

ASTRONOMY 110A: SURVEY OF ASTRONOMY (HONORS)

Spring 2011 – Prof. Roy Gal

Syllabus/Course Information/Class Policies

Time: Tuesdays & Thursdays, 12:00-1:15PM

Location: Watanabe Hall room 415

Co-requisite: ASTR110L (lab) Section 1 with Prof. Mike Nassir

CLASS WEBSITE: <http://www.ifa.hawaii.edu/~rgal/teaching/astr110>

Instructor: Roy Gal

Email: rgal@ifa.hawaii.edu or roygal@hawaii.edu

Phone: 956-6235

Office: Watanabe Hall room 402 and Institute for Astronomy (IfA), room C-102

Office hours: BY APPOINTMENT in Watanabe 402.

Please feel free to email/call me to arrange meeting times.

T.A.: Communal ASTR110 Office Hours in Wat 421, Hours TBD

WHAT IS ASTR110?

This is a one-semester class designed to introduce you to astronomical concepts. You will:

- learn how astronomers and physicists have discovered what we know about the Universe
- understand the apparent motions of celestial objects (Sun, stars, planets, moon)
- develop insights into astronomical techniques and scientific research methods
- develop an understanding of sizes and distances in astronomy, from planets to galaxies and more
- develop an understanding of the basic physical principles governing objects in the Universe

These goals will be achieved through a combination of lecture, in-class activities, discussion, and group work. Because this is an Honors section, we will be doing many activities that require your participation!

EQUIPMENT AND MATERIALS

YOU MUST PURCHASE BOTH TEXTS- THEY COME BUNDLED TOGETHER IN THE UH BOOKSTORE!

Required Text 1: The Essential Cosmic Perspective, 5th Edition – binder version (in the UH bookstore ONLY; special lower price than regular version)

by Jeffrey Bennett et al.

This book includes much of the factual material and more details for the material we will cover in class. Cosmic Perspective includes an access code for the MasteringAstronomy.com website. We WILL use the site a lot for homework and tutorials!

Required Text 2: Lecture-Tutorials for Introductory Astronomy, 2nd Edition

by Ed Prather et al. ISBN 0132392267

This book includes worksheets for many of the topics we will be covering. These worksheets will be part of your coursework and many will be handed in to be graded.

Required Materials:

- Notebook or notepad and pen or pencil. You'll need these not just to take notes, but to complete in-class activities, some of which will be handed in.

Provided Materials:

- Color-coded ABCD sheet for in-class multiple-choice questions (free). **Bring these to every class!** If you lose the first one, replacements are \$1 each.

GRADING

Your final grade will be based on your overall course percentage, which is the number of points you earn on all the assignments, tests and quizzes out of the maximum possible points. A final score of 90% will result in an A-, 80% is a B-, 70% is a C-. Anything below 65% is an F. These lower limits may be revised based on overall class performance, but only downward – so, if you get a 90%, you are *guaranteed* at least an A-.

EXAMS (35%): We will have two midterms during the semester and one final. Each midterm will be 10% of your grade and the final will be 15%. I will offer an improvement bonus on the 2nd exam and the final.

QUIZZES (10%): We will have occasional short quizzes in class. *Missed quizzes may NOT be made up and will be counted as a score of zero unless your absence is excused IN ADVANCE.*

HOMEWORK (20%): You will have homework assignments, including questions to answer, short reports, and other similar activities, about one per week. This will also include online materials at MasteringAstronomy.com. **You are also required to come to each class with at least one written question about the material covered in the previous class or the reading for the current class.**

IN-CLASS ACTIVITIES (20%): We will be completing activities, such as the lecture tutorials, during class. Some of these will be handed in. These **MUST** be handed in during the class when they are completed. *Missed activities may NOT be made up and will be counted as a score of zero unless your absence is excused IN ADVANCE.*

PAPER & PRESENTATION (15%): You will have to write a 5-10 page paper on an astronomy topic NOT covered in class. The topic will be of your own choosing but must be approved in advanced by me (see below). **Papers will be due at the last class session on May 3rd, and we will have 2 class sessions at the end of the semester where you will present the material in your paper (10 minutes per presentation).** The paper will be 10% and the presentation 5% of your final grade.

Extra Credit: There will be a number of optional activities outside of the normal class times which can be attended for extra credit. These may include talks on campus or at the IfA, astronomical event observations, etc. Some may allow you to make up for missed quizzes, while others will add to your final grade. You will be informed of these opportunities as they arise.

ATTENDANCE

This class will involve lots of activities and discussion during our regular class hours. Therefore, *attendance and participation are extremely important!*

Unexcused absences: You may miss up to three classes without excuses. Keep in mind that missed quizzes and in-class activities can only be made up if your absence is excused in advance. **If you have more than four unexcused absences, you will receive a failing grade.** *Please see the section on extra credit to reduce the impact of missed classes!*

Excused absences: Absences due to personal or family emergencies can be excused. You **MUST** contact me **BEFORE** class with the reason for your absence. Do **NOT** wait until the next class. **If you know in advance that you will miss a class (due to travel for work, another class, or a sports team, medical procedure, etc.), you must contact the instructor before that lab.** We will try to arrange some way for you to make up the missed activities or provide an alternate assignment. If you do not contact me in advance, your absence will count as unexcused unless a true emergency prevented you from reaching me.

