

Course Syllabus

Psychology 314-01 Sensation and Perception

Instructor: Dr. Alan Hughes

Office Location: Psychology Center

Office Hours: MWF 3:00 to 4:00 pm or by appointment.

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Course page: <http://www-pub.naz.edu:9000/~rhughes4/alansite/Sensation.html>

Phone: 389-2741

Class meetings: MWF 9:30 to 10:20 AM

Required text:

1. Sekuler, R., & Blake, R. (2005). *Perception* 5th ed. McGraw-Hill. New York.
2. Ramachandran, V.S., & Blakeslee, S. (1998). *Phantoms in the Brain*. Quill: New York.
3. Ackerman, D. (1992). *A Natural History of the Senses*. New York.

COURSE OVERVIEW

This course is designed to introduce to the student the fundamentals of human sensation and perception. Human sensation and perception are important areas of study for psychology. If you stop to think about it, we are constantly taking in information from the environment, whether with our eyes, ears, tongue, nose, or by touch. In fact, sensation and perception are the two oldest areas of modern psychology. Early psychologists were intrigued by the human senses, and now some 130 years later, scientists continue to use a variety of techniques to investigate the early stages of sensory processing in the nervous system. However, sensation is only half the story; perception is a different process. How is physical energy from the environment (e.g., light) "understood" by the nervous system to give rise to a perceptual experiences? The goal of this course is to provide the student with a working knowledge of basic sensory mechanisms and perception, in both humans and animals. We will concentrate on vision and audition, in part because these processes are perhaps the best understood. I hope that you find this course to be interesting, and more importantly, useful.

We'll also be reading the books *A Natural History of the Senses* by Diane Ackerman and *Phantom in the Brain* by V.S. Ramachandran and Sandra Blakeslee. Both books are meant to supplement what is being covered that in lecture. It is my hope you find these interesting and help you to better understand human perceptual phenomena. My goal is for you to develop a broader appreciation of

human perception by reading about, and discussing perpetual issues as they relate to such things as art, history, language, culture, brain damage, literature, etc. The writing exercises ensure you have read the assignment and (should) reward you for doing so. These exercises are "writing to learn".

COURSE OBJECTIVES

Upon completion of this course, the student should:

1. Understand the basic neurophysiology that underlies sensory coding across all sense modalities.
2. Know the basic anatomy and physiology of each sense modality.
3. \Understand the role the brain plays in interpreting sensory information to give rise to perception.
4. Appreciate the importance of both physiological and behavioral studies to our understanding of human sensation and perception.
5. Become familiar with the major research areas in contemporary sensation and perception.

ACADEMIC CONTESTS

There will be four academic contests during the semester. Participation is required of all class members. The theme of these contests will be "Perceptual Jeopardy"; questions and answers will be taken directly from information in the text and from lectures. You'll find study guides on my perception web site that contain definitions and learning objectives for each chapter in the textbook. Basically, these guides provide most of the material for *Jeopardy*. Selected questions and answers from each academic contest will be part of the exam that follows; in other words, we'll have a contest on a Friday, and one of the four exams will be on a Monday. Students will be awarded "Tokens" for correct responses, and the winning team will be awarded bonus tokens (see below). The logic here is very simple: To do well in the contest, you must study very hard. If you study hard for the game, you'll help your self to do well on exams. Doing well in the contest rewards you with certain privileges so it makes sense to study and do well!

On the day that we play Jeopardy, I'll randomly assign students to their teams. Each time that we play, I'll assign new teams. I believe this is the fairest alternative. Students will be awarded "Tokens" for correct responses, and the winning team will be awarded bonus tokens (see below). The logic here is very simple: To do well in the contest, you must study very hard. If you study hard for the game, you'll help yourself to do well on exams. Doing well in the contest rewards you with certain privileges so it makes sense to study and do well!

TOKEN ECONOMY

One very successful means of dealing with abnormal behavior in an institutional setting has been to employ a token economy; here, patients can earn tokens (positive reinforcement) for performing certain "desirable" behaviors. These tokens can later be exchanged for desirable opportunities. A similar approach will be used in this course. Students may earn tokens for the following "desirable" behaviors. Note: Students do not literally receive "tokens"; rather, think of the tokens as you would points that you earn.

