

# Psychology 347 (13335): PERCEPTION



## SPRING TERM 2022 HYBRID COURSE

March 28 – June 10, 2022

**IN PERSON CLASSES meet on PSU campus (Classroom TBA) Mondays, 10:15am – 11:15am**

**ZOOM CLASSES meet on Canvas, Wednesdays 10:15 – 11:15am; TA REVIEWS Fridays 10:15 – 11:15am**

OFFICE HOURS ONLINE:

**By appointment, ZOOM (Bill & Jeff)**

**By appointment, ZOOM (Emily)**

Bill Griesar, Ph.D., **Instructor**; [griesar@pdx.edu](mailto:griesar@pdx.edu)

Jeff Leake, M.F.A., **Instructor**; [jleake@pdx.edu](mailto:jleake@pdx.edu)

Please use these email addresses, *NOT d2l*

TBD, **Undergraduate Teaching Assistant**; [ephelps@pdx.edu](mailto:ephelps@pdx.edu)

Emily Ready, **Graduate Teaching Assistant**; [eready@pdx.edu](mailto:eready@pdx.edu)

OPTIONAL TEXTBOOK (NOT REQUIRED): Sensation & Perception, 2<sup>nd</sup> Edition, Wolfe et al. **No text is required.** We list an old edition, because the material is similar, and it costs a lot less. Newer editions are fine; read chapters that correspond to topics.

**\*\*\*NOTE THAT ALL REQUIRED RESOURCES ARE AVAILABLE ONLINE.**

ADDITIONAL BOOK (*highly recommended*): Hallucinations, by Oliver Sacks

ART SUPPLIES (required): Sketchbook (standard 11" x 14" drawing, 80 pound weight paper, with at least 24 sheets), colored pencils (basic set, 12 assorted colors), Assorted graphite sticks, Pink pearl eraser, pipe cleaners (though these can be replaced with any found objects). *See d2l course website for more details on what you'll need.*

GOAL OF THE COURSE: Perception involves the routing, identification, and interpretation of energy and information in our environment, both external and internal. Typically, it begins with detection of stimuli by sensory neurons, and the relay of this information to specific neural networks in the brain.

In this class we will investigate the mechanisms that underlie sensory detection of specific categories of stimuli (e.g., in visual, auditory, olfactory, gustatory, somatosensory (including touch, proprioception, nociception), and vestibular realms) and the CNS networks involved in perceptual discrimination, interpretation, and complex cognitive responses. We'll also look at how these critical, adaptive networks develop, and how they are influenced by drugs and, ultimately, decay.

We'll also explore how artists have approached, understood and integrated aspects of sensory detection and perception into often extraordinary works that compel, move, inspire, and affect our understanding of ourselves and our world. We'll visit online museums to view art with an eye towards the neural mechanisms involved in perception, and we'll create objects designed to help reflect on and understand the concepts we'll discuss.

GRADES: Grades are based on a point scale: 90 points and above = A; 80 – 89 points = B; 70 – 79 points = C; 60 – 69 points = D; 59 points or below = F. ***An A or B is ABOVE AVERAGE, a C is AVERAGE, and a D is BELOW AVERAGE.*** You can earn points (a maximum of 100) in the following ways.

**\*\*\*\*\* DEADLINES ARE IMPORTANT: Late work receives half credit. It's difficult in a large class to track late assignments for a whole term, so after one week late assignments will be zeroed out.**

**QUIZZES** (40 points): *Each timed, online, one attempt, available for several days*

Quiz One: Psychophysics, neurons, and synapses (10 points)

Quiz Two: Gustation, olfaction, and somatosensation (10 points)

Quiz Three: Visual system (10 points)

Quiz Four: Auditory and vestibular systems (10 points)

**ART PROJECTS** (25 points)

Art Project 1: Neuron model building (5 points)

Art Project 2: Neuron metaphor drawing (5 points)

Art Project 3: Tactile Drawings (5 points)

Art Project 4: Grid Drawing (5 points)

Art Project 5: Sensory neuron model (5 points)

**DISCUSSION FORUMS** (30 points)

Students are required to post their own responses to questions in our ten weekly discussion forums, which cover topics we'll be learning about in Zoom class meetings, online video lectures and other resources and links on Canvas.

