

Tu/Th 8:40 – 9:55 am

614 Schermerhorn

Columbia University

Professor: Sarah Shuwairi, Ph.D.  
E-mail: sms311@columbia.edu  
Office Hours: 10-11am T/R, and by appointment.  
Office: 356 Schermerhorn

Teaching Assistant (TBA)

Name, Email, Office Hours: Time/Location, and by appointment.

### **Course Description**

Fundamental phenomena and mechanisms of visual and auditory perception are described and related to underlying neural processes, to developmental processes, and to sensorimotor function.

### **Course Goals**

In this class you will learn about the foundations of perception, with an emphasis on sight and hearing, and more broadly how we are able to make sense of the world around us based on the input from our five senses. Several important discoveries have been made through the study of perception, including some of the deepest insights about how the nervous system develops and functions. This class will highlight the ways in which this information was discovered and what we can conclude from these facts. This course also places an emphasis on scientific reasoning about how we come to know the few things that we really know about sensory and perceptual processing mechanisms in humans and other animals.

### **Textbook and Supplemental Readings**

Text: Goldstein, E. B. (2009). *Sensation & Perception*, 8<sup>th</sup> ed. Wadsworth. (ISBN-13: 9780495601494).

The publisher offers a freely available companion web site with quizzes and other study aids:

[www.wadsworth.com/cgi-wadsworth/course\\_products\\_wp.pl?fid=M20b&product\\_isbn\\_issn=9780495601494&discipline\\_number=24](http://www.wadsworth.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&product_isbn_issn=9780495601494&discipline_number=24)

Weekly reading assignments may include a book chapter and/or a journal article (see p. 4-6 of syllabus).

Lecture slides, supplemental readings, and homework will be available to students via CourseWorks.

### **Grading**

5% Participation (\*clickers)

15% Homework (3 Assignments, worth 5% each)

5% Weekly Quizzes (11 quizzes, the lowest one is dropped)

75% Exams (two non-cumulative midterms worth 20% each; one cumulative final worth 35%)

### **Requirements and Expectations**

To do well in this course, you will need to engage in approximately 6 to 9 hours of study time outside of class each week. It is highly recommended that students attend lectures on a regular basis, complete all written assignments and exams, and keep up with weekly readings.

### **Classroom Policy**

We request your cooperation in our efforts to maintain a classroom environment that is both respectful and conducive to learning. You may bring food to class as long as it is not noisy or messy or otherwise disturbing other students. As a courtesy to your fellow students, please remember to turn off cell phones, tablets, and other internet-based social networking devices during class period. Using these items during lecture periods can cause distractions for you and other students who are sitting nearby. \*Please note that all text messaging, chatting, internet, tablet and cell phone use should take place outside of class.

## **Exams**

There are three exams. Two of the exams are non-cumulative midterms and the final exam is cumulative. Approximately half of the questions on the final exam will focus on topics covered in the first two midterms, and the other half will focus on new topics covered after the second midterm. All exams will be comprised primarily of multiple choice and short answer questions. Materials covered both in lecture and readings will be included in all exams. Note that you are responsible for all assigned readings, whether or not they are discussed at length in class. Please take advantage of study aids (e.g., practice quizzes) on the textbook's free companion web site. Copy and paste the link below in your web browser:

[www.wadsworth.com/cgi-wadsworth/course\\_products\\_wp.pl?fid=M20b&product\\_isbn\\_issn=9780495601494&discipline\\_number=24](http://www.wadsworth.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&product_isbn_issn=9780495601494&discipline_number=24)

## **Exam Attendance**

Please make note of the midterm and final exam dates and speak to me during the first week of class if you anticipate a problem. We cannot schedule alternative exam times for students who have conflicting examination schedules, travel plans, etc. An unexcused absence will result in a grade of "F" on that exam. To be excused from an exam in the event of a medical or family emergency, please notify me prior to the exam if that is possible. As soon as you are able, you would need to present documentation certifying the legitimacy of your absence. Please note that Columbia strictly limits situations in which a grade of "Incomplete" can be granted. The college bulletin provides further details.

