Psych 210A – Course Syllabus

Introduction to Brain and Cognition I: Perception

INSTRUCTORS:

Prof. George Sperling  
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Office hours; optional discussion section:  
    Monday 2:30-, and by appointment

Prof. Alyssa A. Brewer  
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Office: SBSG 2304  
Office hours: Thursday 3:30-4:30 and by appointment

TIME/LOCATION:
Winter Quarter, 2016-2017  
Wednesday, 1:00 – 3:50 pm  
SSL 206

DESCRIPTION:
This course will explore human sensation and perception and examine behavioral, computational, and neurophysiological approaches used to investigate these cognitive functions. Weekly topics will include vision, audition, somatosensation, olfaction, and gustation.

FORMAT:
Class will consist of lecture and occasional discussions of associated readings. Syllabus, lecture slides, and readings may be found on the course website at:  
https://eee.uci.edu/17w/68840.

ASSIGNMENTS:

Readings
On some weeks, we will assign a selection of readings to complement lectures by highlighting interesting and current issues in sensation and perception. Readings will include 1) review papers that argue for a theoretical interpretation of some body of literature, and 2) experimental papers that highlight techniques and evidence in a specific research area. Everyone will be responsible for reading all of the material prior to the class period in which it is discussed. For each paper, every student should prepare a page containing (a) a paragraph summarizing the paper’s approach and findings and (b) a paragraph of related comments,
constructive criticism, and/or questions for that paper. **PLEASE EMAIL US YOUR COMMENT PAGE BEFORE THE START OF CLASS.** Your paragraphs should also be used during class as a basis for participation in the discussion.

**Homework/Quizzes**

A few lectures will have an associated homework assignment that will be **due 24 hours before the start of the next week’s class.** Other lectures will begin with a short quiz.

**Final Presentation**

The final day of class will consist of student presentations. Each student will prepare a 15 minute presentation about a topic of their choice related to the course. Topics should be approved by one of the professors.

**Grading:**

Letter grades will be based on class participation, paper commentary, homework, quizzes, and the final presentation.

*Revised: 01/09/2017*
TENTATIVE LIST OF WEEKLY TOPICS:

Jan 11: L1 – Vision [Sperling]
Topics: Introduction, Outline of functional visual system; visual angles, measuring blind spot; physics of light; Type 1 and Type 2 expts; Photometry (candlelas, illuminance, luminance, retinal illuminance)
HW1: Visual angles, blind spot, photometry

Jan 18: L2 – Vision [Sperling]
Due: HW1
Topics: Anatomy of the retina, receptive fields.
    Neural economy, pyramids, tiling, electrodes, Kuffler cat ON, OFF; rectification; LGN, Hubel-Wiesel receptive fields, hypercolumns, visual pathways; reverse correlation (Ringach)
HW2: Photometry, Visual angle limitations

Jan 25: L3 – Vision [Sperling]
Due: HW2
Topics: CSF DeLange; Models, system, linear systems; Fourier analysis, sine waves, square-wave demo, noise; pyramid representation (tiling); Gabors.
HW3: convolution, linear vs nonlinear

Feb 1: L4 – Vision [Brewer]
Due: HW2, reading commentaries
Topics: Visual pathways; visual cortex; higher order vision (i.e., object recognition)

Feb 8: L5 – Vision [Sperling]
Due: Quiz 2
Topics: *Selections from:
    Color; Motion; Probably not covered: Dark adaptation; Depth;; Perceptual LNG;
    Sensory scaling; Psychophysical methods; Visual optics (diopters, refraction, chromatic aberration, acquired myopia); eye movements; visuo-motor coordination ("perception and action"); ...

Feb 15: L6 – Audition [Brewer]
Due: Quiz 3, reading commentaries
Topics: Auditory pathways: periphery to cortex

Feb 22: L7 – Audition [Sperling]
Due: Quiz 4, reading commentaries
Topics: The Speech Chain: The Physics and Biology of Spoken Language (Denes & Pinson)

Mar 1: L8 - Somatosensation [Brewer]
Due: Quiz 5, reading commentaries
Topics: Basic sensation from skin to cortex; sensorimotor processing; multisensory integration

Mar 8: L9 – Olfaction & Gustation [Brewer]
Due: Quiz 6, reading commentaries
Topics: Olfaction from receptors to cortex, olfactory attention; gustation from tongue to cortex, flavor; synesthesia

Mar 15: L10 - Presentations [Brewer]
Due: Final projects – student presentations

Revised: 01/09/2017