***Each post must be at least 100 words (~300 max) and you must respond to TWO peers in at least 50 words each. FORUM POSTS ARE DUE THURSDAYS (by 11:59pm); peer responses DUE by SUNDAY (by 11:59pm). NOTE: ONE forum post + responses can be missed without penalty 😊***

**FINAL ART PROJECT** (10 points)

**The final gestalt poster project consists of two parts.**

**Part One:** prepare four collages or drawings that are examples of gestalt grouping principles followed by a written explanation of how those principles are working.

**Part Two:** prepare a formal analysis of a well-known work of art, identifying the principles you chose for your collages or drawings within the image and clearly stating where and how those are operating within that work of art. The gestalt collages, famous artwork, and written descriptions for both will be fixed to an 18"x24" (minimum size) poster and submitted online as a \*.jpg or \*.pdf file.

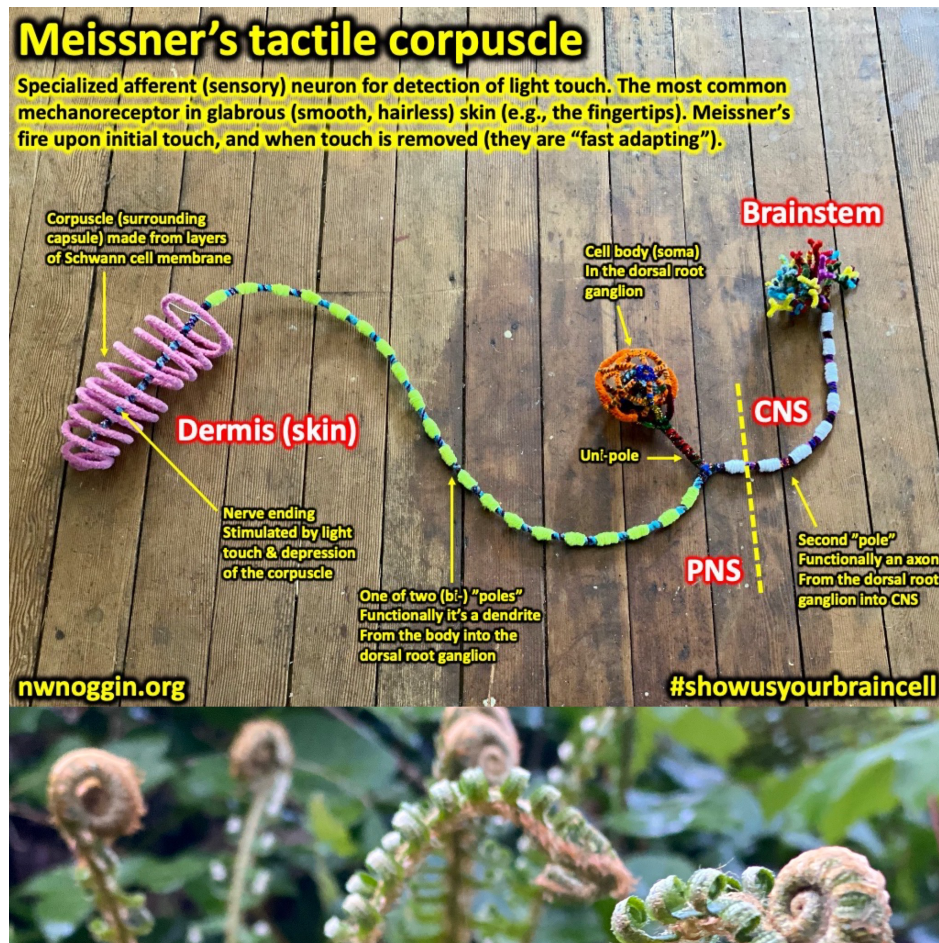
**EXTRA CREDIT** (2 points max): Occasionally there are opportunities to join research studies and/or attend coursework-related talks for extra credit. We will let you know about these options. You can earn an extra 2 points for participating in one study or event. Research studies and events are not always open or accessible to everyone; however, it is our goal to offer multiple opportunities throughout the term.

