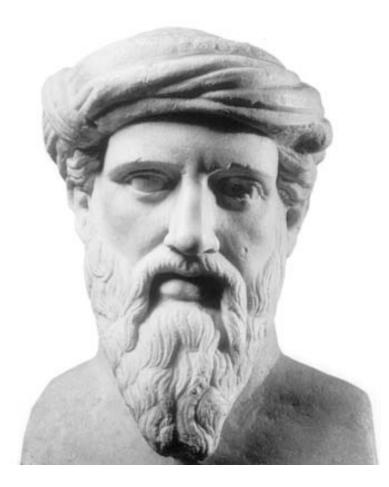# Psychology of Perception

Psychology 4165, Section 100

Summer 2004, Term A, Monday–Friday, 9:15–10:50
Muenzinger D-156
Lewis O. Harvey, Jr. – Instructor

Pythagoras of Samos (580–520 BC)

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Syllabus Topics and Reading Assignments

31 May	**Bolder Boulder**		21 June	Depth & Action	(SB 9)
1 June	Psychophysics	(SB 1)	22 June	• The Auditory System	(SB 10)
2 June	Psychophysics	(SB Appendix)	23 June	Hearing	(SB 10)
3 June	• Psychophysics	(SB Appendix)	24 June	Music Perception	(SB 11)
4 June	The Human Eye	(SB 2)	25 June	• Speech Perception	(SB 11)

31 May **Bolder Boulder**
 1 June Psychophysics   (SB 1)
 2 June Psychophysics   (SB Appendix)
 3 June • Psychophysics (SB Appendix)
 4 June The Human Eye   (SB 2)

 7 June The Eye & Seeing   (SB 3)
 8 June Central Pathways   (SB 4)
 9 June Central Pathways   (SB 4)
10 June Spatial Vision   (SB 5)
11 June • Spatial Vision   (SB 5)

14 June Object Perception   (SB 6)
15 June Color Perception   (SB 7)
16 June Color Perception   (SB 7)
17 June **First Examination**
18 June Depth & Action   (SB 8)

21 June Depth & Action   (SB 9)
22 June • The Auditory System (SB 10)
23 June Hearing   (SB 10)
24 June Music Perception   (SB 11)
25 June • Speech Perception   (SB 11)

28 June Somatosensory   (SB 12)
29 June Taste & Smell   (SB 13)
30 June Taste & Smell   (SB 13)
 1 July Recapitulation & Review
 2 July **Final Examination**

Required Textbooks for the Course

Sekuler, R. W., & Blake, R. (2002). Perception (4th ed.). New York: McGraw-Hill.

Martin, D. W. (2004). *Doing Psychology Experiments* (6th ed.). Pacific Grove,
        California: Brooks/Cole Publishing.

Note: The numbers in parentheses above refer to chapters in the Sekuler and Blake (SB)
        and the Martin (M) texts. Please read the indicated chapter before the class
        meeting.

Office Hours

Name	Lewis O. Harvey, Jr.	Geoffrey R. Urland	Courtney A. Rocheleau
Office	MUEN D-251b	MUEN D342	MUEN D365c
Hours	11:00–12:00 M,T,W and by Appointment	11:00–13:00 Monday and by Appointment	11:00–12:00 Tues & Thurs and by Appointment
Telephone	303-492-8882	303-492-3404	303-492-8701 (messages)
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Laboratory Schedule

Section L101: 13:00–16:00 Monday & Wednesday Room MUEN D-156 (Geoff)

Section L102: 13:00–16:00 Tuesday & Thursday,   Room MUEN D-156 (Courtney)

1.	1 & 2 June 2004	Begin Lab 1: **Weight Discrimination** (Martin Chapter 1, Chapter 12)
2.	3 & 4 June 2004	Work on Lab 1 (Martin Chapter 13)
3.	7 & 8 June 2004	Lab 1 Report Due (30 points) Begin Lab 2: **Signal Detection of Faces** Form Group Project Groups (Martin Chapter 12) (Martin Chapters 6 & 7)
4.	9 & 10 June 2004	Work on Lab 2
5.	14 & 15 June 2004	Lab 2 Due (40 points) Group Project Approval (Martin Chapters 8 & 9) Begin Lab 3: **Color Naming**
6.	16 & 17 June 2004	Work on Lab 3
7.	21 & 22 June 2004	Lab 3 Due (50 points) Work on Group Projects
8.	23 & 24 June 2004	Work on Group Projects
9.	28 & 29 June 2004	Work on Group Projects
10.	30 June 2004	Group Project **Presentations** (20 points) Group Project Report due (60 points)

Conditions Under Which The Course Operates

Lecture:
There will be two exams given during the semester: one mid-term and one final examination. Both are required. No make-up examinations will be given. You will receive a grade of zero for each exam not taken. Part of the semester grade will be based on homework assignments and class participation.

