

**PSYC 2200, section 002  
Physiological Psychology  
Syllabus, Fall 2009**

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**Location:** Castleman (Engineering) room 212

**Date/Time:** Tu/Th 12:30 – 1:45p

**Instructor:** Dr. Holly Fitch

**Email:** Roslyn.h.fitch@uconn.edu (put “PSYCH 2200–your–last–name” in subject line)

**Class Website:** [www.fitchlab.com](http://www.fitchlab.com)

Click on “Physio Psych 2200” button (left). There are numerous links and additional information provided at this site, as well as a link to downloadable (PDF) PowerPoints for each lecture (click the red link button in text, or the “Physio Psych Downloads” button (left)). Also, please check this website if you are unsure about *weather and emergency cancellations* – these should be posted by 10 AM.

**Instructor Office Hours:** Bousfield room 113 (first floor), Thurs 2–4, & by appointment.

Please email me to set up an appointment time if these hours do not fit your schedule.

**Textbook (required):** Biological Psychology: An Introduction to Behavioral and Cognitive Neuroscience 5/e (Edition 5), 2007, Rosenzweig, Breedlove and Watson

ISBN–13: 978–0–87893–705–9

<http://www.sinauer.com/detail.php?id=7059>

**Test Schedule and Policy:** There will be 4 (four) sectional multiple–choice tests, with **one** make–up opportunity (total 5). If you take all 4 sectional tests, you may *choose* to take the make–up, and the top 4 test grades out of 5 will be used. If you **miss** one of the 4 sectional tests *for any reason* (excused or unexcused), or if you would like to substitute for a poor test grade, you must take **the sectional make–up on Dec 8.**

Those who don’t want/need to take the make–up will have the day off : )

The make–up will also be multiple choice and will cover material from all prior 4 tests (cumulative). ***This will be the only sectional make–up test opportunity.***

In addition, there will be a **final exam** (multiple-choice) covering all material discussed over the semester (cumulative). The final exam will occur according to the UConn Final Exam schedule (tentative date, Thurs Dec 17, 10:30 AM).

Any student missing the final exam will receive a class grade of “X” in PeopleSoft. If an absence is excused/validated in writing by the Dean of Students, arrangements will be made for re-scheduling the final (please go to the DOS website, <http://www.dos.uconn.edu> for acceptable reasons for missing a final & timeline to reschedule). If the student cannot validate a missed final, a class grade will be calculated accordingly (20% of your class grade = F).

### **Test Material:**

Tests will be multiple-choice, and will cover material *discussed in class*. Items from readings that were not discussed in class will not be on the test, although some material covered in class may not be in the text (and still be on the test). To assist you in studying, I will make available downloadable PowerPoint presentations for each lecture (in PDF). The PDFs for each lecture will normally be available *the day before class*, allowing you to print the material and bring it to class for note-taking. *Study guides* with key terminology will be uploaded on the website before tests (and I will bring some extra hard copies to Review Sessions). The syllabus provides some basic info about material to be covered in each lecture, but *please use the individual lecture PowerPoints and Review Study Guides to prepare for tests*.

### **Grading:**

Your grade will reflect the average score from the 4 sectional tests, and the final. If you have taken all 4 sectional tests and also take the make-up, the top 4 out of 5 grades will be used, plus the final. **These 5 exams will be averaged equally (20% each)**. Again, if one of the first 4 tests is missed (or failed), you can take the make-up on Dec 8.

### **Reviews:**

Review sessions are scheduled prior to each test, and students are strongly encouraged to bring any questions on the material to class at this time.

### **Readings:**

Class readings are assigned from the required textbook. The readings are intended to elaborate/support the lectures, but all details covered in the specified text readings will not necessarily be covered in class, nor included in the tests.

Some additional readings are provided by links, as a supplement to special topics of interest covered at the end of each class ("Current Interests"). Detailed material from these websites will not be on tests unless the material is discussed in class. Again, the *tests will cover material that has been discussed in class*. Please use the PowerPoints and study guides to focus in on pertinent material.