**ACADEMIC HONESTY:** Any evidence of cheating or plagiarism will lead to serious academic consequences, including possible failure of the course and/or dismissal from school. Plagiarism is also a violation of the PSU Code of Student Conduct. For more information see: <http://www.pdx.edu/dos/psu-student-code-conduct>

**STUDENTS WITH DISABILITIES:** If you are a student with a documented disability and registered with the Disability Resource Center (DRC), please contact the instructor immediately to facilitate arranging academic accommodations. If you have a disability and have not yet registered with the DRC, please contact the DRC.

**INCOMPLETES:** Incompletes are rarely given, and are based on criteria described in the university catalog. Incompletes are not appropriate when less than ¾'s of the course work has been scored. No incomplete will be assigned without a written formal agreement and timeline related to course completion.

**COVID-19:** Portland State works to address the health, safety, and well-being of the entire PSU community during the COVID-19 pandemic. Every effort is being made to provide an accurate and efficient flow of communication to students, staff, and faculty. As questions and concerns arise, many campus resources are available. If you are ever unsure how to find a resource you need or want, explore the College of Liberal Arts and Sciences' website at [pdx.edu/clas/covid-19-resources-for-students](https://pdx.edu/clas/covid-19-resources-for-students). Reach out.



**CHALLENGES:** Look over the course requirements in our syllabus, and on Canvas. If you are unclear about what's expected for an assignment, or assessment, please let me know. Life DEFINITELY has ups and downs, and everyone struggles sometimes with family, work, and other personal concerns and commitments. But not everyone has access to the same resources, or experiences the world in the same way. If there is a serious, unexpected, documented and significant emergency, please get in touch! But be aware that we are obligated to treat all students fairly, and that means each of you should ask questions, think ahead and plan for when assignments are due. *Everyone is subject to the same course expectations.*



## THE CLASSES

### **WEEK ONE (3/28 – 4/1): Introduction**

READ (optional): Text, Chapter 1 (Introduction)

**\*MEET:** IN PERSON Monday; ONLINE Wednesday/Review Friday, all 10:15 – 11:15am

Introductions, syllabus; History of perception; philosophical considerations; Psychophysics, measuring the threshold, signal detection theory

### **WEEK TWO (4/4 – 4/8): Sensory detection**

READ (optional): Text, Introduction

**\*MEET:** IN PERSON Monday; ONLINE Wednesday/Review Friday, all 10:15 – 11:15am

**\* ART PROJECT 1:** Neuron model (pipe cleaners - or any found objects)

**Neurons carry information-rich electrical messages and communicate with each other by releasing chemical messengers (neurotransmitters).** Neurons, membranes, protein machines, forces, resting potentials, the action potential, synapses

### **WEEK THREE (4/11 – 4/15): Chemical senses**

READ (optional): Text, Olfaction, Taste

**\*MEET:** IN PERSON Monday; ONLINE Wednesday/Review Friday, all 10:15 – 11:15am

**\* ART PROJECT 2:** Neuron metaphor (drawing supplies)

Introduction to chemical senses, gustation and olfaction; taste and smell versus flavor; differences with other senses (ipsilateral projection, limbic/paralimbic targets); taste receptor cells, taste buds and papillae; basic tastes; labeled line vs. pattern coding; a few receptor mechanisms gustatory pathways); Olfaction (smell); flavor is so much more than taste; olfactory neurons, glomeruli, bulb, and CNS projection targets; vomeronasal organ and the Flehmen response

### **WEEK FOUR (4/18 – 4/22): Neuroesthetics**

**\*MEET:** IN PERSON Monday; ONLINE Wednesday/Review Friday, all 10:15 – 11:15am

**\*\* QUIZ ONE:** History, psychophysics, neurons and synapses

- AVAILABLE 4/20 – 4/24

**\*\* ART PROJECT 1 DUE BY FRIDAY**

Neuroesthetics (the biology of beauty and art)

