Psy 164 J Sensation and Perception
Winter 2023

Meeting Times: Class: MTWF: 2:40-3:50 PM, CH102/SCC 208
Instructor: **John H. Krantz**
Texts: ***Sensation and Perception, 2nd ed.***
by Schwartz & Krantz. Other materials as provided.

Laboratory: T: 10-11:45 AM or 2:15-4:00 PM, DUG Lib Comp Lab/SCC 130
Office: Science Center 151
Phone: x7316

Office Hours (on Teams):
MW: 1:30-2:30 pm
T: 9-10 am
Others by appointment

I hope that all of you had a wonderful break. I am really looking forward to this class. I hope that you have as much fun as I know I will.

Introduction

General Description:

Welcome to Sensation and Perception and thank you for joining me on this journey into both the mystery and knowledge that we have of an aspect of our mind that most of us take for granted: our senses. Broadly speaking, the study of sensation and perception is the study of how an organism's brain knows what is going on in the world around it. To help you appreciate the questions that scientists studying sensation and perception struggle with, think of the captain of a ship far out to sea. What does that captain need to know to safely sail the ship? The captain must be able to detect obstacles, other ships, and weather conditions such as storms that may affect the operation and safety of the ship. To perform these functions, the captain has radar, sonar and other sensor systems to gain information about the ocean environment. In addition, the captain must know about the operating condition of the ship, such as fuel level and temperature of the engine. Sensors have been placed in the ship to give the captain the needed information. A limited analogy can be drawn between your brain or mind and the captain. In the same manner as the captain, your brain does not have direct access to the information necessary to behave in an intelligent and effective manner. Thus, our sensory systems such as

vision and audition are like the radar and sonar which provides necessary information to guide behavior. You also have sensory systems that obtain information about the state of your body such as your position relative to the ground. Sensors and sensation?

This course is part of the Scientific, Mathematical and Algorithmic Methods CCR as such many of you might be taking this course far outside your major. It is of value to consider why we do that to you for a moment. Let me quote from the Hanover College catalog for a description of the liberal arts:

> The liberal arts are arts suited for free people. The purpose of a liberal arts education is to enable such people to cultivate humanity, to realize their full potential as human beings and as citizens. Accordingly, the liberal arts are designed to equip individuals to develop and integrate every dimension of their own humanity--physical, intellectual, artistic, ethical, and spiritual--and to understand and respect the humanity of others. (p. 8)

This course fits this description in many ways. I want to highlight only a few. First, to develop ourselves, we must know ourselves. Our senses are among the most misunderstood aspects of our human nature. Thus, in this course will be working against a large body of misunderstanding. Second, issues in this course are applicable to the way we interact with art and technology in the world around us. As such, this course can help us integrate knowledge from many areas into a more coherent view of the world and ourselves.

Objectives

Because this course plays many different types of roles in the college, I have grouped the objectives into different categories. Depending upon the reason you are in this course, you may not see a need for all of the objectives. However, the objectives all work together, and the first two sets of objectives actually are vehicles to support the higher-level objectives which are the real reason for taking any course.

Course Specific Objectives:

The specific objective of this course is to develop your understanding of how our sensory systems operate to gain information about the world around us. One of the difficulties with teaching Sensation and Perception is that we all intuitively *know* what we see, hear, etc. In addition, we have an implicit trust that what our senses tell us about is physical reality. This belief is held despite most people having extensive experience with illusions which illustrate the indirect and interpretive nature of the information our senses provide. You will have to leave many of these intuitions

behind, because there are many surprises in how our sensory systems actually operate.

Role of Course in the Major:

In the psychology major, this course is one of the options for a basic or 200 level experimental psychology course. Experimental psychology traditionally has referred to those areas of psychology that have emphasized the laboratory and experimental methods for its research. Thus, areas such as sensation and perception, cognition, and learning have fallen under this general rubric. Many fundamental findings that drive most of our speculation about the nature of the human mind are based on findings in these areas.

