic One exam (7.5):** From material covered in lectures and discussion.

7. **Graduate topic assignment Two (7.5):** PLEASE CHECK the course d2l site for more instruction on required assignments AS THE TERM PROGRESSES...
8. **Grad Topic Two exam (7.5):** From material covered in lectures and discussion.

ASSIGNMENT	POINTS	DUE DATE(S)
Basic brain review exam	20	January 28
Rama. questions/participation	15	Jan 30 – Feb 11
Rama. chapter presentation	20	Jan 30 – Feb 11
Ramachandran project	15	Feb 15
Topic One Assignment (Topic)	7.5	See d2l for details*
Topic One assessment	7.5	See d2l for details*
Topic Two Assignment (Topic)	7.5	See d2l for details*
Topic Two assessment	7.5	See d2l for details*
		+ 5 points extra credit (for being you ☺)
TOTAL COURSE POINTS	105	* Grad students will assign

CLASSES:

PSU students only

Basic brain review

1. **Introduction (1/7):** introductions, course information, syllabus and course expectations, on-line databases, library resources at PSU and elsewhere
 - *READ “Cellular Foundations of Neuropharmacology,” by Floyd Bloom et al*
 - *READ through additional material posted on d2l course website*
2. **Neurons, Glia and Synapses (1/9):** neuron (and glial) structure/function, electrical properties of neurons, resting potential and action potentials, role of myelin; chemical transmission, neurotransmitters, network architecture
3. **Neurons, Glia and Synapses (1/11):** More on these topics...
4. **Gross CNS review (1/14):** Anatomical directional terms, planes of sections, meninges, lobes, sulci, gyri, fissures, diencephalon, brainstem, cerebellum...
 - *READ “The columnar organization of the neocortex,” by V. B. Mountcastle*
 - *READ “Evolution of the neocortex Biology,” by Pasko Rakic*

- *READ "The neocortical column," by Javier DeFelipe et al*
- 5. **The Cortex** (1/16): basic structure and function (lobes, sulci, gyri), sensory vs. association, Brodmann areas, motor/somatosensory gyri, language areas, etc.
 - *READ "A Brief History of Human Brain Mapping," by Marcus Raichle*
 - *READ "The brain's default network," by R.L. Buckner, et al*
 - *READ additional articles on course d2l website*
- 6. **Gross CNS** (1/18): BRAIN VIEWING

**** NO CLASS ON MONDAY, JANUARY 21th**

- **** Happy Martin Luther King Junior Day!**



**** NO CLASS ON WEDNESDAY, JANUARY 23rd**

Join us: [NW Noggin @ MacLaren Youth Correctional Facility](#)

- 7. **Network example** (1/25): Distributed networks underlie complex cognition
- 8. **Basic brain review EXAM** (1/28)

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 peer-reviewed research articles...)

- 9. **Chapters 1, 2** (1/30): student presentations and discussion
- 10. **Chapters 3, 4** (2/1): student presentations and discussion
- 11. **Chapters 5, 6** (2/4): student presentations and discussion
- 12. **Chapters 7, 8** (2/6): student presentations and discussion
- 13. **Chapter 9, 10** (2/8): student presentations and discussion
- 14. **Chapters 11, 12** (2/11): student presentations and discussion
- 15. **** PRIMATE CENTER TOUR! (2/13): 12:30pm – 3:00pm @ ONPRC**
- 16. **Ramachandran PROJECT DUE** (2/15)

PSU and OHSU students**TOPIC ONE: Neurodegeneration****GRAD STUDENT Sydney Boutros, OHSU Behavioral Neuroscience**

MORE Details TBD

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

17. **Topic One (2/18): Graduate student presentation:**18. **Topic One (2/20): Graduate student presentation:**

**** NO CLASS ON FRIDAY, FEBRUARY 22nd**

19. **Topic One (2/25):** latest research articles and discussion20. **Topic One (2/27):** latest research articles and discussion21. **TOPIC TWO EXAM (3/1):** prepared/assessed by grad student**PSU and OHSU students****TOPIC TWO: Neuroscience of Stress Reduction****GRAD STUDENT Elina Thomas, OHSU Behavioral Neuroscience****GRAD STUDENT Brittany Alperin, OHSU Behavioral Neuroscience**

MORE Details TBD

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

22. **Topic Two (3/4): Graduate student presentation:**23. **Topic Two (3/6): Graduate student presentation:**24. **Topic Two (3/8):** latest research articles and discussion25. **Topic Two (3/11):** latest research articles and discussion26. **TOPIC TWO EXAM (3/13):** prepared/assessed by grad student

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

*** **MONDAY, MARCH 18, 2018, 12:30 – 2:20pm** ***

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)...

A NOTE ABOUT STUDY GUIDES AND EXAM PREPARATION: Please be aware that while study guides are *often* prepared and/or updated by course TAs, these are *never* meant to be comprehensive or used as your sole material for study.

***** *Please review your own notes, any course slides, and in particular the readings required for the course before taking any assessment this term...*

ABOUT EXCUSES: Life has ups and downs, and everyone struggles sometimes with family, work, and other personal concerns and commitments. **However, unless there is a serious, unexpected, sudden, documented, and significant emergency, please do not petition for special treatment regarding deadlines for projects, quizzes, or exams.**

I am required to treat all students fairly, so each of you must think ahead and plan for when assignments are due. Everyone is subject to the same course expectations.

Note that sometimes, for a myriad of reasons, life intervenes to create ongoing difficulties with class attendance, and meeting academic requirements. *In these cases, it's often best to withdraw from the course, and perhaps re-enroll at a less stressful time...*