

SIMG-215: Imaging Science Fundamentals

1051-215-02, 20061

Fall 2006 – Revision 1 (9/4/2005)

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TAs: TBA

Lab Materials (*required*): *OSA Optics Discovery Kit* (available soon at SAU bookstore or from Edmund Scientific, <http://www.edmundoptics.com/US/>)

Text (supplemental): *Imaging in the Physical Sciences*, Helguera and Kastner, eds.

Other recommended reading: *Seeing the Light*, David Falk, Dieter Brill, and David Stork

<u>Date</u>	<u>Topic</u>	<u>Lab</u>	<u>Specific Tasks</u>
9/6/06	What Is Imaging Science?	<i>No lab 1st week</i>	
9/7	History		
9/11-/13	Pinhole Optics	Shadowgrams	
9/14-18	Geometrical Optics		Paper #1
9/19	Geo. Optics (cont.)	Understanding Lenses	Quiz #1
9/21-25	The Camera		
9/26-28	Physical Optics...	Diffraction & Polarization	
10/2	Chemical Imaging		Paper #2
10/3-5	Digital	Digital Pinhole Camera	Quiz #2
10/9	Catch up and Review...	No Lab	
10/10	Midterm Exam		
10/12	Human Vision: the Eye		
10/16	Human Vision: Perception	Human Visual System	Paper #3
10/18,19	More on Digital Imaging		
10/23	Imaging Display Systems	Display Systems	
10/24	Applications		Quiz #3
10/26	Applications		
10/30	Applications		FIRST DRAFT OF TERM PAPER
10/31	Applications		
11/2	Applications		Paper #4
11/6	Applications		
11/7	Applications		Quiz #4
11/9	Catch up / REVIEW for final		TERM PAPER DUE

- **Labs:** Laboratory sessions will expand on topics discussed in that week's class. During and after the labs, students will compile reports. The basic structure of a lab report is (1) lab objective, (2) observations, (3) results, (4) conclusions, (5) critique (optional). Most reports should be no more than 2 pages in length. **Reports are to be turned in one week after the laboratory session was held.** Problems completing reports should be discussed with the instructor or a TA at least 2 days before the due date. Some labs will require teamwork, some will not; but lab *reports* should be done on your own. English usage, spelling, etc. counts 25% in the grade of written submissions, so be sure to proofread your papers; do not depend on "spellchecker."
- **Quizzes:** Four quizzes will be given during the quarter. They will be announced at the lecture immediately preceding (i.e. announcement will be made Tues if quiz will be given on Thurs). Most questions will be short answer or multiple choice format (same is true of the midterm

and final exams). *Certain quiz questions, or variations on quiz questions, may also turn up on midterm and final exams.*

- **Papers:** Four short (< 1 page) papers and one long term paper are required. The long paper should be 8 pages \pm 1 page of double-spaced text, not including figures, which corresponds to approximately 2000 words. The subjects of the papers must be different, but may be any topics in imaging of interest to you, including systems, applications, etc. You may include images in your submissions that will make the papers longer, but all images and other inclusions must be referenced, e.g., you must include web addresses for any material taken from the internet. Again, English usage, spelling, etc. counts 25% in the grade of written submissions, so be sure to proofread your papers; do not depend on “spellcheck.”

You should take care about grammar and wording style. I particularly look to see that the antecedents of pronouns are obvious, that the verb case matches the noun, and that apostrophes are correctly placed. For the last, you should be sure that you correctly use “it’s” and “its.” One useful web resource for writing is:

<http://bcs.bedfordstmartins.com/smhandbook/default.asp>

which includes descriptions of the “20 most common errors” and also has examples and exercises. Remember, it is YOUR responsibility to edit your papers to ensure that errors are removed!

You should also take care to use authoritative sources in your references, by which I mean sources written by persons who are recognized as “authorities” in the field. For example, *Wikipedia* is NOT an authoritative source – it may be useful as a place to begin searching for such sources, but you should not reference any *Wikipedia* articles in a serious paper.

A first draft of the long term paper is due AT THE BEGINNING OF CLASS on Monday, October 30. The final paper is due AT THE BEGINNING OF CLASS on Thursday, November 9.

- **Imaging Science News of the Week:** You can gain up to 6% extra credit by reporting on items of interest appearing as a news story (newspaper, magazine, or WWW). The items can relate to any aspect of imaging science. Each item must be turned in as a short (1-2 paragraph) written summary and should be reported orally as a 2-minute summary for the class. The original article should accompany your written summary. WWW news sites are acceptable sources; WWW commercial sites are not. Each contributed item constitutes 1-2% of final grade, depending on quality of the summary and presentation; items can be presented/submitted through week 10 of class. Hastily composed summaries and/or items turned in without in-class presentation will tend to get less credit.