### **Extra Credit:**

Each student may write an extra credit paper (1 per student) that can be applied for up to 10 points (depending on quality) to the overall grade. (Since tests are on 100-point scale, this would be like increasing one test score by a letter grade). The paper will be a ***review of a current peer-reviewed science article***. I will post 4-5 choices on the class website (selected to go with topics being studied) - please choose one. The student will be expected to write a synopsis of the scientific paper addressing the **Problem** being investigated (2 points), **Hypothesis** (2 points), **Methods** (2 points), **Conclusion** (2 points), and **Why Do We Care** (2 points). Minimum 3 pages (double-space), recommended 4 pages.

*I will bring a sign-up sheet for extra credit to class on Nov 19 (Test 4). If you miss class, please email me to sign up for extra-credit by the end of the day Thurs Nov 19.* Email sign-ups for extra credit received after Nov 19 *will not be accepted*. Extra credit papers must be turned in by the start of class on **Thurs Dec 3** (or anytime during the semester **before Dec 3**). Late extra-credit papers, or papers not addressing the assigned topic, will not be accepted.

### **Honors Conversion:**

A once-weekly discussion group, focusing more in depth on original scientific papers relating to the topics of study, may be arranged for PSYC 2200 students who would like to convert this class to Honors credit. This option may be offered if enough students express interest, and we can find a once-weekly time to meet that fits enough schedules. For questions about conversion, see the Honors website, or visit CUE Building Rm. 419.

### **Extra Support:**

In addition to individual lecture web-links, the website "Neuroscience for Kids" has extensive explanations and demo's (including animations) for many basic principles and topics that we will be covering in class. Check it out at:

<http://faculty.washington.edu/chudler/neurok.html>

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### **Lecture and Test Schedule:**

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## **SECTION I, Fundamentals of the Brain**

### ***Tues Sept 1*** – Introduction

First class, no readings.

Review syllabus, tests, grading, and class format.

### ***Thurs Sept 3*** – Fundamentals of the Brain 1 – Anatomic Structure and Organization

Reading: CH 2, 23–49 (to “ventricles”); CH 19, 587 (bottom)–592: (total pages 32).

***What you need to know:*** Basic structure of a neuron; structures and subdivisions of the human brain (peripheral (cranial, spinal, autonomic)/central (brain, spinal cord)); developmental subdivisions; structural subdivisions; cortical hemispheres, cortical regions and function; basic ventricular system; laterality, ear-advantage, corpus callosum.

***Current interest:*** Split-brain and hemispheric asymmetry.

### ***Tues Sept 8*** – Fundamental of the Brain 2 – Mammalian Brain Evolution & Development

Reading: CH 6: 151 – 161, 165–173; CH 7, 181–194 (total pages 32).

***What you need to know:*** Phylogeny versus ontogeny, classification, evolution & natural selection, ways to measure evolutionary/species brain differences; stages of neurodevelopment, cell migration, cell death (necrosis, apoptosis), neurotrophic factors, stem cells.

***Current interest:*** When does the brain stop developing?

Adolescents, decision-making and the frontal cortex.

### ***Thurs Sept 10*** – Fundamentals of the Brain 3 – Neurons, synapses, & transmission.

Reading: (CH 2, rev 23–34); CH 3, 59–69 & 75–80; CH 4, 89–94 (total pages 22).

***What you need to know:*** Detailed neuronal structure/function (dendrite, soma, axon), glia, synapse, circuits; action potential, hyperpolarization/depolarization, ion channel, basics of synaptic transmission, EPSP/IPSP; synaptic vesicle and release, synaptic cleft.

***Tues Sept 15*** – Fundamentals of the Brain 4 – Basic Experimental Design, Methods of Study (MRI, fMRI, electrophysiology)

Reading: CH 2, 51–55; CH 19, 586–587; see also --  
<http://www.med.harvard.edu/AANLIB/home.html>

***What you need to know:*** Basics of experimental design (experimental/control groups, independent/dependent variables, “significant difference”); CAT scan, MRI, PET, fMRI, electrophysiology, MEG, TMS, applications for neuroimaging techniques in human health.

***Current interest:*** Neuroimaging & vegetative state: surprising activity using fMRI.

***Thurs Sept 17*** – Section I -- **Review** Session and discussion, with Q&A.

Reading: Review all Section I readings; bring questions.

