

SYLLABUS: Advanced Neurophysiological Psychology

Psychology 452; NOTE: This is an advanced course, and prior exposure to neuroscience (neurons, synapses, resting/action potentials, receptors, large scale brain structures, techniques) is required. Prerequisites include any of the following courses: PSY 451 (Introduction to Neurophysiological Psychology), PSY 347 (Perception), PSY 450 (Psychopharmacology)

WINTER TERM (1/4 – 3/19); **Online d2l ZOOM classes M/W 12:45 – 1:45pm**

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

Teaching Assistant: TBD,

Graduate Teaching Assistant: TBD,

Instructor Student Hours: ZOOM, by appointment; Mondays 2 – 3:00pm

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

Course 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, glia, synapses, neural networks, gross anatomy, neocortex, some specific cognitive networks, and various staining, 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) *DRUGS OF ABUSE; MODELING ADDICTION* and (2) *DRUGS OF ABUSE; THEORIES OF ADDICTION*. 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!

Student Learning Outcomes: The primary outcomes of this course are:

- (1) **DISCIPLINARY AND PROFESSIONAL EXPERTISE:** To reliably and effectively acquire knowledge of current neuroscience research, including relevant neural and genetic mechanisms, distributed networks, and techniques.
- (2) **COMMUNICATION:** To interact with graduate students, fellow undergraduates, teaching assistants and your instructor in a respectful, empathetic and constructive manner, and to communicate effectively through classroom activities and assignments.
- (3) **CREATIVE AND CRITICAL THINKING:** To explore publicly funded research in area neuroscience labs, and effectively organize material and gain experience presenting and discussing complex brain and behavior related topics through collaborative oral presentations, online videos and art.
- (4) **ENGAGEMENT:** To discover community resources for further pursuit of neuroscience in a variety of educational and research contexts, by working with federally funded graduate students from area labs and visiting the OHSU Oregon National Primate Research Center.

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.
3. ***Ramachandran presentations*** (20): Students will form six groups, and each group will collaborate to orally present a series of book chapters (15 points per student). Each student will prepare an online youtube video presentation and post the link on our course d2l website (5 points)
4. ***Ramachandran art project*** (15): Please pick one neurological disorder, and describe the symptoms, and what we currently understand about its underlying neurophysiological cause, or causes (5 Points). ALSO: Imagine that you have this disorder. Please submit your own creative interpretation of that link between your felt experience and the brain areas/networks known or suspected to be impacted by this disorder using media of your choice (e.g., drawing, painting, clay sculpture, pipe cleaners, paper or writing (10 points).
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.
9. ***Teacher evaluations*** (5): For completing and submitting ALL graduate student teacher evaluations during finals week.
10. ***Graduate panel attendance*** (5): For attending grad panel during finals week.

ASSIGNMENT	POINTS	DUE DATE(S)
Basic brain review exam	20	January 24
Rama. questions/ participation	15	Jan 27 – Feb 7
Rama. chapter presentation	20	Jan 27 – Feb 7
Ramachandran art project	15	Feb 10
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*
Teacher evaluations	5	March 16 (in class)
Graduate panel attendance	5	March 16 (in class)
TOTAL COURSE POINTS	110	* Grad students will assign

CLASSES:

PSU students only

Basic brain review

WEEK ONE (1/4 – 1/8): Introductions, Neurons, Glia & Synapses

Introductions, course information, syllabus and course expectations, on-line databases, library resources at PSU and elsewhere; neuron and glial structure & function, electrical properties of neurons, resting potential and action potentials, role of myelin; chemical transmission, neurotransmitters, network architecture

- *READ “Cellular Foundations of Neuropharmacology,” by Floyd Bloom et al*
- *READ through additional material posted on d2l course website*

WEEK TWO (1/11 – 1/15): Gross CNS/Techniques Review

Anatomical directional terms, planes of sections, meninges, lobes, sulci, gyri, fissures, diencephalon, brainstem, cerebellum; basic structure and function (lobes, sulci, gyri), sensory vs. association, Brodmann areas, motor/somatosensory gyri, language areas; distributed networks underlie complex cognition

- *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
- 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

**** NO ZOOM CLASS ON MONDAY, JANUARY 18th**

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



2. ONLINE Basic brain review EXAM (1/18 – 1/24)

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...)

3. **Chapters 1, 2** (1/20): ZOOM student presentations and discussion
4. **Chapters 3, 4** (1/25): ZOOM student presentations and discussion
5. **Chapters 5, 6** (1/27): ZOOM student presentations and discussion
6. **Chapters 7, 8** (2/1): ZOOM student presentations and discussion
7. **Chapter 9, 10** (2/3): ZOOM student presentations and discussion
8. **Chapters 11, 12** (2/8): ZOOM student presentations and discussion
9. **PRIMATE CENTER TOUR/RESEARCH DISCUSSION (2/10)**

PSU and OHSU students

TOPIC ONE: DRUGS OF ABUSE; MODELING ADDICTION*

OHSU GRAD STUDENT TBD
OHSU GRAD STUDENT TBD

* New topics TBD

MORE Details TBA in class

Please check the D2L course website for further instructions

10. **Topic One** (2/15): Lecture on Models and Theories of Addiction

11. **Topic One** (2/17): Discussion on Theories of Addiction
12. **Topic One** (2/22): Mechanism of Action: Stimulants
13. **Topic One** (2/24): Mechanism of Action: Depressants and Psychedelics
14. **TOPIC ONE ASSESSMENT ONLINE**
15. ***** **Ramachandran PROJECT DUE** (2/24)

