



## **Astronomy 302**

### **Observational Astronomy**

**Mon/Wed 10:00 –10:50 PM, Steward 204**  
**Fri 10:00 – 10:50 PM, Steward 208**

#### **Description of Course**

Astronomy 302 is a course intended for those who desire to pursue a career in astronomy or related imaging fields. The course will cover the theoretical and technical aspects that underpin astronomical observations, and include hands-on experience at professional astronomical telescopes. Students will design and carryout a research project in small groups using the 4096x4096 pixel CCD camera on the 61" Kuiper telescope on Mt. Bigelow, and will conduct spectroscopic observations using the 90" Bok telescope on Kitt Peak. Data will be reduced by standard astronomical software packages and by custom software written by students. Results from the project will be written up as a formal research project, and presented in class. This class will require a substantial time investment from the student and may be quite challenging.

#### **Course Prerequisites or Co-requisites**

The course assumes a minimum preparation of:

- CSC 110 or ECE 175 or PHYS 105A or PHYS 305
- PHYS 142 or PHYS 162H
- MATH 122B or MATH 125
- ASTR 250

Potential students who are unsure of their level of preparation should consult the instructors.

#### **Instructor and Contact Information**

Prof. Thomas Beatty, SO 256, 520-621-2054, [tgbeatty@email.arizona.edu](mailto:tgbeatty@email.arizona.edu)

Dr. Elizabeth Green, SO N412B, 520-205-0576, [egreen@email.arizona.edu](mailto:egreen@email.arizona.edu)

Mr. Andrew Sevrinsky, [sevrinsky@email.arizona.edu](mailto:sevrinsky@email.arizona.edu)

Office Hours: Beatty: SO 270, Wed 2-3pm, Thurs 2-3pm; Green: by appt.

Course Website (D2L): <https://d2l.arizona.edu/d2l/home/872392>

#### **Course Format and Teaching Methods**

The course will be comprised of lectures, labs, graded homework, a semester project, and exams. Monday and Wednesday meetings will be lecture based. Friday meetings will be lab sessions in the Steward computer lab. There will be approximately six homework assignments throughout the semester, due every other week. There will be required observing sessions at Mt. Bigelow and Kitt Peak, scheduled on Friday and Saturday nights throughout the semester. Prof. Beatty will lead the classroom lectures, homework, and exams. Dr. Green will lead the observing. Both instructors will share responsibility for the laboratory sessions.

#### **Course Objectives and Expected Learning Outcomes**

Students will gain a practical understanding of observational astronomical techniques at Radio to UV wavelengths.

Students will be able to plan and execute astronomical observations.

Students will develop skills related to interpretation and communication of results based on astronomical data.

## Absence and Class Participation Policy

The UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>.

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <https://deanofstudents.arizona.edu/absences>

Participating in the course and attending lectures and other course events are vital to the learning process. Students who will miss a lecture due to a pre-known academic activity should discuss the absence with the instructors as soon as the absence is known, and as far in advance as possible.

## Required Texts or Readings:

*Observational Astronomy*, Birney, Gonzalez, and Oesper, 2<sup>nd</sup> Edition (NOTE: The 1<sup>st</sup> edition is substantially out of date and is not suitable for this class)

*A Practical Guide to Data Analysis for Physical Science Students*, Lyons (This book is available in digital format from the university library)

Some of the material covered in this course is not contained in the textbook. Your lecture notes will serve as your primary reference for those lectures.

## Additional Useful Texts:

*Data Reduction and Error Analysis for the Physical Sciences*, Bevington

*Practical Statistics for Astronomers*, Wall & Jenkins

*Handbook of CCD Astronomy*, Howell

## Assignments and Examinations:

Midterm Exam: March 2

Semester Project Reports: April 27

## Final Examination

May 8, 10:30am – 12:30pm

<https://www.registrar.arizona.edu/courses/final-examination-regulations-and-information>

<http://www.registrar.arizona.edu/schedules/finals.htm>

## Grading Scale and Policies

The course is given for standard (ABCDE) grades.

Grading will be based on a mid-term exam (20%); a final exam (30%) divided roughly 2/3 on the material since the mid-term and 1/3 comprehensive for the course; a semester project (30%), and homework and class participation (20%).

Late homework will deduct 10% per day.

Homework should be turned-in in-class, on paper, unless special accommodations are reached prior to the deadline.

University policy regarding grades and grading systems is available at:

<http://catalog.arizona.edu/policy/grades-and-grading-system>

**Requests for incomplete (I) or withdrawal (W)** must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

## Classroom Behavior Policy

Students are asked to refrain from disruptive conversations with people sitting around them during lecture, or other activities that are disruptive to the class environment. Students observed engaging in disruptive activity

will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

### **Threatening Behavior Policy**

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself.

See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

### **Students with Disabilities:**

If you anticipate barriers related to the format or requirements of this course, please meet with me so that we can discuss ways to ensure your full participation in the course. If you determine that disability-related accommodations are necessary, please register with Disability Resources (621-3268; <https://drc.arizona.edu/>) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations. If you require special accommodation in testing, you must notify Dr. Bender at the beginning of the semester.

### **Code of Academic Integrity**

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism, available at <http://www.library.arizona.edu/help/tutorials/plagiarism/index.html>.

### **UA Nondiscrimination and Anti-harassment Policy**

The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

### **Confidentiality of Student Records**

<http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa>

### **Subject to Change Statement**

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.