MOTIVATION AND COLLABORATION

We hope that your own curiosity, along with the beauty and excitement of astronomy (and science in general) will motivate you to excel in this class. You'll get to see astronomical objects that most people have never seen, and gain a direct understanding and appreciation of our Universe.

In this class, you will often be working in pairs or small groups. Indeed, much scientific research is carried out this way. Teamwork will allow you to learn from each other, debate responses to questions, and develop reasoning skills. There are some guidelines to be followed in this collaborative environment:

1. Be respectful to your partners and group members. Some of our activities will include discussion of why you and someone else disagree on the answer to a question, or have you working together to complete an activity. Please be respectful of other peoples' ideas, and allow everyone to contribute. You should also ensure that you contribute to the group, and not allow someone else to do all the talking and/or all of the work!

2. Your homework and in-class assignments must be written individually, in your own words. If you worked or discussed something with a partner or group, please include their name on whatever you hand in, along with a note about what you got help with

3. Do NOT copy text, calculations or data from another student, textbook, website, article, etc. These are all forms of **plagiarism** and you will receive a **zero** for the assignment. In addition, you may be reported for academic misconduct. Your work should demonstrate and reflect your own personal understanding of the material.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Any student who feels s/he may need an accommodation based on the impact of a disability is invited to contact me privately. I would be happy to work with you, and the KOKUA Program (Office for Students with Disabilities) to ensure reasonable accommodations in my course.

KOKUA can be reached at (808) 956-7511 or (808) 956-7612 (voice/text) in room 013 of the Queen Lili'uokalani Center for Student Services.

HALLMARKS OF THE HONORS SECTION

Because this is an Honors section, the class may be somewhat different from your regular classes.

1. The course requires greater depth of understanding of the subject matter:

For example, this may involve: class discussion of additional primary or secondary source materials; an independent research project or paper; advanced laboratory study; or other additional.

2. The course provides for a greater degree of interaction between students and instructors:

For example, this may involve: regular participation in class discussion; group work; peer teaching activities; required conferencing.

3. Students will be encouraged to take greater initiative in their learning:

For example, this may include: independent projects; additional out-of-class activities such as a site visit or fieldwork.

4. Students should be encouraged to become more reflective in their learning:

For example, this may include: discussion of learning styles and strategies; learning journals.

FINAL PAPER & PRESENTATIONS

Your final papers are due on the last day of class, May 3rd. They should be 7-10 pages in length, double spaced 12 point font, with margins no more than 1" on a side. You MUST submit a brief (less than one page) proposal/outline for your final paper no later than October 28th. This proposal must include at least three bibliographic references (books or journal articles – NOT websites). The paper should cover a specific topic we do not discuss in class. These papers should have more depth on a narrow topic as opposed to just touching on several different topics. I will read the proposals and make suggestions for narrowing the focus or finding another topic as needed.

The final presentations will be on the last two days of class. Each of you will have about 10 minutes to present material from your paper. You may use PowerPoint, Keynote, the blackboard, an activity or poster for the presentation.

The papers will be graded mostly on content – how well do you understand the topic you are writing about? Did you cover the relevant issues and questions? Were you scientifically critical of what we know today about the topic? Did you address what is unknown and how we might find answers? Your presentations will be graded on both content and how well you have conveyed what you learned to the class.

ROUGH SCHEDULE OF TOPICS

Do NOT rely on this as the schedule may change based on our progress and student interests. Readings and assignments will be posted on the class website at <http://www.ifa.hawaii.edu/~rgal/teaching/astr110/schedule.htm> and MasteringAstronomy.com throughout the semester.

Week 1:

What is Astronomy?, Scientific Method

Week 2:

Our Place in the Cosmos, Math Methods

Week 3:

Constellations, Star Positions and Apparent Motions

Week 4:

The Changing Night Sky, Seasons, Optics

Week 5:

Orbits, Kepler's Laws, Parallax

Week 6:

Basic Physics, Newton's Laws, Gravity

Week 7:

Electromagnetic Spectrum / Light, Atomic Physics

Week 8:

Blackbody (Thermal) Radiation, Doppler Shifts, How Stars Shine

Week 9:

Properties of Stars

Week 10:

Star Lives and Populations

Week 11:

Stellar Graveyard - White Dwarfs, Neutron Stars, Black Holes

Week 12:

Variable Stars, the Milky Way

Week 13:

Galaxies, Distances and the Expanding Universe

Week 14:

Dark Energy, Dark Matter, Structure of the Universe

Week 15:

Big Bang, Student Presentations