PSU and OHSU students

TOPIC TWO: DRUGS OF ABUSE; THEORIES OF ADDICTION*

OHSU GRAD STUDENT TBD
OHSU GRAD STUDENT TBD

* New topics TBD

MORE Details TBA in class

Please check the D2L course website for further instructions

16. **Topic Two** (3/1): Neurocircuitry and Addiction (Lecture - John)
17. **Topic Two** (3/3): Plasticity and Addiction (Lecture - John)
18. **Topic Two** (3/8): Presentation and Discussion of Neurocircuitry Paper
(Corre et al.) (Alex and John)
19. **Topic Two** (3/10): Addiction Treatment (Dave, Alex, and John)
20. **TOPIC TWO ASSESSMENT ONLINE**
21. **GRADUATE STUDENT INFORMATION PANEL (3/15)**: Final exam week. Undergraduates, please bring (and post) questions about graduate school, research opportunities, application procedures, grants, etc...!
*** **MONDAY, MARCH 15, 2020, 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, d2l links, and in particular the readings required for the course before taking any assessment this term...**

ABOUT CHALLENGES: Look over the course requirements in our syllabus, and on d2l. If you are unclear about what's expected, please let your instructor know.

Life **DEFINITELY** has ups and downs, and everyone struggles sometimes with pandemics, fires, family, work, and other personal concerns and commitments. But not everyone has access to the same resources, or experiences the world in the same way.

If there is a serious, unexpected, documented and significant emergency, please get in touch! But be aware that instructors are obligated to treat all students fairly, and that means you should ask questions, think ahead and plan for when assignments are due.

Everyone is subject to the same course expectations.

However, if you encounter a serious ongoing situation that makes it difficult to meet academic requirements, [there are resources available on campus to help](#). In some cases, it may be best to withdraw from a course and re-take it at a less stressful and difficult time. If this resonates, please contact the [Center for Student Health and Counseling](#) (SHAC) and the [PSU Student Life CARE Team](#)

Access and Inclusion for Students with Disabilities

PSU values diversity and inclusion; we are committed to fostering mutual respect and full participation for all students. My goal is to create a learning environment that is equitable, useable, inclusive, and welcoming. If any aspects of instruction or course design result in barriers to your inclusion or learning, please notify me. The Disability Resource Center (DRC) provides reasonable accommodations for students who encounter barriers in the learning environment.

If you have, or think you may have, a disability that may affect your work in this class and feel you need accommodations, contact the Disability Resource Center to schedule an appointment and initiate a conversation about reasonable accommodations. The DRC

is located in 116 Smith Memorial Student Union, 503-725-4150, drc@pdx.edu, <https://www.pdx.edu/drc>.

- If you already have accommodations, please contact me to make sure that I have received a faculty notification letter and discuss your accommodations.
- Students who need accommodations for tests and quizzes are expected to schedule their tests to overlap with the time the class is taking the test.
- For information about emergency preparedness, please go to the [Fire and Life Safety webpage](https://www.pdx.edu/environmental-health-safety/fire-and-life-safety) (<https://www.pdx.edu/environmental-health-safety/fire-and-life-safety>) for information.

Title IX: Title IX is a federal law that requires the university to appropriately respond to any concerns of sex/gender discrimination, sexual harassment or sexual violence.

To assure students receive support, faculty members are required to report any instances of sexual harassment, sexual violence and/or other forms of prohibited discrimination to PSU's Title IX Coordinator, [Julie Caron](#).

If you would rather share information about these experiences with an employee who does not have these reporting responsibilities and can keep the information confidential, please contact one of the following campus resources (or visit this [link](#)):

Women's Resource Center (503-725-5672) or schedule on line at <https://psuwrc.youcanbook.me>

Center for Student Health and Counseling (SHAC): 1880 SW 6th Ave, (503) 725-2800
Student Legal Services: 1825 SW Broadway, (SMSU) M343, (503) 725-4556

PSU's Title IX Coordinator and Deputy Title IX Coordinators can meet with you to discuss how to address concerns that you may have regarding a Title IX matter or any other form of discrimination or discriminatory harassment. Please note that they cannot keep the information you provide to them confidential but will keep it private and only share it with limited people that have a need to know. You may contact the Title IX Coordinators as follows:

PSU's Title IX Coordinator: Julie Caron by calling 503-725-4410, via email at titleixcoordinator@pdx.edu or in person at Richard and Maureen Neuberger Center
Deputy Title IX Coordinator: Yesenia Gutierrez by calling 503-725-4413, via email at yesenia.gutierrez.gdi@pdx.edu or in person at RMNC, 1600 SW 4th Ave, Suite 830
Deputy Title IX Coordinator: Dana Walton-Macaulay by calling 503-725-5651, via email at dana26@pdx.edu or in person at Smith Memorial Union, Suite, 1825 SW Broadway, Suite 433

For more information about the applicable regulations please complete the required student module [Creating a Safe Campus](#) in your D2L.