Desirable Behaviors

1. Academic contest participation: 2 tokens for each correct question (maximum 20 per contest).
2. Academic contest victory: 20 tokens for each member of the team (Members of a team who have not received at least 6 tokens are not eligible for the bonus).
3. Highest Grade on an exam (before buying points): 10 bonus tokens.
4. Most improved score on an exam: 20 bonus tokens.

Desirable Products

Students can "cash in" their tokens for the following "desirable" products:

1. **One point on a regular exam.....6 tokens**
2. **One point on poster.....8 tokens**
3. **One point on the Final Exam.....8 tokens**
4. **EXEMPT the Final Exam.....80 tokens**

COURSE REQUIREMENTS

As an instructor, I expect that students play a significant part in their own learning. Thus, I have very high expectations from students. I think you'll enjoy coming to class; I try to make things interesting. However, I do expect you work as hard as possible. I know that you have other classes, but as long as you manage your time, you should be able to succeed in this course. However, to do well in the course, you will need to play your part by working as hard as you can. If you do that, then I'll do my part to help you succeed!

It is expected that the student come to class prepared. Thus, it is crucial that students read the assigned readings. This will allow you to spend more time listening and concentrating on lecture material, asking questions when needed, and less time taking frantic notes on material that is covered in the text. I will always tell you if I am covering material not discussed in the text. However, I am lecturing to clarify the information in the text. If you do not come to class, I can't help you.

Listed below are the criteria on which your final course grade will be based:

(1) Exams: As indicated above, there will three (3) regular exams. Each exam is **10%** of your final grade. Forty percent of each exam will be objective and taken directly from the academic contest. The remaining 60 % will be essay and be based on the learning objectives for each chapter represented on an exam. You must take all exams. To do well on the exams, you must take the time to work on the study guides. **NOTE: Make-up exams will be given for just causes (i.e., death in the family, you're sick WITH A DOCTOR'S EXCUSE).**

(2) Final Exam: There will be a cumulative final exam given during our scheduled slot during finals week. This exam will be entirely essay; the questions I ask will be integrative and exhaustive. These questions will permit me to assess how well you understand what you've learned and if you are able to think critically and apply these concepts. The Final Exam is worth 20% of your course grade. **Note:** Students can "buy" an exemption from the final (See "Token Economy" below). Otherwise, the Final is required.

(3) Poster: Each student will be assigned a research method in sensation and perception. The student is expected to prepare a bulletin board project and display of the method summarizing the use of the method, including a description of the historical niche of this method in perception research. The display should be "attractive" and informative without requiring too much time or concentration to understand what is being presented. Students are encouraged to be creative, using imagination and good humor as well as factual information to present their material. Each project will be evaluated on its originality, depth of thought, appropriate use of source materials, overall correctness of style, accuracy, completeness, and attractiveness (of the display). Note that "attractiveness" refers not to the beauty of the project, but rather to the projects ability to "attract" attention. The rationale behind this exercise is to promote collaborative learning, to encourage creativity and independent thought, to help you to strengthen research and communication skills, and to encourage active learning.

I'll distribute to each of you a list of grading criteria and expectations soon. All posters must adhere to the following criteria:

1. There must be extended research beyond the information available in the text or lecture materials.
2. Critical thinking and analysis of the subject matter. You are expected to evaluate, synthesize, interpret, and critique information, not just paraphrase.
3. Clear communication of information and ideas.

The first project is due by the second week of October; each bulletin board will remain posted for one week. Thus, the poster must be removed by Friday at noon of the week it is posted. Then, the next student will assemble his or her poster for the following week. If you are late in putting up the poster, you will

lose points. No exceptions!!! The poster is worth **20%** of your final grade.

