Psy./NSc. 5-031W. Perception

Syllabus: Fall Semester 2011
(Last updated Sept. 2, 2011)

Tu, Th 9:45 – 11:00 AM
Elliott Hall N119

Teaching Staff

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Office</th>
<th>Phone</th>
<th>Email</th>
<th>Office Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gordon Legge</td>
<td>Professor</td>
<td>N257 Elliott</td>
<td>625-0846</td>
<td><a href="mailto:legge@umn.edu">legge@umn.edu</a></td>
<td>Tues. 11:15AM-12:30PM or by appointment</td>
</tr>
<tr>
<td>Tiana Bochsler</td>
<td>T.A.</td>
<td>N37A Elliott</td>
<td>625-4516</td>
<td><a href="mailto:bochs001@umn.edu">bochs001@umn.edu</a></td>
<td>By appointment</td>
</tr>
<tr>
<td>Elizabeth Borchert</td>
<td>T.A.</td>
<td>N640 Elliott</td>
<td>626-3258</td>
<td><a href="mailto:olsen064@umn.edu">olsen064@umn.edu</a></td>
<td>By appointment in JSR</td>
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Class Web Site
http://vision.psych.umn.edu/~gellab/5031
For access to some items, you will need a Username and Password. These will be distributed in class.

Other Useful Web Sites

Minnesota Laboratory for Low-Vision Research (Gordon Legge’s Lab):
http://vision.psych.umn.edu/~gellab
Gordon Legge’s Home Page: http://vision.psych.umn.edu/~legge
Low Vision Gateway: http://lowvision.org/
Eye Diseases (Karolinska Institute): http://www.mic.stacken.kth.se/Diseases/C11.html
WebVision – Organization of the Retina and Visual System: http://webvision.med.utah.edu/
ViperLib: Visual Perception Library (contains many illusions): http://viperlib.york.ac.uk/
Optical Illusions and Visual Phenomena (Michael Bach): http://www.michaelbach.de/ot/

Grade Distribution

<table>
<thead>
<tr>
<th>REQUIREMENT</th>
<th>DATE</th>
<th>% OF GRADE</th>
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</table>
4 Lab Reports | Due one week following the lab. | 12  
Adopt an Illusion | 5-min Class Presentation (3) and Short Paper (5), to be scheduled. | 8  
Wiki Project Title and Brief Plan | Oct. 11 | 4  
Midterm Exam | Oct. 27 | 24  
Wiki Writing Project – 1st Submission | Nov. 8 | 3  
Wiki Reviews | Nov. 22 | 3  
Wiki Project – Final Submission | Dec. 13, 9:45 AM. | 22  
Final Exam | Dec. 22, 8:00 – 10:00 AM. | 24  
Total | | 100

**Exams**

The exams will be open book, and administered by e-mail. Exams will have short answers, essays, and questions from the material in the lab reports. They will cover material from the *required readings* and the *lectures*. Content of the lectures will usually differ from the content of the readings and will be emphasized on the exams. It is important for students to attend classes to do well on the exams.

A sample midterm exam will be distributed by e-mail approximately one week before the midterm exam. It is imperative that all students establish reliable e-mail contact with the T.A. to ensure that they receive the e-mail exams. More details of the procedure will be discussed in class.

No **make-ups** or **incompletes** will be given except for documented medical reasons.

**Adopt an Illusion**

Each student will identify an illusion of his or her choice, find or prepare an example, give a 5-minute class demonstration, and write a short paper on the illusion (1-2 pages.) More details are given at the end of this syllabus.

**Wikipedia Writing Project**
You will be writing or editing Wikipedia articles rather than writing a traditional term paper. See the detailed description at the end of the syllabus.

**Unit Outlines and Lab Reports**

The outline for each unit of the course will be distributed as hard copy in class and posted on the class website. The outline will contain a list of the readings for the unit and a brief outline of material covered in lecture. Students need to attend class and take notes; the slides and outlines by themselves do not cover the material in sufficient depth.

Instructions for the lab reports will be distributed on the lab days. Your lab report is due one week following the lab session.

