

# SYLLABUS

## Sensory Neuroscience

Psychology 312B, Fall 2017  
Lecture, MW 4:00–5:20, TLC 301  
Lab, R 10:00–11:00, TLC108

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CLASS URL: <https://goo.gl/UGSZuU>

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## Description

Sensory systems act as an organism's interface between the external physical world and its inner neural processing. These systems convert physical energy into neural information that, when effective, affords survival and reproduction of the creature. In this class, we will survey the anatomical, physiological and neural mechanisms that convert energy in the organism's sensory arena (AKA the *umwelt*) into things 'in the organism' (the *innerwelt*). We will survey a broad set of environments and life forms — humans, other animals, aquatic life, insects, and even plants — with the goal of understanding common mechanisms across them. We will examine the differences as well to better understand the differentiation and specialization in these systems and organs across the animal kingdom.

## Outcomes, Goals, Objectives

Students who complete this class will have a broad understanding of the neuroscientific, biological, chemical, and physical mechanisms of sensory transduction. We will focus on humans and non-humans, from higher primates to the occasional single-celled organism and plant. We assume foundational knowledge of neuroscience and human perception.

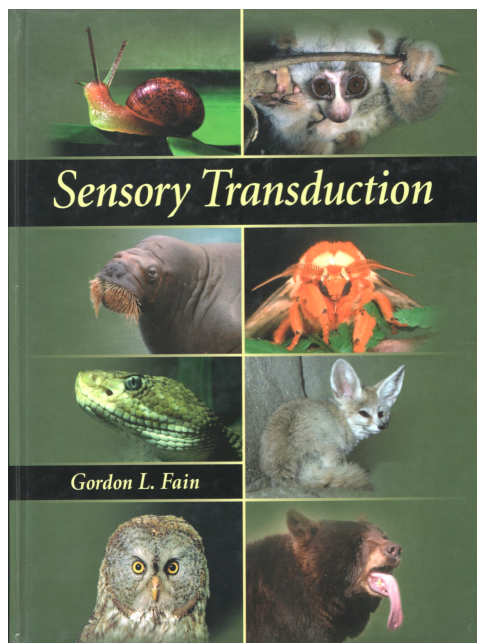
Specifically —

- The philosophical problem of the *innerwelt* and *umwelt*
- Foundational mechanisms of sensation
- Foundational mechanisms of sensory signaling
- Mechanoreception
- Chemoreception
- Photoreception
- Other energy transduction mechanisms such as thermoreception, nociception, magnetoreception, electroreception, &c.

Assessment will be via —

- Two comprehensive exams.
- Four laboratory / research projects.

## Materials



We have one required book, *Sensory Transduction* by Gordon L. Fain (ISBN 0-87893-171-6). We'll also use a set of slides from a talk by Koenderink on some of the interesting philosophical problems of perception. Those are available in the OneNote Content Library. There will likely be some primary source readings, also posted in OneNote.

## Schedule

PART 1: *Sensory Mechanisms*

Some history and background. How sensory systems exploit physical information in the world to create cellular signals.

PART 2: *Mechanoreception*

Things that move other things mechanically and what we do with that information.

PART 3: *Chemoreception*

Chemicals and their transduction into things like taste and smell.

PART 4: *Photoreception*

Turning light into neural information.

PART 5: *Other Receptor Mechanisms*

Electro-magnetic fields, pain, heat, and others.

## Assessment and Grading

Sections 2–5 will have a corresponding laboratory / research project. We will have an exam roughly 1/2 way through the semester, and a final exam. Exam and project details will be distributed on OneNote and in class / lab.

I don't typically take attendance<sup>1</sup>, but I *do* mentally keep track of both your physical *and* mental presence in class. Being physically and intellectually present, interacting, asking questions, and helping your fellow students are examples of things that increase your presence. Time spent on a laptop, pad, phone or the ilk 'detract' from your presence.

LABS: — 50%

EXAM: — 40%

PRESENCE: — 10%

## Office Hours & Appointments

I'm in a slightly chaotic mode, since I just got back from sabbatical (OK, honestly, I'm *always* in a chaotic mode). The easiest way to schedule an appointment is with your Skidmore Office 365 account — <http://office.com> since I keep my availability relatively up-to-date there. To do that see the instructions at <https://goo.gl/ozosaS>.

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<sup>1</sup>But see the notes about missing class in the 'Details' section.

## Details

Honor Code: The Skidmore Honor Code is the main governing policy of this class. Learn it. Know it. Live it.

See <http://www.skidmore.edu/advising/integrity/index.php> for details.

Attendance: Show up. Miss more than 3 classes and I *reserve the right* to fail you. Miss the first day and I *reserve the right* to drop you from the class and admit someone on the wait-list.

Missing Exams or Labs: To be excused from an exam, except for sudden extreme illness, you must arrange with me at least 24 hours before the exam is scheduled. Anyone missing an exam who has not been excused will receive a o. Make-up exams must be scheduled within the week following the exam.

Lateness: Work presented late without prior notice will receive a o. If something is going to be late get in touch with me. I reserve the right to give late work whatever penalty I feel is appropriate.

Extra Credit: I don't offer 'extra credit.'

Plagiarism: *Any* act of plagiarism will result in a failing grade for the course and whatever procedures / processes I am obligated to undertake on behalf of the department & college. I take this pretty seriously. If you're not sure if something is plagiarism, **ask**.

ADA: Services and accommodations are available to students covered under the Americans with Disabilities Act. If you have any visual, perceptual, or physical challenges that might result in the need for some form of accommodation I am more than willing to help you help yourself. Contact me and/or Student Academic Services [http://www.skidmore.edu/academic\\_services](http://www.skidmore.edu/academic_services) for assistance.

Slack: Generous swaths of slack shall be cut to those who exhibit respect for the learning process and the class in general. This means that the above restrictions, limits, penalties, punishments, &c are somewhat malleable based on *your* attitude.

CYA Clause: This document subject to random changes at my discretion or via *vis major* — with proper notice in class / via email, web site, and/or carrier pigeon.

In this class, you could be exposed, at any moment, *and without warning of its imminence* to: ideas, comments, imagery, sounds, feels, readings, people, and other things that you may find: shocking, offensive, absurd, annoying, racist, sexist, homophobic, discriminatory, or generally obnoxious.

This called 'education.' — after J Rauch