### **WEEK FIVE (4/25 – 4/29): Somatosensation & Gestalt**

READ (optional): Text, Touch

**\*MEET:** IN PERSON Monday; ONLINE Wednesday/Review Friday, all 10:15 – 11:15am

**\* ART PROJECT 3:** Tactile Drawings

**\*\* ART PROJECT 2 DUE BY FRIDAY**

Mechanical senses (touch, proprioception) vs. protective senses (temperature, pain,

itch, deep sensual touch); mechanoreceptor physiology & mechanisms (e.g., Meissner's, Pacinians, Ruffini's, Merkel's receptors, muscle spindle receptors, Golgi tendon organs); Dorsal column/trigeminal nerve for CNS delivery of mechanoreception; Anterolateral system for detection, delivery and mapping of emotionally salient stimuli; receptors/receptor mechanisms (nociceptors, thermoreceptors, itch-sensitive neurons, deep touch receptors), pathways (spinothalamic, spinoreticular, spinomesencephalic); Hypothalamic detection/response, cortical networks for somatosensory integration (S1/S2 (parietal lobe), insula, anterior cingulate); **Gestalt** (important for final project)

## **WEEK SIX (5/2 – 5/6): Vision & Gestalt**

READ (optional): Text, Vision

**\*MEET:** IN PERSON Monday; ONLINE Wednesday/Review Friday, all 10:15 – 11:15am

**\*\* QUIZ TWO:** Gustation, olfaction, somatosensation

- AVAILABLE 5/4 – 5/8

**\*\* ART PROJECT 3 DUE BY FRIDAY**

Nature of the stimulus (narrow range of electromagnetic energy), eye anatomy (cornea, pupil, iris, lens, retina); presbyopia, myopia; retinal network physiology (e.g., photoreceptors, bipolar cells, ganglion cells, horizontal and amacrine cells); rods vs. cones (S, M, L), Ishihara testing; Lecture on Gestalt

## **WEEK SEVEN (5/9 – 5/13): Vision**

**\*MEET:** IN PERSON Monday; ONLINE Wednesday/Review Friday, all 10:15 – 11:15am

**\* ART PROJECT 4: Grid Drawing**

Intrinsically photosensitive ganglion cells, circadian cycles; sensitivity vs. acuity, center/surround receptive fields, parvocellular vs. magnocellular pathways; central visual targets (LGN to V1, superior colliculi, hypothalamus, pre-tectal region); visual hemifields, nerves vs. tracts; Optimal stimuli, receptive fields; columnar organization of neocortex; functional organization of V1 (orientation specificity); P pathways & object recognition in ventral temporal lobe, visual agnosia, prosopagnosia; M pathways & spatial mapping in parietal lobe

## **WEEK EIGHT (5/16 – 5/20): Audition**

READ (optional): Text, Hearing: Physiology and Psychoacoustics

**\*MEET:** IN PERSON Monday; ONLINE Wednesday/Review Friday, all 10:15 – 11:15am

**\*\* ART PROJECT 4 DUE BY FRIDAY**

Physical features of stimulus (frequency, amplitude, complexity) vs. perceptual experiences of sound (pitch, loudness, timbre); ear anatomy (outer, middle, inner; pinna, tympanic membrane, ossicles, oval window, cochlea); structure and function (e.g., pinna size vs. frequency/amplitude detection); acoustic reflex; Physiology of cochlea; inner/outer hair cells; stimulus transduction mechanism; frequency coding

(tonotopy); physical coding of frequency, amplitude and complexity in the cochlea; central pathways for audition; sound localization

## **WEEK NINE (5/23 – 5/27): Vestibular Function & Hallucinations**

READ (optional): Text, [Hearing in the environment](#)