Laboratory:
The laboratory is not optional in Psychology 4165. There will be four assignments in laboratory. These assignments will be graded and the sum of the four grades will be your laboratory grade. All lab assignments must be written and printed with a computer word processor and all graphs must be prepared with a graphics or spread sheet program.

Grading:
Your final grade is computed from your exam scores, homework grades, participation grade, and the laboratory grade. The total possible points in the course is 800:

> 200   First Examination (17 June 2004)
> 300   Final Exam   (2 July 2004)
> 80   Homework grade
> 20   Class participation
> 200   Laboratory Grade
> -----
> 800   Total Possible Points

Your final letter grade in the course will be assigned in the following manner. First a "Reference Score" will be calculated by taking the mean of the top five percent of the class. Your grade will be determined by how well you have done in comparison to this reference score:

> A >96.6%,   A- >93.3% of the reference score
> B+ >90.0%, B >86.6%,   B- >83.3% of the reference score
> C+ >80.0%, C >76.6%,   C- >73.3% of the reference score
> D+ >70.0%, D >66.6%,   D- >63.3% of the reference score
> F <63.3%

It is therefore possible for the entire class to receive the grade of A. By the same token, it is also possible that very few people would receive an A.

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Psychology 4165   Courtney A. Rocheleau–Assistant
Section 100   Geoffrey R. Urland–Assistant
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Comments About The Psychology Of Perception

Why Take This Course?

There are three reasons to take this course: (1) To gain an understanding of the capabilities and limitations of our perceptual experiences; (2) to sharpen your ability to critically evaluate the results of experiments in light of theories of perception; and (3) to gain practical skills in the use of computers for designing experiments, for analyzing and graphing data, and for preparing written laboratory reports.

The study of perception is the oldest part of modern psychology. It developed from trying to answer two questions posed by philosophers: "How do we know what we know?" and "Why do things appear the way they appear?" Since most of what we know about the outside world comes to us through our sensory systems, our sensory capabilities were the first to be studied extensively. Perceptions are derived from neural and psychological mechanisms that operate on sensory information. All of our sensory systems operate under the same set of basic principles that we will study in depth:

1. **Selective Receptors**: Individual receptors respond to a restricted range of stimuli;
2. **Receptive Fields**: Individual sensory neurons respond selectively to a restricted range of stimuli that can be described by its receptive field;
3. **Distributed Response**: Each stimulus causes a pattern of activity across the neurons which respond to it;
4. **Neural Maps**: Neurons are arranged in the brain in an orderly way, forming maps based on their response properties;
5. **Columnar Organization**: Neurons that have similar response properties are organized in vertical columns of brain tissue;
6. **Parallel Pathways**: Different types of information flow from receptors to the brain in different parallel pathways;
7. **Relationship Between Physiology and Perception**: Perceptual experience is created by physiological activity—we will study this relationship in detail where possible;
8. **Cognitive Influences**: Perception is influenced by thoughts, feelings, motivations and memories.

Prerequisites:

A broad understanding of the basic concepts from a general psychology course is assumed. You will be using methods of inferential statistics, such as those taught in Psychology 3101, to evaluate the results of your experiments. A facile ability with these methods in particular and with mathematical concepts through algebra and trigonometry are required. A familiarity with calculus is helpful but is not necessary. Please work through the eight questions on the next two pages. If you find these questions very difficult and you don't know how to even find out how to answer them, you probably are not ready to take this course. The course requires considerable commitment of time. For each credit hour you should expect to spend 3 hours of class-related activities (studying, research, writing) per week. Since the class is a four credit course expect to spend 12 additional hours per week outside the class and laboratory.

Skills Needed for Psychology of Perception

Question 1:
Rearrange the following linear equation to solve for *b*: $Y = a + b \cdot X$

$b =$

Question 2:
Solve the following equation for *X*: $Y = \log X$

$X =$

Question 3:
Compute the arithmetic mean and the standard deviation of this sample of numbers:
   10.0, 9.0, 12.0, 11.0, 8.5, 13.0, 8.0, 10.0, 7.0, and 11.5:

$\mu =$

$\sigma =$

Question 4:
In an experiment you observe the number of times six different kinds of events occur.
A theoretical model makes a prediction about how often these events <u>should</u> occur. These
data are presented in the table below. Compute the chi-square (χ^2) statistic to test if the
observed data are significantly different from the predicted data. You may assume *n-1*
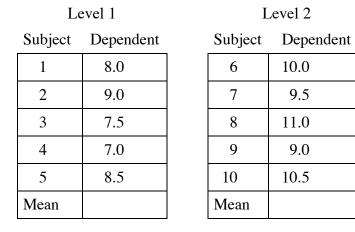degrees of freedom.