**Readings**

Recommended for Purchase.


Grad Readings and Optional Readings. Some of the readings, designated (G) in the following outline, are required readings for graduate students only. Undergrads are encouraged to read them as interesting optional material. Readings designated (O) are optional for everyone. Most required readings will be available on the web.
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<thead>
<tr>
<th>Date</th>
<th>Activity</th>
<th>Course Requirement</th>
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<tbody>
<tr>
<td>Sept. 6</td>
<td>Introduction</td>
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<tr>
<td>Sept. 8</td>
<td>Unit 1</td>
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<td>Sept. 13</td>
<td>Unit 2</td>
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<td>Sept. 15</td>
<td>Background on Wikipedia</td>
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<td>Sept. 20</td>
<td>Unit 2</td>
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<td>Sept. 22</td>
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<td>Sept. 27</td>
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<td>Sept. 29</td>
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<td>Oct. 4</td>
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<td>Oct. 6</td>
<td>Unit 3</td>
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<td>Oct. 11</td>
<td>Unit 3</td>
<td>Wikipedia Project Plan Due</td>
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<td>Oct. 13</td>
<td>Unit 4</td>
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<td>Oct. 18</td>
<td>Unit 4</td>
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<td>Oct. 20</td>
<td>Unit 4</td>
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<td>Oct. 25</td>
<td>Video – “Island of the Color Blind”</td>
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<td>Oct. 27</td>
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<td>Midterm Exam Units 1,2,3</td>
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<td>Nov. 1</td>
<td>Unit 5</td>
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<td>Nov. 3</td>
<td>Unit 5</td>
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<td>Nov. 8</td>
<td>Unit 5</td>
<td>1st Submission of Wikipedia Project</td>
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<td>Nov. 10</td>
<td>Discussion of scientific writing and peer review</td>
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<td>Nov. 15</td>
<td>Unit 5</td>
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<td>Nov. 17</td>
<td>Unit 6</td>
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<td>Nov. 22</td>
<td>Unit 6</td>
<td>Peer reviews due</td>
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<td>Nov. 29</td>
<td>Unit 6</td>
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<td>Dec. 1</td>
<td>Unit 6</td>
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<td>Dec. 6</td>
<td>Unit 7</td>
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<td>Dec. 8</td>
<td>Unit 7</td>
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<td>Dec. 13</td>
<td>Unit 7, Wrap-Up</td>
<td>Final Wikipedia Project Due</td>
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<td>Dec. 22</td>
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<td>Final Exam (8:00-10:00AM)</td>
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DETAILED COURSE OUTLINE AND ASSIGNED READINGS

Introduction and Overview (Sept. 6)

"A beautiful human eye! Any beautiful eye—a dog’s, a deer’s, a donkey’s, an owl’s even! To think of all that it can look, and all that it can see!" --George du Maurier: Trilby.

Unit 1. Light (Sept. 8)

“Let there be light” --Genesis

Readings:
- Palmer, Preface and Ch. 1 (pp. 3-15)
- (O) DiLaura, D. (2008) A brief history of lighting. Optics and Photonics News (OPN), September. Provides a nice historical overview of the technologies people have used for lighting since antiquity.

Unit 2. Optics and Anatomy of the Eye: Impact on Perception (Sept. 13, 20, 22, 27)

“To suppose that the eye, with all its inimitable contrivances for adjusting to focus at different distances, for admitting different amounts of light, and for the correction of spherical and chromatic aberration, could have been formed by natural selection seems, I confess, absurd in the highest degree.” –Charles Darwin

Readings:
- Legge, Physiological Optics & Perception, Class Notes.
- Legge, Low-Vision Perception, Class Notes (section on Disorders of the Eye's Optics)
- Palmer, Ch. 1 (pp. 15-28), Ch. 2 (pp. 45-59, skim pp. 59-70)

Wikipedia: An Overview. Guest Presenter: Kate Peterson, University Librarian (Sept. 15).
**Unit 3. The Retinal Machine (Sept. 29, Oct. 4, 6, 11).**

