

Course Syllabus
29:137 Astronomical Laboratory
Fall 2011

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Astronomical Laboratory is a course intended to acquaint students with the basic instruments of optical, radio, and x-ray astronomy. The emphasis is on the devices themselves, computer control of instruments, and acquisition of data.

General Course Information

1. Class is from 9:30 - 10:45 AM, Tuesday and Thursday, in room 655 Van Allen Hall. Additional time will be required outside of these class periods, including nighttime observational sessions (this is an astronomy course).
2. There is a internet web page for this course. Look under the category “Teaching” on my web page. The line for this course is at the top. Course material including text readings and laboratory exercise descriptions will be made available there.
3. There is no textbook for this class. Copies of articles, technical manuals, and links to explanatory material will be made available on the course web page. Click on “Text Books” on the course web page. I recommend (but do not require) the textbook “Astrophysical Techniques”, by C.R. Kitchin, published by the CRC press.
4. A schedule of laboratory exercises is given on the course web page in the area “Laboratory Write-Ups and Descriptions”. This schedule will evolve with us as the semester progresses.
5. This course assumes a certain level of understanding of astronomy, physics, and mathematics. I expect that students have completed mathematics courses on linear algebra, vector calculus, and differential equations (22M:27 and 22M:28 at the University of Iowa), and a complete set of introductory, calculus-based physics classes (29:27,28,29, and 30 at the University of Iowa). It is also expected that students have completed a year-long, introductory course in astronomy for science students (29:61 and 62 at the University of Iowa).

6. Office hours for by the instructor are Monday, Tuesday, and Thursday, 2:30 - 3:30 PM, or by appointment if attendance at these times is not possible.
7. **Course Organization:** Many of the laboratory exercises work with a unique instrument; we do not have enough pieces of equipment for each student to work with one, or even each group of two or three students. In general, it will be necessary for students to take turns in using these instruments. To facilitate this, each student will be assigned to a “working team” for the semester. These teams are named after some of my favorite stars and other astronomical objects, and are as follows.

- 18 Scorpii
- Beta CVn
- HIP 56948
- Zeta Reticuli
- 3C228
- M67
- DA406
- UX Ari

Two students will be assigned to each group. Each group will meet on Tuesday *or* Thursday for the main class meeting, as well as other times to finish the projects.

8. **Laboratory Reports:** A report will be required for each laboratory exercise. Some of these will be worksheets furnished with the laboratory document, and will be required from each student. For other projects, a more extensive report will be required. One such report will be due from each working team. For each such report, the instructor will appoint an “Alpha Ape” from each working team to take principal responsibility for completing the report, although both working team members will share the grade assigned. The “Alpha Ape” can further solicit help and participation from his or her team partner by such traditional primate tactics as “glare threats”.
9. **Laboratory Notebooks:** An important part of good scientific practice is the maintenance of a laboratory notebook in which measurements, procedures, observations, and calculations are written down. The notebook is the fundamental source for information about an experiment or scientific project. Each student will be required to maintain a notebook, and they will routinely be

examined by the course instructor. It is up to the student to choose the format of this notebook, whether a traditional bound book in which information is written by pen, or in the form of a computer file. In the latter case, it will be required that all entries be in a single file, or in a directory with clearly identifiable files representing the entries on different days.

10. The work in this class will include calculations, fitting model curves to data, and plotting of data. This will require use of *Mathematica*, *Mathcad*, *Graphical Analysis*, or a similar package. Students need to become proficient in one of these, if not so already. These packages are available on student machines in the laboratory as well as in student clusters throughout the department. If you wish to have one of them installed on your own machine, you will have to purchase it (with student discount) from Iowa Book and Supply.
11. Grades will be assigned on the basis of a point total from the lab worksheets and reports and the laboratory notebook. Students must also attend all scheduled class periods and arrive promptly at the beginning of class. The letter grade will be determined in part on an absolute scale (to be determined) and in part by a student's standing vis-a-vis his or her peers. Students will be fully informed of the grading scale as the semester progresses.
12. I would like to hear from anyone who has a disability which may require some modification of seating, testing, or other class requirements so that appropriate arrangements may be made. Please see me after class or during office hours.