ASTR 300L: OBSERVATIONAL ASTRONOMY LAB

COURSE SYLLABUS

Instructor: Geoff Mathews
Email: mathewsg@hawaii.edu
Office: Watanabe hall, room 402
Hours: Mon. 12:00 PM – 1:00 PM;
Wed. 1:00 PM – 2:00 PM

Assistant: Elizabeth Toller
Email: toller@ifa.hawaii.edu
Office: Watanabe hall, room 403
Hours: TBD

In addition, the general Astronomy TA pool staffs Watanabe room 403. Any of the graduate student TAs will be able to provide assistance with this course. A link to their hours will be posted on the Laulima site for this course (laulima.hawaii.edu).

Class Details

Semester: Fall, 2015
Meeting Time: T, 13:30 - 16:30
CRN: 79356

Room: Watanabe 415
Dates: 24 August – 10 December, 2015
Last submission: 2 p.m., 17 December

Materials

- computer access (useful in class, necessary outside of class)
  - Python
  - LaTeX
  - DS9
- textbook for ASTR 300 (To Measure the Sky, Chromey)
- class website at `http://laulima.hawaii.edu`

Course Description

Overview. ASTR 300L is a practical introduction to the methods of observational astronomy. In this course, you will perform computer-based and hands-on exercises exploring key concepts. You will learn how to extract scientific information from astronomical data, using existing observations from telescopes on Mauna Kea, Haleakela, and other professional facilities. In conjunction with ASTR 300 (Observational Astronomy), this course will prepare you for hands-on work with professional astronomical instruments. This course is designed to be complementary to and taken concurrently with ASTR 300.

Learning Goals

The primary goal of this course is to teach you the "bread and butter" skills of an astronomer:

- be able to manipulate and measure light,
- carry out the data reduction and analysis of photometry, astrometry, and spectroscopy,
- the basics of programming as a tool for both processing data and assembling figures,
- how to communicate your processes and findings to others, and
- how to productively collaborate and critique

Important dates

- August 24 - first day of instruction
- August 31 - last day to drop course without a "W"
- September 1 - last day to add a course or change a grading option
- September 7 - holiday, Labor Day
- October 24 - last day to drop a course with a "W"
- November 11 - holiday, Veterans' Day
- November 25 - last day for exams before finals
- November 26, 27 - holiday, Thanksgiving
- December 10 - last day of instruction
- December 17, 2:00 p.m. - final submission deadline

Experiments

The course will be split into 4 primary sections. For each section, you will produce a written document in the style of the techniques section and / or a technical appendix of a scientific paper.

Programming and image data reduction: 6 weeks
Geometric optics: 3 weeks
Spectroscopy: 3 weeks
Design your own: 3 weeks

Assignments

The primary grading mechanism in this course is four written reports that follow each of the main blocks of the course. I will supply a rubric for each assignment.

There will be some smaller assignments given at points in the course; these are intended to be preparation for in-lab discussions and critiques. Some of these will represent progress checks on the written reports, e.g., bring a draft of your paper to lab for partner feedback.

Evaluation

Traditional ABCDF scale (90%, 80%, 70%, 60%, less than 60%)

There are 5 primary components of your grade:

in-lab discussions and critiques 20%, and
4 reports, 20% each.

Writeups are due within one week of the completion of each lab. Writeups will be graded on a 100 point scale, using a rubric according to the type of submission (attached). There will be a penalty of 20% for each week that a report or presentation is late.

Writeups may be revised. Revisions must be submitted within two weeks of receiving the graded assignment back from the instructor. In emulation of the review process for publications, the revised document must show changes in bold text, and include a document describing the changes made in response to feedback. The last writeup, due on the final exam date, is not eligible for revision.

Collaboration

Teamwork is becoming increasingly common in Astronomy as the concepts being explored require wider and deeper datasets, reflecting a wide range of expertise. Furthermore, work with a team can progress much more quickly, benefitting from sharing ideas and the process of explaining concepts to another. Therefore, you are welcome to work with a partner.

However, you should ensure that you do not balkanize the processes. In data collection, ensure that you each make some of the measurements. In data processing, it is best if you carry out all steps independently and compare approaches and results. Furthermore, your written submissions and presentations must reflect your understanding. While you and your partner should read and critique each others' work prior to submission, you should not copy material from each other or from any other source. Work with plagiarized content will receive zero credit, and may be referred to the Dean of Students.

Lab conduct & safety

While the physics and optics equipment is generally safe, they are not completely harmless. Individual labs will include relevant safety notices. When in doubt, contact the instructor or TA.

If any equipment breaks or fails, contact the instructor or TA so they can see to its repair.

Food is not allowed in the labs. Drinks are allowed but should be kept far from any experimental apparatus.