“Her presence in the left corner of his vision feels like a dark, damp cloth approaching that side of his face.” –John Updike, *Rabbit, Run*

Readings:
- Legge, *Low-Vision Perception*, Class Notes (section on Aged-Related Macular Degeneration)
- The Retina. In: *The Brain from Top to Bottom*: [http://thebrain.mcgill.ca/flash/i_i_02/i_02_cl/i_02_cl_vis/i_02_cl_vis.html](http://thebrain.mcgill.ca/flash/i_i_02/i_02_cl/i_02_cl_vis/i_02_cl_vis.html)
- Palmer, Ch. 1 (pp. 28-44), Ch. 4 (Retina and LGN, pp. 145-151). O: Ch. 2 (pp. 70-93)


Students should submit a working title and a paragraph describing their Wikipedia project. Submit to Tiana Bochsler by email at bochs001@umn.edu. You should discuss your writing project with Bess, Tiana or Gordon prior to submission of your title and plan.

**Unit 4. Color Vision (Oct. 13, 18, 20).**

“How different is blue from every kind of color. For blue is like the sea, the sea is like the firmament and the firmament is the throne of glory!” –Babylonian Talmud

Readings:
- Palmer, Ch. 3 (treat as O the subsections on Retinex Theory, p. 128.; Illumination vs Reflectance Edges Revisited, p. 134; and A Fuzzy Logical Model, p. 140)
- (O) Palmer, Appendix C: Color Technology (pp. 689-700)


Midterm Exam – Oct. 27. Covers lectures & readings from Units 1-3.
A sample midterm exam will be distributed by e-mail approximately one week before the actual midterm exam. Every student should confirm receipt of this sample exam, or discuss with the TA why it wasn’t received. We want to be sure that all students receive the actual midterm safely.

Unit 5. Visual Coding of Patterns (Nov. 1, 3, 8, 15)

“My object in living is to unite my avocation with my vocation as my two eyes make one in sight.” –Robert Frost

Readings:
- Palmer, Ch. 4, but with the following subsections designated (G): Edge Operators and Convolution, p. 173; Marr-Hildreth, p. 175; Neural Implementation, p. 179.
- (O) Palmer: Scale Integration, p. 180; 4.3.3: Alternative Computational Theories, pp. 182-186; Exploiting the Structure of Natural Images, pp. 188-192.
- Legge, Low-Vision Perception, Class Notes (Three Dimensions of Vision Loss, Some Visual Abnormalities)

First Submission of Wikipedia Project (Nov. 8)

All students are required to make available their Wikipedia project in complete form. The articles will be reviewed. Students will be asked to revise their articles in response to the reviews prior to the final submission.

Discussion of Scientific Writing and Peer Review (Nov. 10).

Unit 6. Depth and Surfaces (Nov. 17, 22, 29, Dec. 1)

“She had a cousin in the life guards, with such long legs that he looked like the afternoon shadow of somebody else.” –Charles Dickens, David Copperfield

Readings:
- Palmer, Ch. 5 (skim 5.5 but know what these cues are, O: 5.3.3: Computational Theories)
- Palmer, Ch. 10 (skip 10.1.5: Computational Theories, 10.4.3: Intuitive Physics)
- Legge, Low-Vision Perception, (Perceptual Disorders).
Unit 7. Recognizing Objects, Letters and Faces (Dec. 6, 8, 13)

“HAMLET: Do you see yonder cloud that's almost in shape of a camel?
POLONIUS: By the mass, and 'tis like a camel, indeed.
HAMLET: Methinks it is like a weasel.
POLONIUS: It is backed like a weasel.
HAMLET: Or like a whale?
POLONIUS: Very like a whale.” –Shakespeare, Hamlet

Readings:
- Palmer Ch. 7 (Treat as O Secs. 7.3: Orientation, and 7.4: Position).
- Palmer Ch. 8 (Treat as O Sec. 8.2.3: Features and Dimensions (pp. 385-394) and Figural Goodness and Pragnanz)
- Palmer Secs. 9.2.1: Categorical Hierarchies (pp. 416-420), 9.3.1 and 9.3.2 (pp. 433-444): describes Biederman’s model
- (O) Sacks, O. To see and not see. The New Yorker, 10 May, 1993, 59-73. This article tells the compelling story of Virgil, a man whose vision was restored late in life.