## **Clicker Participation**

You will be using a handheld "i-Clicker" to respond to questions posed in class. Using your clicker in every lecture will help you to engage actively with the material and will provide useful feedback regarding your comprehension. Your responses will be used to calculate your participation points. You will receive the maximum of 5 points for clicker participation if you respond to at least 4 of the 5 questions posed during at least 20 of the 24 lecture periods this term. To learn more about clickers, where to buy them, how to register them, and how to use them, please refer to the i-Clicker handout.

## **Extra Credit**

Opportunities for optional extra credit work will be available throughout the semester.

## **Academic Integrity**

The intellectual venture in which we are all engaged requires of faculty and students alike the highest level of personal and academic integrity. As members of an academic community, each one of us bears the responsibility to participate in scholarly discourse and research in a manner characterized by intellectual honesty and scholarly integrity. Scholarship, by its very nature, is an iterative process, with ideas and insights building one upon the other. Collaborative scholarship requires the study of other scholars' work, the free discussion of such work, and the explicit acknowledgement of those ideas in any work that informs our own. This exchange of ideas relies upon a mutual trust that sources, opinions, facts, and insights will be properly noted and carefully credited.

In practical terms, this means that, as students, you must be responsible for the full citations of others' ideas in all of your research papers and projects; you must be scrupulously honest when taking your examinations; you must always submit your own work and not that of another student, scholar, or internet agent. Any breach of this intellectual responsibility is a breach of faith with the rest of our academic community. It undermines our shared intellectual culture, and it cannot be tolerated. Students

failing to meet these responsibilities should anticipate disciplinary action, including being asked to leave Columbia.

### **Faculty Statement on Academic Integrity**

Academic honesty in writing assignments, examinations, and i-Clicker participation is expected of all students in this class. Academic dishonesty is one of the most serious offenses a student can commit at Columbia University. Not only does it violate Columbia standards, it severely inhibits your opportunity to develop academically, professionally, and socially. Academic dishonesty may be intentional or unintentional. Here are some examples:

- Plagiarism (copying word for word or even paraphrasing illegitimately, without proper citation or acknowledgment, from any other written, electronic, or online source)
- Cheating on examinations
- Unauthorized collaboration on an assignment
- Receiving unauthorized assistance on an assignment
- Forgery
- Submitting work for one course that has already been used for another course
- Unauthorized distribution of assignments and exams
- Lying to an instructor or University official
- Obtaining advance knowledge of exams or other assignments without permission

*\*This was adapted from the bulletins of the School of General Studies and Columbia College.*

### **Accommodations for Students with Disabilities**

The university is committed to providing access to all programs and curricula to all students. If you have a disability that requires an academic accommodation or the use of auxiliary aids and services in the classroom, please let the instructor know within the first two weeks of classes. You should also contact the Office of Disability Services as soon as possible. The ODS determines the specific needs of students with disabilities, and develops and implements programs and policies to meet those needs. The procedures for registering with ODS can be found at <http://health.columbia.edu/services/ods>. Location: Alfred Lerner Hall, 7<sup>th</sup> Floor, at 2920 Broadway. Phone: (212) 854-2388.

### **Writing Center**

If you would like to learn to improve your writing, you should take advantage of the free individualized writing instruction available to all students at the Writing Center. Writing consultants will meet with you at any stage of the writing process. <http://www.college.columbia.edu/core/uwp/writing-center>

### **Counseling and Psychological Services**

To schedule an appointment: (212) 854-2878  
After-hours clinician-on-call: (212) 854-9797

Tu/Th 8:40 – 9:55 am

614 Schermerhorn

Prof. Sarah Shuwairi

## Weekly Lecture Topics and Reading Assignments

Week	Date	Day	Lecture Topics	Reading*
1	4-Sep	Tu	Course Introduction; Anatomy of the Eye	Ch. 1
	6-Sep	Th	Physics of Light, and the Journey of Light into the Eye <b>QUIZ 1</b>	Ch. 2
2	11-Sep	Tu	Retinal Physiology and the Retinocortical Pathway	Ch. 4
	13-Sep	Th	Lateral Inhibition; Brightness and Contrast; NOVA Video <b>QUIZ 2</b>	Ch. 3
3	18-Sep	Tu	Color Perception: Theory of Trichromacy, Color Opponency, Afterimages	Ch. 9
	20-Sep	Th	Color Blindness, Synaesthesia, Industrial Applications of Color <b>QUIZ 3</b>	Suppl. Reading
4	25-Sep	Tu	Object Perception and Visual Illusions <b>Homework 1 Due</b>	Ch. 5
	27-Sep	Th	Face Perception <b>QUIZ 4</b>	Ch. 5
5	2-Oct	Tu	Visual Attention	Ch. 6
	4-Oct	Th	Visual Attention <b>QUIZ 5</b>	Ch. 6
6	9-Oct	Tu	<b>MIDTERM EXAM 1</b> (1 hour, 15 min) *Last day to drop	<b>EXAM 1</b>
	11-Oct	Th	Motion and Action <b>QUIZ 6</b>	Ch. 7-8
7	16-Oct	Tu	Depth, Size and Shape Perception <b>QUIZ 7</b>	Ch. 10

