PSY U452: Sensation and Perception

Fall 2007

Instructor: Frank Naarendorp
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Office hours: Mon., Wed. 1.00 – 2.00 pm.
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Class hours: Mon, Wed, Thu, 10.30-11.35.
Place: 104 G West Village

Content: Environmental stimuli such as light and sound waves impinge incessantly upon our sensory organs producing the sights and sounds that we become aware of. However, the natural environment in which we exist is never the same, it literally changes from night to day and vice versa. Moreover, by moving through the environment we expose ourselves to lights and sounds of changing intensity. Despite enormous variations in the intensities of the stimuli, our visual and auditory perceptions of the environment remain stable. This course examines what enables us to maintain such perceptual stability. Are the relationships between physical stimuli and human perceptual responses fixed, *i.e.* do these relationships obey certain laws ? If yes, then what kind of biological mechanisms underlie these relationships ? We will cover traditional issues in sensation and perception but we will also draw on some recent advances in the Neurosciences as they relate to perception. Emphasis will be on the workings and principles of design of the visual, auditory and somato-sensory system.

Course format: Lectures, demonstrations, discussions.

Requirements: Three (3) Exams.
Each Exam consists of two parts: 1. a take-home assignment (30% of Exam grade); 2. an in-class multiple choice test (70% of Exam grade).
The take-home assignment: essay questions on topics drawn from lectures and readings. Grading of take home questions is pass/fail. The take-home questions prepare you for the in-class tests.
The syllabus shows the scheduling of the first two multiple choice tests. The third test will be given in the Finals' Week. The final test is not cumulative. Your course grade will be the average of the grades earned on all three Exams.
As a rule, there will be no make-up exams unless there are good reasons for exceptions.

Required text: E. Bruce Goldstein, Sensation and Perception, 7th Ed. Belmont, California: Wadsworth Inc, 2001.

SCHEDULE

Part I.

Wed, Sep. 05 Introduction.

Thu, Sep 06 Various approaches to sensation and perception
Read: Goldstein, pages 1-16.

Mon, Sep 10 Psychophysics: absolute and difference threshold. The psychometric function.

Wed, Sep 12 Weber's law, Fechner's law, Stevens's power law. Muller's law of specific nerve energies. Sensory areas in the brain.

Thu, Sep 13 The nerve impulse . Take Home Questions I.
Read: Goldstein, pages 21-42.

Mon, Sep 17 The nerve impulse.

Wed, Sep 19 Retinal processing.
Read: Goldstein, pages 45-66.

Thu, Sep 20 Retinal processing. Spatial sensitivity.

Mon, Sep 24 Mach bands. The horseshoe crab. Home work due.

Wed, Sep 26 Review.

Thu, Sep 27 Exam

Part II.

Mon, Oct 1 Receptive fields of cells in the retina, lateral geniculate nucleus and cortex.
Read: Goldstein, pages 71 - 89.

Wed, Oct 3 Columnar organization of cortex.

Thu, Oct 4 Object perception: Gestalt psychology. Take Home Questions II.
Read: Goldstein, pages 93 - 106.

Wed, Oct 10 Depth perception: monocular and binocular cues.
Read: Goldstein, pages 167 - 189.

Thu, Oct 11 Binocular vision

Mon, Oct 15 Visual illusions

Wed, Oct 17 Color vision: psychophysics and physiology. Theories of color vision.
Read: Goldstein, pages 141 - 162.

Thu, Oct 18 Theories of color vision. Color Vision: deficiencies. Home work due.

Mon, Oct 22 Review

Wed, Oct 24 Exam

Part III.

Thu, Oct 25 Hearing: the stimulus
Read: Goldstein, pages 233 - 245.

Mon, Oct 29 Hearing: psychophysical approach

Wed, Oct 31 Hearing: masking
Read: Goldstein, pages 246 - 259.

Thu, Nov 1 Binaural hearing. Take Home Questions III.

Mon, Nov. 5 Auditory system: anatomy

Wed, Nov 7 Hearing : physiological approach. Theories of hearing.

Thu, Nov 8 Theories of hearing.

Wed, Nov 14 Central auditory processing.

Thu, Nov 15 Organization of the somato-sensory system (cutaneous senses)
Read: Goldstein, pages 311-315.

Mon, Nov 19 Organization of the somato-sensory system. Cortical projections. Homunculus.

Mon, Nov 26 Psychophysics of the somatosensory system.

Wed, Nov 28 Vibration and touch.
Read: Goldstein, pages 316-323.

Thu, Nov 29 Pain.

Mon, Dec 3 Pain perception. Home work due.

Wed, Dec 5 Review

Fri, Dec 7, 10 - 14 Exam Week