Instructor:
Ginny McSwain
Office: LL 405
phone: 8-5322
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office hours: walk-in anytime or by appointment

Textbook:
Required textbook: *Interpreting Astronomical Spectra* by D. Emerson

Other helpful texts:
*An Introduction to Modern Astrophysics* by Carroll and Ostlie

*The observation and analysis of stellar photospheres* by David F. Gray

Rob Rutten’s course notes on radiative transfer
(available online at http://www.staff.science.uu.nl/~rutte101/Course_notes.html )

*The Fundamentals of Stellar Astrophysics* by George W. Collins
(available online at http://bifrost.cwru.edu/personal/collins/astrobook/ )

*Atomic Spectroscopy* by W. C. Martin and W. L. Wiese
(available online at http://www.nist.gov/pml/pubs/atspec/index.cfm )

*Stellar Atmospheres* by J. B. Tatum
(available online at http://orca.phys.uvic.ca/~tatum/stellatm.html )

Grading:
Homework – 75%
Research Paper and Presentations – 25%

Attendance is strongly recommended but not required. Every assignment must be turned in to receive a passing grade for the course. Late homework will be penalized by 10% per day late, without a valid excuse. If you have a valid excuse, we will agree upon a reasonable deadline to complete the work.

Academic Integrity:
All work must be the individual’s own work. Copying from other students or outside sources is considered plagiarism, and it will not be tolerated. I do not mind if you use outside references on homework assignments; there are many resources available to help you learn the material. Outside references (other than the class textbook) must be properly cited if
used on any assignment. Any student found to have engaged in academic misconduct on a
graded assignment or exam may be assigned a zero for that assignment, assigned an F in
the course, and/or reported to the Dean of Students.

**Accommodations for Students With Disabilities:**
If you have a disability for which you are or may be requesting accommodations, please
contact both your instructor and the Office of Academic Support Services, University Center
212 (610-758-4152) as early as possible in the semester. You must have documentation from
the Academic Support Services office before accommodations can be granted.

**Tentative Schedule:**

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>Week of Jan. 14:</td>
<td>Introduction to stars, spectral types</td>
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<tr>
<td>Week of Jan. 21:</td>
<td>Measuring fundamental parameters with binary stars</td>
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<tr>
<td>Week of Jan. 28:</td>
<td>Instrumentation</td>
</tr>
<tr>
<td>Week of Feb. 4:</td>
<td><strong>Possibly no class</strong> – Professor out of town?</td>
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<tr>
<td>Week of Feb. 11:</td>
<td>Thermodynamic equilibrium</td>
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<tr>
<td>Week of Feb. 18:</td>
<td><strong>No class</strong> – Professor out of town</td>
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<tr>
<td>Week of Feb. 25:</td>
<td>Atomic structure and spectroscopic notation</td>
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<tr>
<td>Week of Mar. 4:</td>
<td>Introduction to radiative transport</td>
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<tr>
<td>Week of Mar. 11:</td>
<td><strong>Spring break</strong></td>
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<tr>
<td>Week of Mar. 18:</td>
<td>Radiative transfer and stellar atmospheres</td>
</tr>
<tr>
<td>Week of Mar. 25:</td>
<td>Statistical equilibrium</td>
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<tr>
<td>Week of Apr. 1:</td>
<td>Sources of opacity and line profile shapes</td>
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<tr>
<td>Week of Apr. 8:</td>
<td>Line profile shapes, cont.</td>
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<tr>
<td>Week of Apr. 15:</td>
<td>Line formation, curve of growth</td>
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<td>Week of Apr. 22:</td>
<td>Applications of spectroscopy: stars, stellar winds</td>
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<tr>
<td>Week of Apr. 29:</td>
<td>Research papers due; Presentations</td>
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Makeup classes will be scheduled as spectroscopy observing sessions during clear evenings.
This syllabus is only a tentative outline of the course. The grading policy, dates, or the
topics covered in class may change as needed.

**Research Papers and Presentations:**
Each student will research one application of spectroscopy discussed in our text: active
galactic nuclei (AGN), the interstellar medium (ISM), or the solar corona.

The research paper should have 1-inch margins on each side, 12-pt font size, and single line
spacing. The paper should be 5–6 pages long (excluding supporting figures, tables, and refer-
ences). You should try to cite at least 5 sources, which should include mostly recent, refereed
journal articles. Please use the citation style recommended by *The Astrophysical Journal*
(see their Author Guidelines online). You may assume that the reader is familiar with all
content from our class notes, and you should discuss relevant theory and/or observations as
appropriate for your topic.

Students will give a 20 minute presentation on their research topic at the end of the semester.