The Visual System
Bio 399 -Winter 2014

Lectures: 12:00-1:20pm, Tu/Th
Discussion sections: TBD

Instructor: Cristopher Niell
Email: cniell@uoregon.edu
Phone: 541-346-8598
Office Hrs: TBD

Text: Martin Tovee, *An Introduction to the Visual System* (2012).

Description
This course will explore the organization of the visual system, from photons hitting the eye to the cognitive processes of image recognition and attention. Throughout this process, we will explore how aspects of the visual world are detected and processed by the nervous system, spanning the level of individual photopigment molecules up to brain networks. Furthermore, many of the principles and experimental methods exemplified in the visual system apply through many domains of sensory and cognitive processing, and thus the visual system can provide a foundation that will be useful for many students of neuroscience.

Lectures will sequentially cover the function of visual system structures, and will include guest lectures from local experts on different aspects of vision. Discussion sections will cover primary source literature (journal articles) as well as an opportunity for questions about lectures, problem sets, and exam preparation. Weekly homework will alternate between problem sets based on the lectures and primary source readings.

Grading
Homework   20%
Midterm   30%
Final Exam   50%

Schedule

Jan 7 – Overview of vision
Jan 9 – Light and optics

Jan 14 - Structure of the eye
Jan 16 – Neurons

Jan 21 – Photopigments and photoreceptors (O'Day - TBD)
Jan 23 – Receptive fields

Jan 28 – Parallel pathways
Jan 30 – Color

Feb 4 – Visual pathways through the brain (Sereno - TBD)
Feb 6 – Primary visual cortex

Feb 11 – *Midterm exam*
Feb 13 – Development and plasticity

Feb 18 – Imaging neural activity
Feb 20 – Object & face recognition

Feb 25 – Representing space & motion
Feb 27 – Visual deficits and agnosias

Mar 4 – Attention (Awh - TBD)
Mar 6 – Working memory (Vogel - TBD)

Mar 11 – Optogenetics
Mar 13 – Consciousness and perception