***Tues Sept 22*** – \*\*\*\*\*Test, Section I, Fundamentals of the Brain \*\*\*\*\*

## **SECTION II – Things that Affect the Brain**

***Thurs Sept 24*** – Things that Affect the Brain 1 –Hormones (emphasis on steroids)

Reading: CH 5, 119–130 (review table 5.2); CH 12, 368–383 (total pages 28).

***What you need to know:*** Hormone categories (protein, amine, steroid); major glands, their products & basic functions; sexual differentiation, organizational versus circulating (activational) steroid effects, gender, sexual orientation.

***Current interest:*** Sex differences in cognition: Myth or reality?

**Tues Sept 29** – Things that Affect the Brain 2 – Experience & Genes (Nature vs Nurture)

Reading: CH 7, 194– 206 (top); CH 9, 263; CH 19, 573–575 (total pages 17).

**What you need to know:** intrinsic versus extrinsic influence, critical/sensitive periods, Hubel & Wiesel, twin/adoption studies, genetic abnormalities, deprivation, enrichment, plasticity, experience.

**Current interest:** Does early music training alter brain development?

**Thurs Oct 1** – Things that Affect the Brain 3 –Aging, Injury & Disease

Reading: CH 7, 210 – 213; CH 11, 342–350; CH 19, 577–581, 595–602 (total pages 22).

**What you need to know:** How brain function changes with aging; alzheimers and dementias; brain trauma (stroke, etc) and functional effects (aphasia, prosopagnosia, hemispatial neglect, dementia pugilistica), spinal injury, apraxia, Parkinson’s disease, Huntington’s, ataxia.

**Current interest:** Stem cells and spinal cord injury: Can paralysis be cured?

**Tues Oct 6** —Things that Affect the Brain 4 – Drugs and Alcohol

Reading: CH 4, 95 – 116 (total pages 22)

**What you need to know:** receptors, receptor sub-types, endogenous/exogenous, affinity, competitive and non-competitive agonist and antagonist, re-uptake inhibitors, neuromodulators (e.g., caffeine), recreational drugs and their effects.

**Current interest:** The neural effects of alcohol and other recreational drugs.

**Thurs Oct 8** –Section II -- **Review** and Discussion w/Q&A

Reading: Review section II readings; bring questions.

**Tues Oct 13** – \*\*\*\*\*Test, Section II – Things that Affect the Brain\*\*\*\*\*

## SECTION III – How the Brain Works, Part I

**Thurs Oct 15**– How the Brain Works Pt. 1a – Touch, Pain, and Smell  
Reading: CH 8, 217 – 239; CH 9, 270 (bottom) – 278 (total pages 29)

**What you need to know:** sensory receptors, detection thresholds, sensory transduction, intensity, adaptation, somatosensory cortex, receptive field, nociceptor, endorphin, enkephalin; papillae, taste buds, olfactory cilia, mitral neurons, olfactory bulb.

**Current interest:** Why do some smells trigger powerful memories?

**Tues Oct 20** – How the Brain Works Pt. 1b – Hearing

Reading: CH 9, 249 – 266 (total pages 17)

**What you need to know:** Outer, middle and inner ear; cochlea, organ of corti, hair cells, stereocilia, tonotopy; sound properties (frequency, intensity, AM, FM); basic mechanisms of sound transduction; ascending auditory structures, basic organization of primary and secondary auditory cortices.

**Current interest:** Reorganization of auditory cortex in the congenitally deaf.

**Thurs Oct 22** – How the Brain Works Pt. 1c – Vision

Reading: CH 10, 285 – 314 (total pages 29)

**What you need to know:** Structures of the eye (retina, fovea, optic disk, lens, blind spot); photoreceptors, rods & cones, rhodopsin, basic mechanisms of light transduction, acuity, visual properties (spatial frequency, motion), ascending visual structures, basic organization of primary and secondary visual cortices.

**Current interest:** Visual illusions: How we trick the brain.

**Tues Oct 27** – How the Brain Works Pt. 1d – Motor Function (half-class) and **Review** w/Q&A (half class)

Reading: CH 11, 324 (middle) –333; rev Section III readings; bring questions.

