# Home

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## General Information

Credits: 3 (PHY 517) or 4 (AST 443)

Instructor: Anja von der Linden (anja.vonderlinden 'at' stony brook.edu, ESS 453)

Office hours: TBD

TAs:

- TBD

Suggested texts:

- Measuring the Universe, G. Rieke (Cambridge University Press, 2012)
- Data Reduction and Error Analysis for the Physical Sciences, P.R. Bevington & D. K. Robinson (McGraw-Hill Higher Education, 2003)
- Practical Statistics for Astronomers, J.V. Wall & C.R. Jenkins (Cambridge University Press, 2008)

Prerequisites: AST 203 ; some programming experience (at least PHY 277) is highly encouraged

Class times are Mondays and Wednesdays, 6-9pm (TBC), in ESS 450, and will be scheduled either as lectures, tutorials, or computing lab time, i.e. the possibility to work on the data analysis in the presence of the instructor / the TAs. **In addition**, the observing labs need to be scheduled with the TAs and/or instructor; expect to schedule 2-6 night-time observing sessions, and 1-3 day-time sessions. You need to be flexible for the weather!

# Description

Astronomers explore the universe by detecting and analyzing light from all over the elecromagnetic spectrum. We concentrate on a subset of techniques for detection of photons at visible and at radio wavelengths.

This is a three-quarters lab and one-quarter lecture course. The laboratory component entails obtaining and analyzing astronomical data with optical and radio telescopes. Three distinct observational experiments, plus one introductory lab, will be conducted, focussing on optical photometry/time-series analysis, optical spectroscopy, and radio interferometry. The students will be responsible for setting up and calibrating their telescope equipment, obtaining their own data, and analyzing the data.

The lecture component is intimately intertwined with the experimental aspects of the course. The students will learn the basics of practical observational astronomy, such as determining the observability of select targets, telescope and detector technology, the use of photometric, spectroscopic, and interferometric techniques, and methods of error, statistical, and time-series analysis.

Data analysis will be performed using standard astronomy software packages. In addition, students will need to familiarize themselves with standard Linux tools (such as bash scripting), as well as one general-purpose programming language such as python.

For one of the projects, the students will write a telescope observing proposal, and conduct a peer-review of all proposals. The observing proposal will emphasize the need for generating a testable hypothesis and justifying it through expected signal-to-noise or other appropriate statistical arguments. The peer evaluations will serve to assess the evaluator's ability to critically assess the quality of the other proposals.

The students will prepare journal-style written reports on each of their observational projects and a final oral or poster presentation on one of the projects.