(4) Student demonstrations. As a way to encourage students to be more active in the course, students will present to the class a demonstration illustrating some perceptual process. For most of the chapters we cover, there are several easy and fun demonstrations that can be done in class to help students to better understand the material. I expect students to spend no more than 15 minutes of class time doing the demonstration. This exercise provides students a way to be creative in explaining how a particular phenomenon helps us to understand memory and cognition. I will pass out a handout soon that reviews my expectations for the demonstrations. The in-class demonstration is worth 15% of your final course grade.

(5) Current Empirical Articles and Portfolio. At the end of each week, students are required to hand in an empirical article that addresses some topic relevant to that week's discussion. I think it is imperative for students to recognize the empirical work that is done on the various topics we cover in class. You may only pick empirical articles; they must come from reputable psychology or related journals (e.g., *Science*, *Nature*, *Vision Research*, etc). For each article, you must bring in a copy of the abstract and answer the following questions:

- a. What is the main point of the article?
- b. What is the major research question and what are some of the hypotheses?
- c. How do the methodologies used in the study target the sensory or perceptual process(s) being evaluated?
- d. How do the findings relate to information covered in the text or in class?

Your responses to these questions do not need to be lengthy but they do need to be complete.

In addition to what you hand in to me, at the end of the semester, you must turn in to me a 'portfolio' of these articles. You should divide the portfolio into clearly labeled sections, using such headings as "Form Perception" or "Color Vision". Each section of the portfolio should contain a complete copy of the article you picked along with your typed responses to the above questions. The copy of the article must be in the format one would find in a journal article. You may not use HTML versions for your portfolio.

(6) Class Attendance. Although class attendance is not figured into your final grade, it is expected that students attend class. I will keep track of who attends class and who does not. At the end of the term, if your grade is borderline (to the next highest grade), class attendance could help you; if your grade is borderline, and you have missed class excessively, don't expect pity from me. **COME TO CLASS!**

GRADE DISTRIBUTION

Assignment	Points	Percentage of Grade
Exams	150	30%
Final Exam	100	20%
Poster	100	20%
Student Demonstrations	75	15%
Empirical Article Portfolio	75	15%

500 Total Points

<u>Points you earn:</u>	<u>Percent Grade</u>
450-500	(90%-100%) A
400-449	(80%-89%) B
350-399	(70%-79%) C
300-349	(60%-69%) D
0-299	(0%-59%) F

CONCEPTUAL OUTLINE OF THE COURSE

Below is a breakdown of topics we'll discuss this semester.

Introduction to Sensation & Perception:

Sensation & Perception (Chapter 1).

Basic Psychophysics and Methodology (Appendix).

Vision: Sensation:

Basic Visual Processes (Chapters 2 & 3).

Central Visual Pathways (Chapter 4).

Vision: Perception:

Spatial Vision and Pattern Perception (Chapter 5)

Color Perception (Chapter 7).

Depth and Motion Perception (Chapters 8 & 9).

Other Senses:

Auditory System (Chapter 10).

Hearing (Chapter 11).

Touch (Chapter 13).

Smell (Chapter 14).

Taste (Chapter 15).

CONTENT OUTLINE OF THE COURSE

WK1 8/29 to 9/2 Introduction to Course/Introduction to Sensation and Perception

Issue: Students will be introduced to the field of sensation and perception.

Sekuler and Blake: Chapter 1.

WK2 9/5 to 9/9 Behavioral Methods for Studying Perception

Issue: One of the most important objectives of this course is for students to learn about the methods used to study perception. A great deal of what we know about perception of the world comes from sophisticated procedures known collectively as psychophysics. The goal of this section of the course is to expose students to this very important topic.

Sekuler and Blake: Appendix.

WK3 9/12 to 9/16 The Eye as an Optical Instrument and the Anatomy of the Retina

Issue: Students will learn about the anatomy of the eye, including the portion of the eye that serves as an optical device as well as the anatomy of the human retina. A major focus of this section is helping students understand how the eye's optics work together to form a clear image on the back of the eye.

Sekuler and Blake: Chapter 2 and Handouts.