	E1	E2	E3	E4	E5	E6
Observed Data	174.0	172.0	104.0	92.0	41.0	8.0
Predicted Data	175.5	167.8	106.5	90.4	44.3	6.5

$\chi^2 =$

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Question 5:
In an experiment with two levels of an independent variable you observe the following values of the dependent variable for 10 subjects (five were tested under level 1 and five under level 2). Compute the mean of each column and calculate a t-test (or ANOVA if you wish) to test the hypothesis that there is a significant difference between the means:

Level 1

Subject	Dependent
1	8.0
2	9.0
3	7.5
4	7.0
5	8.5
Mean	

Level 2

Subject	Dependent
6	10.0
7	9.5
8	11.0
9	9.0
10	10.5
Mean	

$t(df) =$

$p =$

Question 6:
Convert the probability 0.76 to a z-score based on the unit, normal Gaussian distribution. What is the probability that a single sample drawn from a population having a Gaussian distribution with a mean of 0.0 and a standard deviation of 1.0 will have a value of 1.96 or greater?

Question 7:
Using least-squares linear regression, compute the slope (b) and y-intercept (a) of the straight line ($y = a + b \cdot x$) that best fits the following set of data :

x	1.0	3.0	5.0	7.0	9.0
y	4.1	9.9	16.1	22.0	27.9

$a =$

$b =$

$R^2 =$

Question 8:
Plot the data in Question 7 on a graph using linear axes. The x-axis should have a range of 0.0 to 10.0 and the y-axis should range from 0.0 to 30.0.

Agreements For Participating In The Course

The purpose of these agreements is to create a condition that allows all people in the class to get maximum value from the course.

Agreements

1 You agree to be responsible for these agreements.

2 You agree to be on time to class and to your laboratory meetings.

3 You agree to complete the assigned reading and homework on time.

4 You agree to complete your laboratory assignments on time.

5 You agree to attend all class and laboratory meetings unless an emergency comes up.

6 You agree to understand the material.

7 You agree to ask questions when you don't understand the material.

8 You agree to communicate any complaints and criticisms you may have only to someone who can do something about the situation and you agree not to complain or to criticize to someone who cannot do something about the situation.

9 You agree to get value out of your participation in the course.

If you attend the next class meeting, you are accepting responsibility for the above agreements.

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Academic Integrity Policy

A university's intellectual reputation depends on maintaining the highest standards of intellectual honesty. Commitment to those standards is a responsibility of every student, faculty, and staff member on the University of Colorado at Boulder campus.

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Honor Code
A student-run Honor Code was instituted on the Boulder Campus in 2002. The intent of the Honor Code is to establish a community of trust where students do not plagiarize, cheat, or obtain unauthorized academic materials. An honor code council collaborates with the colleges and schools in addressing allegations and instances of academic dishonesty and in assisting to educate all members of the university community on academic integrity issues.

Breaches of academic honesty include cheating, plagiarism, and the unauthorized possession of examinations, papers, computer programs, as well as other class materials specifically released by the faculty.

A student accused of academic dishonesty will either accept the accusation made by a faculty member or request a hearing before a student panel, who will make a decision on the accusation of academic dishonesty. In addition to academic sanctions imposed by the faculty, students found guilty of academic dishonesty also face consequences from the honor code council ranging from attending a mandatory class in ethics to expulsion from the campus. More information about CU-Boulder's Honor Code may be found at www.colorado.edu/academics/honorcode/Home.html.

The following terms are clarified for the benefit of all members of the university community.

Cheating
Cheating is defined as using unauthorized materials or receiving unauthorized assistance during an examination or other academic exercise. Examples of cheating include: copying the work of another student during an examination or other academic exercise (includes computer programming), or permitting another student to copy one's work; taking an examination for another student or allowing another student to take one's examination; possessing unauthorized notes, study sheets, examinations, or other materials during an examination or other academic exercise; collaborating with another student during an academic exercise without the instructor's consent; and/or falsifying examination results.

Plagiarism
Plagiarism is defined as the use of another's ideas or words without appropriate acknowledgment. Examples of plagiarism include: failing to use quotation marks when directly quoting from a source; failing to document distinctive ideas from a source; fabricating or inventing sources; and copying information from computer-based sources, i.e., the Internet.

Unauthorized Possession or Disposition of Academic Materials
Unauthorized possession or disposition of academic materials may include: selling or purchasing examinations, papers, reports or other academic work; taking another student's academic work without permission; possessing examinations, papers, reports, or other assignments not released by an instructor; and/or submitting the same paper for multiple classes without advance instructor authorization and approval.

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Check out http://www.marymount.edu/academic/sehs/ps/plagiarism_glines/index.html for explicit examples.