Course Description: This is a laboratory course designed primarily for physics majors who are concentrating in astronomy and astrophysics. It is also suited to physics and non-physics majors who are interested in technical aspects of astronomical observing. Students will learn to plan, carry out, and analyze astronomical observations ranging from those made with the naked eye to those taken with orbiting observatories. Weather permitting, students will have opportunities for significant hands-on experience with SFSU Observatory telescopes and CCD cameras. The skills and concepts developed in this course are critical components of an astronomer's toolbox. The goal of the course is not just to become familiar with these tools, but to master them so that they become part of your own personal astronomical toolkit.

Prerequisites: Astronomy 300 or 115 and Physics 220 or 111 with grades of C- or better. Students who have not taken the standard prerequisites must show evidence of equivalent experiences and get instructor approval.

Meeting time and place:

Astronomy 301 (schedule # 1339,1340)
Tues 5:30-9:20 pm w/15-min break (note difference from published time)
411 Thornton Hall (initial meeting in TH 329 at 5:10 pm)

Instructor:

Dr. Adrienne Cool, Department of Physics and Astronomy
Office: 416 Thornton Hall
Email: cool@sfsu.edu
Phone: (415) 338-6450
Web: http://www.physics.sfsu.edu/~cool

Office Hours:

Mondays 2:10 – 3:00 pm or by appointment

Required materials (bring to every class):

* text: "To Measure the Sky" by Frederick C. Chromey,
* planisphere ("star wheel"; $6 from PAC)
* laboratory notebook; pencil and eraser for taking notes
* 3-ring binder for keeping course handouts organized and accessible
* warm clothes (it gets cold on the roof!)

Grading: Grades will be based on a combination of homework assignments (approximately 10), detailed lab reports (approximately 4), in-class lab exercises, quizzes, and class participation. Lab reports are an important part of the grade; each will be worth approximately 10% of the final grade. Homeworks will each be worth approximately 5% of the grade. There is no final exam in this course.

Students with disabilities who need reasonable accommodations are encouraged to contact the instructor. The Disability Programs and Resource Center (DPRC) is available to facilitate the reasonable accommodations process. The DPRC is located in the Student Service Building and can be reached by telephone (voice/TTY 415-338-2472) or by email (dprc@sfsu.edu).” (http://www.sfsu.edu/~dprc/facultyfaq.html#1)

*** turn over for course topics ***
Course Topics

Topics that may be covered include most, but not all, of the following. The emphasis placed on various topics in different years will depend on weather conditions and on the timing of various astronomical events of interest.

* Units of distance in astronomy (AU, ly, pc, plus metric system review)

* The celestial sphere: celestial poles, celestial equator, and ecliptic

* Coordinate systems on the sky: Right Ascension and Declination; altitude and azimuth

* Angular size vs. physical size, units of angular measure

* Apparent motions of the stars (diurnal motion), and role of latitude on Earth

* Apparent motion of the Sun (annual motion); equinoxes and solstices; precession

* Apparent motion of the planets, effects on planet visibility

* The magnitude system for measuring brightness; apparent vs. absolute magnitude

* Astronomical systems of time: solar time, sidereal time, universal time and more

* Using binoculars and telescopes: light-gathering power, resolving power, magnification

* Geometrical optics and telescope design: refractors and reflectors

* Telescope mounts: equatorial vs. altitude-azimuth design

* Inherent limitations of a telescope: diffraction and the Airy disk

* Limitations imposed by Earth's atmosphere: "seeing", atmospheric "windows"

* Astronomical detectors: the human eye and CCD cameras

* Quantitative measurements in astronomy: photometry using CCDs

* Photometry of star clusters: creating an interpreting a color-magnitude diagram

* Observing at other wavelengths: X-ray imaging using Chandra Observatory

* Astronomical resources on the world wide web

*** turn over for course information ***