As a result of this placement of sensation and perception in the major, the course is designed to give you a fundamental introduction to experimental methods and ideas using this topic. The other course at this level of the major is PSY162 Neuropsychology. Together these courses are often grouped under the rubric of biological psychology and, thus, present how biological knowledge and approaches have been used to facilitate understanding in psychology. So while there are many non-biological approaches to sensation and perception and they will be covered, there is a need to make sure you understand the basics of the nervous system and how this basic understanding yields important insights for psychology.

This course also needs to provide a foundation of basic experimental methods as used in the laboratory areas of psychology. In the advanced experimental course in psychology you will be expected to design your own experimental project in the area of that course and to execute that project. So, the laboratory section is designed to help you get experience with the various components of how experiments are conducted in experimental psychology so that you will be prepared to conduct your project in the advanced course.

Role of Course in the Core Curriculum (CCR: SL): Many of you are taking this course to fulfill one of the science requirements, as a CCR. Here are few of my goals, taken from the goals for the CCRs. The central aims of the SL CCR are to:

- *expose students to the nature and limits of scientific knowledge and mathematical and/or algorithmic reasoning,*
- *expose students to the language, theory, and practice of disciplines within the scientific, mathematical and/or algorithmic realms, and*
- *expose students to scientific methodology and the connections between scientific theory and physical phenomena.*

Objectives Connected to the Liberal Arts:

This course connects to the liberal arts in several ways. Science is a traditional and fundamental area of study in the liberal arts. Science is different from many of the other areas of knowledge by its apparent ability to build a body of knowledge that is to some degree cumulative, and some knowledge can gain a very wide degree of acceptance by practitioners of that field. It is these characteristics that has led to the claim, made by some, that scientific knowledge is more objective that other disciplines. But science is not a fixed set of facts to be learned, but a constantly changing and evolving body of knowledge like any other scholarly field you find taught at Hanover College. To understand science, in fact to understand any discipline taught here at Hanover, requires one to understand how the field learns and expands its horizon and critiques its past knowledge. Thus, this class will emphasize the data and reasoning that leads researchers in sensation and perception to certain conclusions and in the class, we will be asked to critique these data and the consequent reasoning. In addition, one feature of the liberal arts is that it prepares people "to lead deliberate, examined lives." (Catalog, p. 8) However, one facet of our lives that often goes little examined is how it is possible that we can sense and perceive the world around us and how these mechanisms that make sensation and perception affect our lives. By making you aware of these mechanisms a more aware life is possible.

Course Organization/Expectations

Read material and use media before coming to class. In class, we will not simply present the material from the text but examine the material. Class is for working on understanding, applications, covering of new material. Thus, familiarity with the material *prior to class* is vital.

Laboratory: The labs will be a chance to delve into some of the methods of the field. Sensation and perception has developed a set of methods that are unique, even within psychology. These methods have demonstrated their usefulness by being the basis for many applications you run into on a daily basis.

Attend Class.

No Electronic Devices in Class: That means no phones, no handheld devices, no laptops, no tablets, etc. are to be used at all during class.

Turn assignments in on time. A letter grade is lost for each late day and nothing will be accepted more than three days late. Late is defined as one minute after the start time of class.

Participation in Class. As much of this class will be an investigation into the meaning of the findings we discuss we need all of you to ask questions, suggest ideas and critique other people's ideas, including mine.

Seek help as you need it. Unfortunately, my training in psychology has not made me a mind reader. If you are having troubles seek help from me and/or fellow students before the latter part of the term. Seek the help as soon as the trouble begins. That requires you thinking about the material and not just memorizing so that you know if you really understand it.

