Astronomy 350/680: Astronomical Techniques

Lecture: Tu, Th 12:30-13:45, PA 256

Office Hours: Tu, Th 10:30-11:30, P 134

Text: Observational Astronomy, 2nd Ed., Birney (Cambridge Univ. Press)

Instructor:
• Dr. Allen Shafter, P 134, x46170, ashafter@mail.sdsu.edu

Guest Lecturers (tentative):
• Mr. Charles (Chuck) Horst, PA128, x44564
• Dr. Bob Leach, Astronomical Research Cameras, Inc.

Course Description:

The purpose of this course is to provide students with a brief introduction to astronomical techniques. We will begin with a cursory discussion of the basic mathematical, physical, and astronomical tools required to conduct research in Astronomy. The course will then expand to cover basic principles of astronomical photometry, and direct imaging. In particular, the acquisition and reduction of astronomical data will be emphasized.

There will be a lecture as well as a laboratory component to the course. The laboratory component will include data reduction using IRAF, and various photometry reduction packages available in the department. In addition, one or more trips to the Mount Laguna Observatory to participate data acquisition will be undertaken. If the weather cooperates and a suitable target becomes available, we may study a cataclysmic variable star this Fall, possibly leading to a publication.

Astronomy 350 and Astronomy 680 are required core courses for undergraduate astronomy majors and for entering graduate students, respectively. This year the course will be team-taught. Prof. Shafter will organize the class and present the introductory and background material, and will present the discussion on direct imaging. It is planned that Dr Bob Leach will give a lecture on CCD detectors.

It is our intention that this course provide the minimal experience and background necessary to enable students to successfully complete the core curriculum and to initiate their own research programs.

Grading will be based primarily on a midterm (25%), and a comprehensive final exam (40%). The remaining 35% of your grade will be based on class assignments that are to be decided by the various instructors. The grades for Astronomy 350 and Astronomy 680 will be assigned independently.

(over)
Key Student Learning Outcomes:

By the end of the semester students should be able to:

- Write a FORTRAN program to compute the Signal-to-Noise Ratio of a stellar source detected in a CCD image.
- Plot and print data using XMGrace on a computer with the Linux operating system.
- Perform pipeline processing (Bias, Trim and Flat-fielding) of astronomical imaging data using the Image Reduction and Analysis Facility (IRAF) software package.
- Perform differential photometry of astronomical sources and produce a differential light curve of a variable astronomical source.
- Propagate errors through the analysis of astronomical data such as measured fluxes and magnitudes.

Statement on Student Disability:

If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact Student Disability Services at (619) 594-6473. To avoid any delay in the receipt of your accommodations, you should contact Student Disability Services as soon as possible. Please note that accommodations are not retroactive, and that accommodations based upon disability cannot be provided until you have presented your instructor with an accommodation letter from Student Disability Services. Your cooperation is appreciated.

Emergency Preparedness:

http://bfa.sdsu.edu/emergency/