SYLLABUS FOR PSYCH 454: BEHAVIORAL NEUROSCIENCE

Semester: Fall, 2015.
Class time: Tuesday and Thursday, 9.30am-10.45am.
Class location: Room 113 Brogden Hall.

Professor: Yuri Saalmann.
Office: Room 518, Brogden Hall; Email: saalmann@wisc.edu; Telephone: 262-8671.
Office hours: Thursdays 11am-12noon.

Teaching Assistant: Xin Zhao.
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Office hours: Tuesdays 11am-12noon.

Learning Objectives: This course provides an introduction to behavioral neuroscience. Each week focuses on a key neuroscience theme. Usually, there will be two lectures per week and corresponding reading assignments. The overarching goal is for students to learn, develop and use brain mechanisms to explain and predict (with varying degrees of success) what they and others think and do in all facets of their lives. Specific objectives are for students to understand: (i) how the brain codes information; (ii) how the brain is organized; and (iii) the neural mechanisms which enable us to interact with our environment and with others. In other words, what you need to read minds, build a brain, and fix it when things go wrong.

Grading: There will be two multiple choice examinations. Examination 1 will occur mid-semester on October 27. Examination 2 will occur at the end of the semester on December 15. Your grade for the course will be the sum of your scores on each examination. Examination 1 and 2 will equally contribute to your final grade. No make-up exams will be given.

A=93-100%, AB=88-92%, B=83-87%, BC=78-82%, C=70-77%, D=60-69%, F=0-59%.

Students are expected to read the assigned materials in advance of class each week. Lectures build on the assigned reading.

Text book: *Neuroscience: Exploring the Brain* by Bear, Connors, Paradiso (2015) 4th edition (ISBN 9780781778176).

Lecture topics and weekly readings

September 3. Introduction to behavioral neuroscience.

September 8 and 10. *Cracking the neural code:* Neural signals, neural prostheses, and mind reading.

- *Chapter 3: Neuronal membrane at rest* and *Chapter 4: Action potential*. Bear, Connors, Paradiso (2015).

September 15 and 17. *Brain Networking:* Small world networks, brain organization, and repeating motifs.

- *Chapter 7: Structure of the Nervous System*. Bear, Connors, Paradiso (2015).

September 22 and 24. *Maps, coordinate systems and the brain's Babel fish:* Spatial reference frames and sensorimotor transformations.

- *Chapter 5: Synaptic transmission*. Bear, Connors, Paradiso (2015).

September 29 and October 1. *We're plastic:* Learning, memory and synaptic plasticity.

- *Chapter 24: Memory systems*, pages 824-830 and 835-857. Bear, Connors, Paradiso (2015).
- Wanting more (optional further reading)? *Chapter 25: Molecular mechanisms of learning and memory*. Bear, Connors, Paradiso (2015).

October 6 and 8. *What you see and what you don't:* Visual physiology and psychophysics.

- *Chapter 9: Eye* and *Chapter 10: Central visual system*. Bear, Connors, Paradiso (2015).

October 13 and 15. *Cocktail parties, jazz, hearing color, etc:* Auditory physiology and psychophysics.

- *Chapter 11: Auditory and vestibular systems*. Bear, Connors, Paradiso (2015).

[October 20. No class.]

October 22. *I feel you touching something that is not me (and other stuff):* Somatosensory physiology and psychophysics.

- *Chapter 12: Somatic sensory system*. Bear, Connors, Paradiso (2015).

Examination 1: October 27.

October 29 and November 3. *Umami and sniff (worst buddy movie ever):* Taste and olfactory physiology.

– *Chapter 8: Chemical senses*. Bear, Connors, Paradiso (2015).

November 5 and 10. *Rules of the game:* Decision-making, rules, categorization, and prefrontal cortex.

– *Chapter 24: Memory systems*, pages 830-835, Working memory. Bear, Connors, Paradiso (2015).

November 12 and 17. *Hunter, gatherer, piano-player:* Motor physiology.

– *Chapter 14: Brain control of movement*. Bear, Connors, Paradiso (2015).
– Wanting more (optional further reading)? *Chapter 13: Spinal control of movement*. Bear, Connors, Paradiso (2015).

November 19. *Reward and pleasure (had Dostoyevsky been American):* Orbitofrontal cortex, striatum, and brainstem.

– *Chapter 16: Motivation* and *Chapter 24: Memory systems*, pages 857-863, Procedural memory. Bear, Connors, Paradiso (2015).

November 24 and December 1. *Where are my keys:* Attention and awareness.

– *Chapter 19: Brain rhythms and sleep* and *Chapter 21: The resting brain, attention, and consciousness*. Bear, Connors, Paradiso (2015).

[November 26. Thanksgiving recess. No classes.]

December 3 and 8. *Love and war:* Social neuroscience.

– *Chapter 18: Brain mechanisms of emotion*. Bear, Connors, Paradiso (2015).

December 10. *When something else happens:* Network models of psychological disorders.

– *Chapter 22: Mental illness*. Bear, Connors, Paradiso (2015).

Examination 2: December 15.

Additional resources (optional)

Supplementary text: *Human Brain Coloring Book* by Diamond, Scheibel, Elson (1985) (ISBN 0064603067)

Ethics of being a student in the Department of Psychology. The members of the faculty of the Department of Psychology at UW-Madison uphold the highest ethical standards of teaching and research. They expect their students to uphold the same standards of ethical conduct. By registering for this course, you are implicitly agreeing to conduct yourself with the utmost integrity throughout the semester.

In the Department of Psychology, acts of academic misconduct are taken very seriously. Such acts diminish the educational experience for all involved – students who commit the acts, classmates who would never consider engaging in such behaviors, and instructors. Academic misconduct includes, but is not limited to, cheating on assignments and exams, stealing exams, sabotaging the work of classmates, submitting fraudulent data, plagiarizing the work of classmates or published and/or online sources, acquiring previously written papers and submitting them (altered or unaltered) for course assignments, collaborating with classmates when such collaboration is not authorized, and assisting fellow students in acts of misconduct. Students who have knowledge that classmates have engaged in academic misconduct should report this to the instructor.

Complaints. Occasionally, a student may have a complaint about a TA or course instructor. If that happens, you should feel free to discuss the matter directly with the TA or instructor. If the complaint is about the TA and you do not feel comfortable discussing it with him or her, you should discuss it with the course instructor. If you do not want to approach the instructor, make an appointment to speak to the Department Chair, Professor H. Hill Goldsmith (chair@psych.wisc.edu).

If your complaint has to do with sexual harassment, you may also take your complaint to Dr. Linnea Burk (burk@wisc.edu), Psychology Department, Clinic Director, Room 315 Psychology (608-262-9079).

If you believe the TA or course instructor has discriminated against you because of your religion, race, gender, sexual orientation, or ethnic background, you also may take your complaint to the Office of Equity and Diversity, Room 179-A Bascom Hall (www.oed.wisc.edu).

Accommodations policy. The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations, as part of a student's educational record is confidential and protected under FERPA.