	18-Oct	Th	Perceptual Development	Ch. 16
8	23-Oct	Tu	Perceptual Development	Suppl. Reading
	25-Oct	Th	Perceptual Development	Suppl. Reading
9	30-Oct	Tu	Perceptual Development <b>Extra Credit Homework Due</b>	Suppl. Reading
	1-Nov	Th	Perceptual Development <b>QUIZ 8</b>	Suppl. Reading
10	6-Nov	Tu	<i>Election Day -- No Class!</i>	-
	8-Nov	Th	The Auditory System: Structures and Functions <b>Homework 2 Due</b>	Ch. 11
11	13-Nov	Tu	Sound Localization; Speech and Hearing; NOVA Video <b>QUIZ 9</b>	Ch. 12 & 13
	15-Nov	Th	<b>MIDTERM EXAM 2</b> (1 hour, 15 min)	<b>EXAM 2</b>
12	20-Nov	Tu	Chemical Senses (Gustation and Olfaction)	Ch. 15 & 16
	22-Nov	Th	<i>Thanksgiving Holiday -- No Class!</i>	-
13	27-Nov	Tu	Chemical Senses (Gustation and Olfaction) <b>QUIZ 10, Homework 3 Due</b>	Ch. 15 & 16
	29-Nov	Th	Cutaneous Senses (Touch and Pain) <b>QUIZ 11</b>	Ch. 14
14	4-Dec	Tu	Aesthetics	Suppl. Reading
	6-Dec	Th	Aesthetics, Course Review	Suppl. Reading
15	11-Dec	Tu	<b>CUMULATIVE FINAL EXAM</b> (3 hours)	<b>EXAM 3</b>

\* All assigned chapters are in your required text: Goldstein, E. B. (2009). *Sensation & Perception*, 8<sup>th</sup> ed. Wadsworth. (ISBN-13: 9780495601494). Copies are available at the Columbia Bookstore. The supplemental readings are journal articles (listed below) and they will be available as PDF files for you to download on CourseWorks.

## Required Supplementary Readings\*

\*These readings are available as PDF files for students to download on CourseWorks.

### **Week 3. Color**

Ramachandran, V. S., & Hubbard, E. M. (2003). Hearing Colors, Tasting Shapes. *Scientific American*, 288(5), 42-49.

### **Weeks 8-9. Perceptual Development**

DeCasper, A.J., & Spence, M.J. (1986). Prenatal maternal speech influences newborns' perception of speech sounds. *Infant Behavior and Development*, 9, 133-150.

Johnson, S. P., Amso, D., & Slemmer, J. A. (2003). Development of object concepts in infancy: Evidence for early learning in an eye tracking paradigm. *Proceedings of the National Academy of Sciences (USA)*, 100, 10568-10573.

Needham, A., Barrett, T., & Peterman, K. (2002). A pick-me-up for infants' exploratory skills: Early simulated experiences reaching for objects using 'sticky mittens' enhances young infants' object exploration skills. *Infant Behavior and Development*, 25, 279-295.

Shuwairi, S. M., Tran, A., DeLoache, J. S., & Johnson, S. P. (2010). Infants' response to pictures of impossible objects. *Infancy*, 15, 636-649.

### **Week 14. Aesthetics**

Biederman, I., & Vessel, E. A. (2006). Perceptual pleasure and the brain. *American Scientist*, 94(3), 247-253.

Vessel, E. A., Starr, G., & Rubin, N. (2012). The brain on art: Intense aesthetic experience activates the default mode network. *Frontiers in Human Neuroscience*, 6:66, 1-17.