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Fall 9-1-2022

### PSYX 571.01: Advanced Physiological Psychology

D. Stuart Hall

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# Psyx 571 – Advanced Physiological Psychology

Fall 2022

## Course Location and Time

Skaggs 246  
MW 2-3:20

## Instructor Information

Instructor: Stuart Hall, Ph.D.  
Email: [stuart.hall@umontana.edu](mailto:stuart.hall@umontana.edu)  
Office: Skaggs 207  
Office hours: Monday 3:30-5 and by appt.

## Readings

Readings and supplemental materials will be available on Moodle. Be sure to read each one on time for in-class discussion.

For a more in-depth and comprehensive resource see: <https://nba.uth.tmc.edu/neuroscience/>

## Course Description

In this course we will focus on how neural systems work and how they interact with one-another. In other words, we will be exploring some basic **mechanisms** of behavior. This field is vast and, relative to many areas of science, our understanding is still very incomplete. It is vast in part because the system can be broken down into parts in many different ways, at many levels. It is also vast because human behavior has a breadth and depth that exceeds any other system we know of, ranging from simple reflexes to nuanced expressions built from memories, expectations, emotions, etc. Therefore, the goal is for you to *build enough basic knowledge of the central nervous system, and the process of its investigation, that you can critically evaluate research and clinical situations related to this field.*

## Intellectual and Communication Skills

The expectation is that, as a graduate level course, students in PSYC 571 should be able to learn and utilize the assigned material in an advanced manner. For example, you should be able to extract and organize material from both lectures and the readings in a manner that will promote effective learning. You should be able to work with information (e.g., synthesize, evaluate and generalize from information provided in class/text) and reason toward answers--not just regurgitate information. You should also be able to effectively communicate your knowledge in writing and/or diagrams. Certain questions in each test will be designed to assess these skills. Finally, most students find that this class requires a good deal of studying to master the material.

## Course Guidelines and Policies

### Drop Date

Beginning the 46<sup>th</sup> instructional day of the semester through the last day of instruction before scheduled examinations, [students must petition to drop](#).

### Academic Misconduct

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the [Student Conduct Code](#).

### Disability Modifications

The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and [Office for Disability Equality](#). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with the Office for Disability Equality (ODE), please contact ODE in Aber Hall 1<sup>st</sup> Floor or call 406.243.2243. I will work you and ODE to provide an appropriate modification.

### Makeup Tests

If you have to miss a scheduled exam, please contact me before the test to discuss the situation and make arrangements for a makeup.

### Lectures and Reading Assignments

You will be responsible for all information from the lectures as well as the text--including material in the reading assignments not covered in class. Please be sure to keep up with your reading and attend lectures.

### Assessment and Grades

Grades will be based on the average of the 4 test scores (equally weighted) and the score on the written assignment: 90-100%=A, 80-89%=B, 70-79%=C, 60-69%=D, 59% and below=F. A plus/minus grading system will not be used. Tests will be taken in class and require written answers essentially in short answer format. You may use resources during the exam. Test questions will require that you communicate clearly, reason towards answers from information that is provided in lecture and text, draw effective diagrams, and synthesize several items of information into a well formulated answer (see above).

- **Test 1** covers section 1 lectures and readings
- **Test 2** covers section 2 lectures and readings
- **Test 3** covers section 3 lectures and readings
- **Test 4** covers section 4 lectures and readings

### Paper Requirement

A 5-10 page paper is required and due by **November 30**. Find a topic of interest to you in the neurosciences and delve into the research. Clinical conditions (e.g., autism, anxiety, epilepsy) would be good topics as are issues in the more basic neurosciences or animal models. In the paper you should integrate at least two of the following: biological, cognitive, affective, social or developmental aspects of the topic.

## Course Schedule

Section	Topics, Readings, Exams	Details
SECTION 1	Topics	Cells of Nervous System, Neural Communication, Synaptic Transmission, Neurotransmitters, Pharmacology of Synapses
	Readings	eText and original articles/materials on Moodle
	<b>TEST 1: September 19</b>	
SECTION 2	Topics	Neuroanatomy
	Readings	eText and original articles/materials on Moodle
	<b>TEST 2: October 5</b>	
SECTION 3	Topics	Visual System, Somatosensory System, Auditory System, Vestibular System, Motor Systems, Sleep
	Readings	eText and original articles/materials on Moodle
	<b>TEST 3: October 26</b>	
	<b>PAPER due: November 30</b>	
SECTION 4	Topics	Neurological syndromes and neurological disorders
	<b>TEST 4: December 7</b>	eText and original articles/materials on Moodle

## Further Reading

### Neurons

- (2005). The neuron doctrine, redux. *Science* 310, pp. 791-793.

### Anatomy

- Harvard Whole Brain Atlas: [www.med.harvard.edu/AANLIB/home.html](http://www.med.harvard.edu/AANLIB/home.html)  
Journal of Neurology, Neurosurgery, and Psychiatry. 2003 Mar; 74(3)288.

<http://www.med.harvard.edu/aanlib/>

### Pharmacology

- Hnasko, T.S., Sotak, B.N., & Palmiter, R.D. (2005). Morphine reward in dopamine-deficient mice. *Nature*, 438, 854-857

### Motor

- Chouinard, P.A., & Paus, T. (2010). What have we learned from “perturbing” the human cortical motor system with transcranial magnetic stimulation? *Frontiers in Human Neuroscience*, 4, Article 173.

### Sensory systems

- Desimone, R. (1991). Face-selective cells in the temporal cortex of monkeys. *Journal of Cognitive Neuroscience*, 3, 1-8.
- Ward, J. (2013). Synesthesia. *Annual Review of Psychology*, 64, 49-75.

### Sleep

- Mednick, S., Nakayama, K. & Stickgold, R. (2003). Sleep-dependent learning: A nap is as good as a night. *Nature Neuroscience*, 6, 697-698.

### Emotion

- Ochsner, K. Silvers, J. & Buhle, J.T. (2012). Functional imaging studies of emotional regulation: A synthetic review and evolving model of the cognitive control of emotion. *Annals of the New York Academy of Sciences*, 1251, E1-E24.

### Memory

- Squire, L. (2008). The legacy of H.M. *Neuron*, 61, 6-9.

### Language

- Price, C.J., (2012). A review and synthesis in the first 20 years of PET and fMRI studies of heard speech, spoken language and reading. *Neuroimaging*, 62, 816-847.

### **Hemispheric Lateralization**

•Gazzaniga, M.S. (2005). Forty-Five years of split brain research and still going strong. *Nature Reviews Neuroscience*, 6, 653-659.

•Corbetta, M., & Shulman, G. (2011). Spatial neglect and attention networks. *Annual Review of Neuroscience*, 34, 569-99.