

Fundamentals of Astronomical Imaging (1051-217)  
 Spring 2006  
 Prof. Joel Kastner

Class hours: MW 2-3:15pm in 76-1155; 2 lab times available (Thurs 5-7pm, Fri 10am-noon)

Office hours: TBA (or by appointment) in 17-3190

Guest Instructor: Dr. Catherine Buchanan

TA: Linpeng Cheng

email: [jhk@cis.rit.edu](mailto:jhk@cis.rit.edu); phone: 475-7179

**Course Description:** This class will familiarize students with the goals and techniques of astronomical imaging. The nature of astronomical sources will be outlined, in terms of fundamental physical characteristics (temperatures, states of matter, compositions) and their size and distance scales. We will explore how this information translates into requirements on astronomical imaging systems. These requirements are then investigated in the context of the astronomical imaging chain. Imaging chains in the optical, infrared, X-ray, and/or radio wavelength regimes will be studied in detail as time permits. Concepts developed in class will be explored via laboratory assignments involving optical images from on-line resources and/or collected at the RIT Observatory, radio images collected at MIT's Haystack Observatory, and Chandra and Yohkoh X-ray images pulled from on-line astronomical imaging archives.

**SYLLABUS (Rev. 3, 4/11/06)**

<u>Class</u>	<u>Date</u>	<u>Tentative Topic</u>	<u>Labs, quizzes, &amp; exams</u>
1	3/13	Overview: looking at the sky; astronomical distance scales	
2	3/15	A brief history of astronomical imaging	
3	3/20	Telescopes, angular resolution, & magnification	
4	3/22	Measuring colors and luminosities of stars	start lab #1
5	3/27	Star colors & temperatures (cont.)	quiz 1
6	3/29	The astronomical imaging chain	
7	4/3	Optical astronomy imaging chain: telescopes & detectors	lab #1 due; start lab #2
8	4/5	Telescopes & detectors (cont.)	
9	4/10	X-ray astronomy imaging chain	
10	4/12	X-ray astronomy (cont.)	quiz 2 due ( <i>take-home</i> )
11	4/17	Midterm	lab #2 due
12	4/19	Radio astronomy imaging chain	start lab #3
13	4/24	Radio astronomy (cont.)	
14	4/26	The elements, states of matter, & multiwavelength imaging	
15	5/1	CCDs & image processing	lab #3 due; final project assigned
16	5/3	CCDs & image processing (cont.)	quiz 3
17	5/8	NASA's Space Telescopes: Hubble, Chandra, Spitzer	
18	5/10	TBD	
19	5/15	TBD	quiz 4
20	5/17	Final exam	final project due; final exam

- **Grading:** 20% midterm; 20% final exam; 30% laboratories; 10% quizzes, 20% final project or report. Class participation also counts, particularly when evaluating students with borderline grades.
- **Exams** (midterm and final) will consist of 20-25 short-answer questions. Quizzes are intended mainly to provide preparation for exams, and will consist of about 3-4 questions each. Expect 2-3 pop (unannounced) quizzes. Your lowest overall quiz grade will be dropped, when computing course grade.