

Astronomy 4200: Astronomical Laboratory

Winter 2017

F 1-10:30-2:00, Room 134, Physics Building, evening roof observing will be scheduled if and when the weather permits.

This is a 2 credit course. This is a laboratory course and students will learn to do some of the techniques of modern astrophysics. The focus is on optical astrometry. Students will learn to measure the Quantum Efficiency of a CCD based astronomical digital camera. They will measure the throughput as a function of wavelength of a set of standard astronomical filters. They will measure the effects of extinction by dust and gas. They will calibrate the response of a spectrometer. Weather permitting we will do solar observations with an H-alpha filter, observations of bright celestial objects, and observe the spectra of a bright star. Students are encouraged to work in groups of two or three.

Professor: David Cinabro (139 Physics, 313-577-2918, cinabro@physics.wayne.edu, <http://motor1.physics.wayne.edu/cinabro.html>)

Office Hours: W 10:30-11:30 or by appointment

Text: Provided hand outs.

Plan and Grading

Each lab is due before the next lab is started. The last write up is due by 5:00 PM on the day that the final for the class is scheduled. Write ups are expected to be like research papers that appear in refereed journals. There should be an introduction describing what this lab is about in general terms focusing on what is to be measured, a section describing the experimental set up, a section giving the raw data, a section giving the analysis of the raw data, and a conclusion. Labs will be graded not only on the data, but also on the clarity and correctness of the writing (70%/how many labs we do).

For one of the write-ups in the latter half of the semester students will also have to prepare a brief, 10 minutes or so, presentation of the results. This will be similar to a talk at a research conference (15%).

For another of the write-ups in the latter half of the semester students will also have to prepare a poster style presentation of the results. This will be similar to posters presented at research conferences (15%).

The expectation is that each lab will take more than one week. The first week the lab will be introduced, explained, demonstrated by the instructor, and the students will begin to take their own data. The second week is an opportunity to take additional data and discuss and ask questions about the analysis of the data.

Observations will be scheduled when the weather, the instructor, and student schedules permit. These are only done in one week. In past years we have done the the four laboratory experiments, and one or two of the observings.

Note that everything is "under construction" for this course. Things might change drastically and unpredictably as we get into it.

Week by Week in Lab

Week	Lab
2-3	Measuring the QE of a CCD Camera
4-5	Measuring the Through Put of the Sloan Filter Set
6-7	Measuring the effects of Extinction
8-9	Calibrating the Response of a Spectrometer
?	Weather Permitting: Solar Observations with an H-alpha filter
?	Weather Permitting: Observations of Bright Celestial Objects
?	Weather Permitting: Spectrum of a Bright Star