Final Version of Wikipedia Article Due Dec. 13, 9:45AM

Final Exam – Thursday, Dec. 22, 8:00-10:00AM. Covers lectures and readings in Units 4-7.
WRITING-INTENSIVE REQUIREMENTS

Introduction

Good writing is a key component of success in science and most other disciplines. Sometimes people regard scientific writing as a kind of afterthought, something that’s done after the “real science” leaves the lab. But most scientists agree that the process of articulating their ideas in clear, written form is one of the most challenging and creative parts of research or teaching. You really don’t know what you know until you have to write your ideas down so that someone else can understand them.

Psy. 5-031W is designated Writing Intensive. In addition to our study of the principles of visual perception, our goals for the course will include exploration and implementation of principles of good scientific writing.

Some class time will be devoted to discussion of key elements of scientific papers, and the nuts and bolts of the peer-review system of scientific publishing.

There will be two scientific writing assignments, a short one on your choice of visual illusion, and a Wikipedia writing project.

Adopt an Illusion

Each student will be asked to identify a visual illusion (or visual “effect”) Some touch illusions parallel visual illusions. You can adopt a touch illusion, but select one that has a parallel in vision and describe the parallel.

To avoid redundancy, we want each student to adopt a different illusion. As soon as you have decided on an illusion, report it to Bess Borchert at olsen064@umn.edu and your illusion will be listed in a table on the class website. Students who select first will have the widest range available.

Students will be given five minutes to demonstrate their illusion in class, either by showing an example they have prepared, or by showing an example from a website. We will schedule students to do these presentations throughout the semester at the beginning of class.

Students will be required to submit a short paper in electronic form on their illusion by one week following presentation of their class demo. The paper should be one or two pages, and should contain the following elements:

- Name of the illusion or “effect”.
- Example of the illusion (url for a web site is ok, but include a full credit)
- Citation or discoverer of the illusion.
- Paragraph describing the illusion.
- Paragraph describing the significance for visual perception.
• Where appropriate, include citations in APA format.

The Adopt an Illusion assignment will be graded as follows: 3 points for a concise and interesting class demo, and 5 points for the written paper. Students will lose one point per day for a late paper.

Wikipedia Writing Project

The main part of the writing-intensive program will be a 2,000-word Wikipedia entry (in replacement of the usual term paper). Students can write an original entry on Wikipedia or provide a substantial addition to (or edit of) an existing entry. Students will 1) identify a topic in consultation with the teaching staff; 2) make a first submission of a complete term paper; 3) receive reviews of their paper and participate in reviewing other students’ papers; and 4) revise their papers in response to the reviews for final submission. The goal is to show how the process of review and revision can strengthen scientific writing.

Writing Project Topics

The paper should describe the principles of vision science relevant to some vision disorder or condition, or the operation of vision in some challenging environmental domain. Other topics related to perception may be acceptable, but must be approved by a member of the teaching staff. Examples of some possible topic areas are:

• Dyslexia.
• Visual neglect.
• Hemianopia.
• Monocular vision (when a person has good vision in only one eye).
• Prosopagnosia (face blindness).
• Acquired Achromatopsia or Rod Monochromatism (life without color vision).
• Inherited color deficits.
• Low-vision problems (The focus could be on tasks such as reading or driving, or the effects of specific diseases such as macular degeneration or glaucoma.)
• Aging and vision.
• Vision underwater or in flight.
Most of these topics will be discussed (at least briefly) in class or in the *Low Vision* Class Notes. However, please plan ahead because you will probably have to get started on your Wikipedia project before we reach many of the topics in lecture.