**\*MEET:** IN PERSON Monday; ONLINE Wednesday/Review Friday, all 10:15 – 11:15am

**\*\* QUIZ THREE:** Visual system

- AVAILABLE 5/25 – 5/29

Physiology of vestibular organs (semicircular canals, otolith organs); vestibulo-ocular reflex; detection for three vestibular “modalities” (angular motion/acceleration and semicircular canals, gravity/tilt and linear acceleration and otolith organs); anatomy of vestibular organs (canals, vestibules, ampullae, cristae, hair cells; utricle/sacculle and macula, otolithic membrane, otoconia); CNS pathways for vestibular perception; Hallucinations, drug effects, and other sources of perceptual distortion; Charles Bonnet Syndrome; Musical Ear Syndrome, sensory deprivation experiments.

## **WEEK TEN (5/30 – 6/3): Museum Tour**

READ (highly recommended): Oliver Sack’s “Hallucinations”

**\*NO CLASS MONDAY: Happy Memorial Day**

**\*MEET:** ONLINE Classes both Wednesday and Friday, 10:15 – 11:15am

**\*\* QUIZ FOUR:** Auditory and vestibular systems

- AVAILABLE 6/1 – 6/5

**\* VIRTUAL MUSEUM TOUR WEDNESDAY**

## **FINAL PROJECT DUE ONLINE BY WEDNESDAY, JUNE 8<sup>th</sup>**

**\* ART PROJECT 5 DUE \*\*SAME WEDNESDAY (6/8)\*\***

A REMINDER: We are obligated to treat all students fairly, and that means each of you should ask questions, think ahead and plan for when assignments are due. *Everyone is subject to the same course expectations.* Note that sometimes, for a myriad of reasons, life intervenes to create ongoing difficulties with class attendance, and meeting academic requirements. *In these cases, it’s often best to withdraw from the course, and perhaps re-enroll at a less stressful time.*

## **TITLE IX REPORTING OBLIGATIONS**

Portland State is committed to providing an environment free of all forms of prohibited discrimination and sexual harassment (sexual assault, domestic and dating violence, gender or sex-based harassment and stalking). If you have experienced any form of

sexual harassment, know that help and support are available. PSU has staff members trained to support survivors in navigating campus life, providing academic support and more. Information about PSU's support services on campus, including [confidential services](#) and [reporting options](#), can be found on PSU's [Sexual Misconduct Response website](#) or you may call a Confidential Advocate at 503.894.7982 or by scheduling [online](#). You may also report any incident of discrimination or discriminatory harassment, including sexual harassment, to the **Title IX Coordinator**, [Office of Equity and Compliance](#), or the [Office of the Dean of Student Life](#).

Please be aware that all PSU faculty members and instructors **are required to report** information of an incident that may constitute prohibited discrimination, including sexual harassment and sexual and relationship violence. This means that if you tell me about a situation of sexual harassment or discrimination, I have to share the information with the University's Title IX Coordinator or the Office of the Dean of Student Life. However, the information will be kept private and only those with a need to know will be provided with what you disclose.

Please complete the required student module [Understanding Sexual Misconduct and Resources](#) in Canvas, which provides information about PSU policy and resources. You may also report sexual and relationship violence to law enforcement on campus with [Campus Public Safety Office \(CPSO\)](#).

Or you may file an [anonymous report with Campus Public Safety Office](#) or a [Bias Incident report](#) with the [Bias Review Team \(BRT\)](#). PSU does not typically investigate the reports that are made through these two avenues. These reports help PSU understand what students and employees are experiencing on and around campus and provide support where needed.

## **Recordings in Zoom classes**

We will use technology for virtual meetings and recordings in this course. Our use of such technology is governed by FERPA, the [Acceptable Use Policy](#) and PSU's [Student Code of Conduct](#). A record of all meetings and recordings is kept and stored by PSU, in accordance with the Acceptable Use Policy and FERPA.

Your instructor will not share recordings of your class activities outside of course participants, which include your fellow students, TAs/GAs/Mentors, and any guest faculty or community based learning partners that we may engage with.

**You may not share recordings outside of this course.**

Doing so may result in disciplinary action.