Schedule:

Week	Topic	Reading and Web Pages
1 1/9-13	Background: Philosophical/Biological	Schwartz & Krantz Chapter 1; Krantz ESP Appendix Review Structure of Neuron Review Action Potential
2 1/16-20	Visual System: The Eye	Schwartz & Krantz Chapter 3
3 1/23-27	Visual System: The Brain	Schwartz & Krantz Chapter 4
4 1/30-2/3	Object Perception Test # 1 Friday, February 3	Schwartz & Krantz Chapter 5
5 2/6-10	Color Perception	Schwartz & Krantz Chapter 6
6 2/13-17	Depth and Size	Schwartz & Krantz Chapter 7
7 2/20-24	Movement and Action	Schwartz & Krantz Chapter 8
8 3/6-10	Constancy and Illusions	Schwartz & Krantz Chapter 9 or Krantz Chapter 9
9 3/13-17	The Auditory System Test #2 Friday, Mar 17	Schwartz & Krantz Chapter 10 Fourier Analysis Tutorial
10 3/20-24	The Auditory Brain & Sound Localization	Schwartz & Krantz Chapter 11
11 3/27-31	Speech Perception & Music Perception	Schwartz & Krantz Chapter 12 & 13

12 4/3-7	Touch & Pain	Schwartz & Krantz Chapter 14
13 4/10-14	Olfaction & Taste	Schwartz & Krantz Chapter 15

Apr 17-21 Final Examination (During Final Examination Period)

Laboratory Schedule:

In all types of inquiry, the knowledge gained is fundamentally dependent upon the methods used to gain that knowledge. Therefore, the laboratory portion of this course is set up to allow you to both experience some fundamental phenomena and also to gain experience in how scientific questions are asked, answers sought and discoveries communicated. Below is the schedule of laboratories that are part of the course.

Lab	Laboratory Topic	Assignment Type
1	Psychophysical Methods I: Thresholds and Computation of Threshold and Linear Interpolation	Read: Schwartz & Krantz Chapter 2 Problems (25 pts)
2	Psychophysical Methods II: Magnitude Estimation	Read: Schwartz & Krantz Chapter 2 Problems and Graphs (25 pts)
3	Psychophysical Methods III: Psychophysical Laws	Data Graphs with Interpretation (A mini results section) (25 pts)
4	Psychophysical Methods IV: Signal Detection Theory and Graphing ROC curves with Excel	Quiz calculating d' and criterion. (25 pts)
5	Acuity and Retinal Location I : **Experiment**	
6	Acuity and Retinal Location II: Analyzing Data relative to your hypothesis	Data Graph
7	About Lab Reports	Method Section, Results, Summary (50 pts)
8	Size Constancy I: Making Quantitative Predictions	
8	Size Constancy II: Quantitative Predictions & Monocular Cues	Graph of Predicted Sizes
9	Size Constancy III: Full Report	Full Lab Report (75 pts)

10	Making a Law: Frequency Discrimination I	
11	Making a Law: Frequency Discrimination II	Full Lab Report (100 pts)
12	Presentations: Frequency Discrimination Results	
13	Goggles	No Assignment

Assignments and Examinations:

Homework.

Throughout the term there will be homework problems assigned. They will be due the next class day. Problems will come from the problems at the end of the text chapters and from others I will hand out in class. Often they will require the use of the text media. Problems of this sort will also be on the exams. Homework will be collected and graded and will total to 100 points.

Examinations.

There will be three tests. The tests will be a combination format of short answer items (such as identification) and longer essays. All examinations will be of a similar format. Also, all examinations will be cumulative because all later material builds on or relates to earlier material. Since each successive examination covers more material, each successive examination will be worth more according to the following table.

Exam #1	100 points
Exam #2	150 points
Exam #3	200 points

Laboratory Assignments.

There will be several types of laboratory assignments including problems, data analysis, graphing of results, and laboratory reports. These assignments are listed above in the schedule of the laboratories and will be described more in the labs where they are involved. However, the labs have a cumulative set of purposes. These purposes are two-fold: to develop skills at experimentation using the methods of sensation and perception and to develop skills at critically

analyzing the results of these experiments. Thus, assignments such as graphing may seem purely as a skill, but even here, how one graphs can greatly impact the way we interpret data. Thus, understanding the impact of how a graph is constructed on interpretation can assist in a critical understanding of data.

