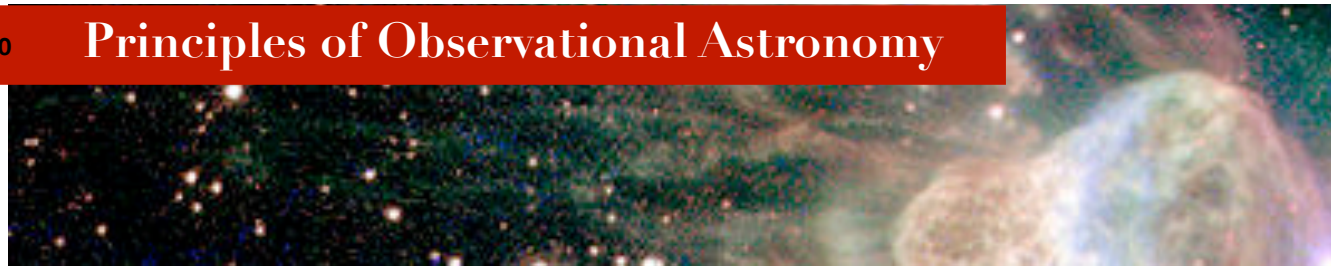
Fall, 2010

# Principles of Observational Astronomy



**Contact Information**

You might need to contact me, Dr. Stacy Palen. I have two offices. One is in the next building, SL209. The other is across the hall, LL231A. My office phone number is 626-7030, and my email is spalen@weber.edu. The course website, where homework and lecture notes will be posted, can be found at: http:\\physics.weber.edu\palen\phsx2040

**The Point**

There are two main goals for Principles of Observational Astronomy. The first is to familiarize you with the Universe in which you live, using mathematics as a descriptive and analytical tool. The second is to teach you how we know these things, and give you the tools to further advance our knowledge.

**The Points**

Your grade in this class will be determined in the following way: 35% Homework; 35% Observing Project; 30% Final

*Homework*: Homework is handed out each week, typically on Friday, due the following Friday. Warning: start these as soon as you get them, as some include making multiple observations over multiple nights---something that can't be done at the last minute! Roughly every other week, these will be an observing project that will require you to know some basic astronomy. References will be on reserve at the library to help you, if you need more background information.

*Observing Project*: The observing project will be carried out as a true astronomical project. You will write a proposal, serve on the Time Allocation Committee (TAC), carry out observations, analyze them, and prepare a paper about them. In the full project description (in the course pack), you will find the weighting of these various components, as well as sample observing proposals and papers.

The *final* is oral short-answer and problem based. Questions will include hands-on demonstrations that you understand the observational equipment available to you. You will sign up for a time block in the last week of class.

**The Text**

You should have purchased three things at the bookstore:

1) The course pack. This is your lifeline! It includes all the manuals for the telescopes, CCD camera, filter wheel, etc. that we will be using here on campus, but also information about the Sierra Stars Observatory (SSO). You will "compete" for time on SSO to carry out your observing project, so it is a really good idea to become familiar with its capabilities as soon as possible.
2) The Manual of CCD Photometry, from the American Association of Variable Stars Observers.
3) Observing the Universe: A Guide to Observational Astronomy and Planetary Science, Andrew J. Norton, Editor, Open University Press

Any student requiring accommodations or services due to a disability must contact Services for Students with Disabilities (SSD) in Room 181 of the Student Services Center. SSD can also arrange to provide course materials in alternate formats if necessary.

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# Elementary Astronomy

| Week of | Monday | Wednesday | Friday |
|---|---|---|---|
| 8/23 | Intro;<br>**Survey of the Universe: Solar System** | **Survey of the Universe: Stars** | **Survey of the Universe: Galaxies**<br>*HW1: Orientation to the Night Sky (Obs)* |
| 8/30 | **Astronomical Coordinate Systems: Alt/Az and RA/Dec and Time.** | **Magnitudes and Extinction** | **Photometry and Colors**<br>*HW2: Working with Coordinate Systems* |
| 9/6 | No School! | **Ephemerides and Finding Charts** | **Catalogs and Software**<br>*HW3: Finding Things in the Night Sky (Obs)* |
| 9/13 | **Our Telescopes and SSO** | **Intro to the CCD** | **Writing Observing Proposals**<br>*HW4: Observing Proposal* |
| 9/20 | **Darks, Flats and Biases** | **Planning an Observing Run** | **TAC Meeeting**<br>*HW5: Submission Request to SSO* |
| 9/27 | **Astronomical Literature** | **Signal-to-Noise Ratio and the Quality of Astrophysical Data** | **Aperture Photometry**<br>*HW6: Differential Photometry of Variable Stars* |
| 10/4 | **Standard Reduction Procedure** | **Aligning and Co-adding Images** | **Astrometry**<br>*HW7: Moons of Jupiter* |
| 10/11 | **Proper Motion** | **Period Analysis**<br>*HW8: Periods of asteroids* | No School! |
| 10/18 | **Photometry of Extended Objects** | **Intro to Spectroscopy** | **Stellar Spectra**<br>*HW9: Spectral Classification* |
| 10/25 | **Outside the Optical** | **WSU Radio Telescope** | **Observing the Galactic Center**<br>*HW10: Galaxy Rotation* |

| Week of | Monday | Wednesday | Friday |
|---|---|---|---|
| 11/1 | **Data Mining I: Literature Searches** | **Data Mining II: Formats and I/O; the Bane of Your Existence** | **Data Mining III: Other People's Trash**<br>*HW11: Eclipse Timing of Binary Stars* |
| 11/8 | **Writing a Scientific Paper: Background and Method** | **Writing a Scientific Paper: Results and Conclusion** | **Writing a Scientific Paper: Abstracts and "Camera-Ready" Graphs**<br>*No HW: Work on your project!* |
| 11/15 | **Writing a Scientific Paper: Fun with LaTeX!** | **Open Project Work Time in CPL** | **Open Project Work Time in CPL**<br>*No HW: Work on your project!* |
| 11/22 | **Preparing and Presenting a Scientific Poster** | **Preparing and Presenting a Scientific Talk** | No School! |
| 11/29 | **The Refereeing Process** | **Dealing with Criticism** | **Presentation of Projects** |
| 12/6 | Sign up for a final exam time during this week. | | |