WK4 9/19 to 9/23 Visual Processing in the Retina

Issue. The goal of this section of the course is to help the student understand the role the retina plays in the early stages of vision. Although the "brain" is responsible for your perceptions, the retina (which is actually an extension of the brain) does a great deal of the work in processing information about the world. One objective is to help students recognize the intimate relationship between retinal anatomy and function.

Sekuler and Blake: Chapter 3 and Handouts.

WK5 9/26 to 9/30 Central Visual Processing: The Role of the LGN and Cortex

Issue: This section of the course introduces students to the role higher brain centers play in visual processing. An important goal is to help students understand how visual processing at later stages in the visual system differs from that of the retina. One thing that I try to accomplish here is helping students come to know and appreciate how the physiological mechanisms of cortical function create “what you see” in the world.

Sekuler and Blake: Chapter 4 and Handouts.

WK6 10/3 to 10/7 Perception of Form

Issue: Loosely speaking, form refers to the shape, texture, curvature, smoothness, etc that comprises an object in the visual world. In this part of the course students will learn about traditional and modern theories of form perception. This is the first section of the course dealing specifically with perception per se, and it is important here that the student integrates the materials from the first few sections as a way to better understand form perception.

Sekuler and Blake: Chapter 5 and handouts.

WK7 10/10 to 10/14 Perception of Color

Issue: This is my favorite topic! The perception of color is extremely fascinating, but also very complicated. My goal here is to aid the student in developing some appreciation of how the brain constructs our perceptions of the vivid hues we perceive. We will focus on two major components: the nature of color (such as the physics of light) and how the visual system processes light to give rise to color perceptions.

Sekuler and Blake: Chapter 7 and handouts.

WK8 10/17 to 10/21 Perception of Depth

Issue: Depth perception refers to the ability of people to judge distance between objects. In this section of the course, students will learn about the visual mechanisms that enable us to perceive distance. We will distinguish between perception that relies upon one eye (known as monocular depth perception) versus perception that rely upon two eyes (known as binocular depth perception).

Sekuler and Blake: Chapter 8 and handouts.

WK9 10/24 to 10/28 Perception of Motion

Issue: Like other visual attributes we have discussed, the perception of movement relies upon a set of specialized brain areas. The goal of this section of the course is to teach

students about classic theories of motion perception while at the same time showing how our ability to detect moving objects is governed by sophisticated neural mechanisms.

Sekuler and Blake: Chapter 9 and handouts.

WK10 10/31 to 11/4 Ear and Auditory System

Issue: Though most of the semester so far has been dedicated visual function, we now turn our attention to the auditory system. The goal of this section is to provide an overview the basics of sound and the anatomy of the auditory system.

Sekuler and Blake: Chapter 10 and handouts.

WK11 11/7-11/11 Hearing and Listening

Issue: Although we could cover a myriad of topics here, we will focus on two major issues in hearing: the perception of loudness and the perception of pitch.

Sekuler and Blake: Chapter 11 and handouts.

WK12 11/14-11/18 Touch

Issue: One of the most exquisite of the sense is somatosensation, better known as the perception of touch.

Sekuler and Blake: Chapter 13 and handouts.

THANKSGIVING BREAK November 21-25

WK13 11/28-12/2 Taste

Issue: The focus here is helping the student understand the complex anatomy and physiology of this sensory system.

Sekuler and Blake: Chapter 14 and handouts.

WK14 12/5-12/9 Smell

Issue: Finally, we end our saga by learning about the sense of smell. As with other sensory systems, one goal is to help students come to appreciate the relationship between the anatomy and physiology.

Sekuler and Blake: Chapter 15 and handouts.

Important Dates....

Friday, September 2:

- (1) Last day to add or drop classes without "W" grade.
- (2) To settle Fall semester bills without de-registration.
- (3) To change meal plan.

Wednesday, September 7:

- (1) To elect Pass/Fail
- (2) To change any course from credit to audit status

Friday, September 9:

- (1) Last day to reduce credit load without full tuition liability

Thursday & Friday, October 6 and 7

- (1) Semester Reading Day/Holiday - No Undergraduate Day or Evening Classes