These topics are broad with surprising amounts of research. You will have to identify a key question or theme to narrow the scope of your paper. Look at the existing perception-related Wikipedia entries and either find a topic that has not been covered or one that has been covered inadequately or inaccurately (e.g., biased or incorrect information). Typically, it is challenging for students to identify a sufficiently clear and well-focused theme. We strongly urge you to consult the teaching staff for help and guidance. The schedule in the syllabus indicates the date on which you are required to submit a working title and paragraph describing your topic.

Your paper should identify the question or issue being addressed, the principle(s) from vision being applied, and the strengths and weaknesses of the solution.

**Submission, Review, and Revision**

On the first-submission date (see syllabus), you should turn in a complete version of your Wikipedia entry. It is not necessary to actually post your entry on Wikipedia at this time. If you are submitting a revised entry, include a copy of the entry before your addition and one of the entry after your addition. This version should obey all the rules given below, and should represent your best effort to complete a high-quality paper. You should **not** submit a partial draft, outline, or work in progress. In short, the first submission should be like a final submission for most other courses. Remember that the stronger your first submission, the less work you’ll have to do in revising the paper.

Each entry/revision will be reviewed by one member of the teaching staff and one or more student peers in the class. In addition to having your own paper reviewed, you will be asked to review the paper of at least one other student. We will distribute guidelines and a “Reviewer’s Form” to help you structure your review. The idea of peer review is to provide the author with objective, helpful comments to improve the content or structure of the paper. The teaching staff will read the reviews and award points based on the extent to which these goals are achieved. The peer reviews are due on the date listed in the syllabus.

Your final entry should be posted on Wikipedia for the teaching staff to view by Dec. 13th, at 9:45AM. In addition, an electronic copy must be sent to Tiana Bochsler (bochs001@umn.edu). Acceptable formats include Microsoft Word, RTF, pdf, or html. Use a standard extension on the filename to identify the format, e.g., .doc, .rtf, .pdf or .html. We hope to rely on e-mail for distributing electronic versions for the peer reviewing.

Students should take the reviews into account in revising their Wikipedia entries. A cover note should accompany the electronic copy of your entry explaining how you addressed the reviewers’ comments. You are not obliged to accept all of the reviewer’s suggestions. If you disagree with the reviewer,
explain why you have decided not to implement the suggested change. Think of the reviewer as a sample reader. He/she may have misunderstood one of your points, but the misunderstanding may be a clue that you need to explain your point more clearly.

This system of first submission, review, and final submission is commonly used by peer-reviewed scientific journals.

Rules for the Wikipedia Writing Project

Maximum Length. The maximum length of the entry/revision is 2,000 words, not counting title page, references, and figure captions. If you are revising an existing entry, at least 1,000 words should be your own addition, with another ~500-1,000 words of edited text. Papers exceeding 2,000 words may receive grading penalties. Specify the word count on your title page.

Format. Entries must follow correct Wikipedia format.

References. You are expected to consult the research literature beyond the assigned readings in preparing your entry. You should use citations in your paper to justify your claims. Wikipedia format requires numbered footnotes. Citations within the body text are correspondingly numbered and linked to the appropriate footnotes. If you consult websites, be sure to cite the source of the information, the URL, and download date. Remember that websites vary widely in the reliability of information they convey. Be cautious in relying on websites for your literature review.

Late Papers. One point will be deducted for each day late, including weekends.

Writing Support on Campus

Student Writing Support (SWS) provides free writing instruction for all University of Minnesota students—graduate and undergraduate—at all stages of the writing process. In face-to-face and online collaborative consultations, SWS consultants help students develop productive writing habits and revision strategies.

SWS consultants are teachers of writing: graduate and undergraduate teaching assistants and professional staff. Some consultants specialize in working with non-native speakers, and others have experience with writing in specific disciplines.

Consulting is available by appointment through SWS.online and in 15 Nicholson Hall, and on a walk-in basis in 9 Appleby Hall. For more information, go to writing.umn.edu/sws or call 612.625.1893.

In addition, SWS offers a number of web-based resources on topics such as documenting sources, planning and completing a writing project, and addressing punctuation and grammar questions. See http://writing.umn.edu/sws/quick_help.htm