The different types of assignments will be worth different point values depending on the size of the assignment. The points are listed in the syllabus above in the laboratory schedule. The information for the format and guidelines for the laboratory format are on Moodle. For the final lab, you will be asked to do a short in class group presentation relating to the results you have found. We will discuss the presentation and its expectations when we get to the lab.

Research Participation

One of the objectives of the science CCR is to show you different ways that science is conducted. However, this class can only introduce a small number of methods. So this assignment is to give you experience with alternative methods, but from a psychological perspective. You can earn this credit in two ways. First, you can participate in research or you can write a critique of an article. To complete this assignment for the class, you must do three of these activities (participate in a study or write a journal critique). By participating in these studies, you can gain valuable, first-hand knowledge about how research is conducted. By critiquing journal articles, you will gain insight in to how researchers do and present their findings. You will receive up to 100 points this assignment.

If you chose to participate in a study, there are three ways that you can participate. As you read below, not that the different ways of participating give you different levels of credit towards the assignment.

1. Participant in-person in the study conducted by a Hanover College Psychology Faculty Member or Student whose research is being conducted as part of a psychology class. (Each study counts as one study)

2. Participate in an on-line study conducted by a Hanover College Psychology Faculty Member or Student whose research is being conducted as part of a psychology class. (Each study counts as 3/4 of a study)

3. Participate in an on-line study conducted by a student or faculty an another institution but listed on this site: Psychological Research on the Net. (Each study counts as 1/2 of a study)

To receive credit for participating in an in-person study, you MUST: a) obtain the signature of the researcher, and b) answer some basic questions about the nature and purpose of the study [see Research Participation Form on Moodle]. To received credit for participating in an online study, either Hanover or Not Hanover, you MUST: a) print out the debriefing form of the study, and b) fill out and answer the questions related on the online participation form [see Online Participation Form on Moodle]. To receive credit for writing a journal critique, write a 2-page summary and critique of an approved psychological journal article [The guidelines are on Moodle].

Extra Credit

You may earn extra credit by completing two more of these assignments for up to 20 points each (the relative weight of the research participation holds for the extra credit as well). The Research Participation Forms and/or Article Critiques will be collected the Friday before the beginning of dead week.

Grading and Class Policies:

Class Participation:

Participation in and regular attendance of classroom activities and discussions will be worth 100 points. I expect each student to participate fully in discussions in class and laboratories. These discussions are integral to getting the greatest possible benefit from this class in addition to being a part of the development of your speaking abilities.

Late Policy:

An assignment is late one minute after the beginning of class. One letter grade will be subtracted for the first day late and another letter grade for each additional day, also beginning at the time of class plus one minute. Nothing will be accepted more than three days late.

Grading:

This class is graded on a point system which means that each assignment of the course is worth a certain amount of points towards the final grade. When you get an assignment back you will be given a grade with the points earned over the total number of points. Thus, you should be able to follow your progress in the course on your own.

The table below summarize the grading for each class assignment.

Activity	Points
Test 1	100
Test 2	150
Test 3	200
Homework	100
Lab Assignments	
Psychophysics 1	25
Psychophysics 2	25
Psychophysics 3	25
Psychophysics 4	25
Acuity Lab	50
Size Constancy Lab	75
Frequency Discrimination Lab Presentation	100
Research Participation	100
Participation	100
Total	1100

Grades will be converted to percentiles and letter grades will be assigned as follows:

Grade	Percent Range
A	100%-93.4%
A-	93.3%-90%
B+	89.9%-86.7%
B	86.6%-83.4%
B-	83.3%-80%
C+	79.9%-76.7%
C	76.6%-73.4%
C-	73.3%-70%
D+	69.9%-66.7%
D	66.6%-60%
F	< 60%