**What you need to know** (motor function): Muscle fibers, myosin, actin, smooth & striated muscle, neuromuscular junction, acetylcholine, proprioception, spinal reflex, pyramidal system.

**Thurs Oct 29** – \*\*\*Test, Section III – How the Brain Works Pt I\*\*\*\*\*

## SECTION IV – How the Brain Works, Part II

**Tues Nov 3** – How the Brain Works Pt. IIa – Sleep

Reading: CH 14, 419–447 (total pages 30).

**What you need to know:** Circadian rhythm, diurnal/nocturnal, SCN, pineal, melatonin, entrainment, stages of sleep, brain structures/circuits in sleep.

*Current interest:* Does sleep deprivation affect memory?

**Thurs Nov 5** – How the Brain Works Pt. IIb – Emotion

Reading: CH 15, 451 – 478 (total pages 28)

**What you need to know:** Limbic system, amygdala, anterior cingulate, aggression, stress, oxytocin, cortisol, norepinephrine/epinephrine and excitement.

*Current interest:* Surfing, snowboarding, skydiving – addicted to adrenalin?

**Tues Nov 10** – How the Brain Works Pt. IIc – Learning and Memory

Reading: CH 17, 513 – 550 (total pages 38)

**What you need to know:** Anterograde/retrograde amnesia, declarative/procedural memory, Korsakoff's, classical conditioning, operant conditioning (shaping), short vs long term memory, brain structures involved in learning and memory (e.g., medial temporal lobe), primacy & recency effects, LTP.

*Current interest:* 50 First Dates: Does it really happen?

**Thurs Nov 12** – How the brain Works Pt. IId – Cognitive & Language Development; *Guest Lecture by Courtney Hill*

Reading: Review cognitive milestones over the first 5 years of life at class website.

**What you need to know:** Cognition, Bayley Scales of Infant Development, Habituation & Recognition Memory, Operant Conditioning; Piagetian Stages, Object Permanence; critical periods, developmental milestones.

**Tues Nov 17** – How the Brain Works Pt. IIe – Language Continued; and **Review** w/Q&A

Reading: CH 19, 571–581; review section IV readings, bring questions.

What you need to know (language): phoneme, spectrogram, formants, Wernicke's, Broca's, aphasias, non-human "language."

**Thurs Nov 19** – \*\*\*Test, Section IV-- How the Brain Works Pt. II\*\*\*\*  
\*\*\*\*\**Sign up for extra credit*\*\*\*\*\*

(**Note** -- I can administer Test IV a day early - on wed Nov 18 -- for students observing Rosh Hashanah on the 19th. Please see me *in advance* to schedule this. No last minute requests!)

**Tues Nov 24** – **NO CLASS, THANKSGIVING BREAK**

**Thurs Nov 26** – **NO CLASS, THANKSGIVING BREAK**

## **SECTION V – Wrapping Up**

**Tues Dec 1** -- Developmental Disorders

Reading: CH 7, 206–209 (bottom); CH 19, 583–585, 592 (bottom)–593

**What you need to know**: Dyslexia, autism and autistic spectrum disorders and other PDDs, mental retardation, Williams syndrome, ADHD, fetal alcohol syndrome; clinical diagnosis versus biological criteria, “risk” genes, prematurity, DSM Guide.

*Current interest*: Autistic savant: mysterious genius.

**Thurs Dec 3** – – Adult Psychiatric Disorders and Treatment

\*\*\*\**Extra Credit Papers Due today*\*\*\*\*\*

Reading: CH 3, 84–85; CH 16, 481 – 509 (total pages 32).

**What you need to know**: Schizophrenia, antipsychotics, depression, bipolar, anxiety, phobia, panic disorder, PTSD, OCD.

*Current interest*: Iraq war veterans and PTSD.

**Tues Dec 8** --Cumulative make-up test (optional)

**Thurs Dec 10** – Last class; General Review and Discussion for Final, Q&A.

Class game of "Brain Jeopardy" using sample test questions; complete student evaluations.

Reading: Review all readings; bring questions.

**Final Exam** -- Cumulative (covers all material) --- Date/time tentative for Thurs Dec 17, 10:30 AM.