

Stars, Galaxies, and the Universe – ASTR 201

Spring Semester 2010

3 Credits

<http://www.owl.net.rice.edu/~astr201/>

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Lectures: Tuesday/Thursday 1:00 pm - 2:20 pm
Room 106, Space Science Building
Start: January 12, 2010

Office Hours: I encourage you to come and see me whenever you have questions related to the course! Since I share my time between office and lab, it is most efficient if you send me email to set up a specific time to meet. Please don't be shy and make use of this opportunity. I will have “default” office hours from 3-4 pm on Tuesday / Thursday in my lab.

Course Description:

This is an introductory course to astronomy for students in academic programs and fulfills Group III distribution requirements. ASTR 201 covers such fundamentals in astronomy as distances, coordinates, and timekeeping, as well as basic physical principles required for the understanding of astrophysical phenomena, e.g., energy, gravitation, and the physics of light. The focus of this course will be on the structure and evolution of stars and galaxies, and on the structure, origin, and future of the universe, as we understand it today. This course is not part of the requirements for students majoring in Astronomy/Astrophysics, as they take the more in-depth courses ASTR-350/360. However, if you are not sure about your major yet, or if you would like to get introduced to the topic already, this course is a good start. A complementary course, ASTR 202, concentrates on the solar system and planetary science.

Prerequisites:

High school algebra and physics are sufficient. This course will not use calculus. However, homework and test problems will involve equations and calculations.

Required Textbooks/Media:

The Cosmic Perspective, 5th edition, by Bennett, Donahue, Schneider, and Voit (ISBN-13 9780321551382). Depending on your interest, and whether you plan to also take ASTR-202 in the next semester, you have a choice of buying the complete edition, which covers both this course and the Solar System course (providing a rather complete introduction to astronomy), or the reduced version, *The Cosmic Perspective: Stars, Galaxies, and Cosmology* (ISBN-13: 978-0-321-50320-6), which covers all topics of this course. Each new copy comes with a personal access kit for the “Mastering Astronomy” website and a planetarium software. If you purchased a used copy of the book, you can buy access to the website online at <http://masteringastronomy.com>. I recommend this online resource to improve your understanding of the material. Older editions: for the most part, the 4th edition will do fine, but even older editions are significantly different.

Assessment: Your grade will be based on:

Homework problem sets:	Average counts 40%
3 exams:	Average counts 50%
Web project:	10%
Optional Observing Project:	5% (if completed, the total is renormalized to 100%)

Homework problems will be due typically 1 week after being assigned. You may discuss general concepts with

fellow students and you are encouraged to do so. However, *the specific homeworks have to be done individually*, and the honor code applies. You can always ask questions to your professor or the TA's. Always study the relevant sections in the textbook and it is recommended that you use the tutorials on the textbook website to deepen your understanding.

Exams will be closed book, closed notes, (non-programmed) calculator allowed.

Web project: Students submit a report on a recent (not older than ~1 yr) news article pertaining to research in astronomy/astrophysics, related to this course. Your report will be submitted to the professor by email in the form of a "pdf" or "doc" file. Therefore, start watching out for relevant news, and check with your professor whether the article you have in mind is suitable. (See "Guidelines for the Web Project" posted on the course webpage.)

Observing Project: It will consist of performing a few observations of solar system and other sky objects, assisted by the instructor and/or TA's, using the Rice Campus Observatory. More information will be posted on the class website. Check regularly.

Class participation: Due to the typically considerable size of this course, I will not attempt to grade class participation. Nevertheless, I encourage you to *participate actively* in class. It will help you and others to learn better, and it also makes for a more lively and enjoyable class experience.

Grades:

You can get the grade you want without having much of a scientific background yet. You will find, however, that you have to put in a fair amount of work regularly to achieve good grades. Always study the book before lectures, and make use of the helpful tutorials and other materials available on the textbook website! Come see me for questions or any concerns. For students taking the class pass/fail, please be advised to *leave a large safety margin* before entering the last exam, since you *will* fail the course if you end up with less than 50% of the score.

Due Dates:

Strictly enforced! Requests for extensions must be cleared with the professor (by email) *before* the due date, and you need valid reasons for them to be accepted. If you have concerns regarding the grading of homeworks, exams, or any other course work, bring them to the attention of your professor *within one week* after the corresponding work was returned. Later claims will not be considered. Should extraordinary circumstances prevent you from participating in an exam, contact your professor by email *well in advance* of the exam.

Websites:

You can access the course website through: <http://www.owl.net.rice.edu/~astr201/>

(We will actually use Owl-Space, but this page will provide a link to the syllabus and Owl-Space.)

The textbook website <http://masteringastronomy.com/> contains tutorials, study guides, exercises, etc.

Emails:

Please send email to "astr201", not to my regular Rice email account.

This email alias helps me make sure that your email gets the fastest possible attention, and does not get buried.

Special Needs:

Any student with a documented disability needing academic adjustments or accommodations is requested to speak with the professor during the first two weeks of class. All discussions will be confidential. Students with disabilities should also contact Disability Support Services in the Allen Center.

I hope you will find this class truly enriching and that you will join me in the excitement of understanding our place in space and time in the universe, and learn about our origins in a cosmic perspective!

Stars, Galaxies, and the Universe - ASTR 201 - Outline

A schedule will be posted and updated throughout the semester on the course website.

1. Course overview, Our Place in the Universe (ch.1)
2. Discovering the Universe, Celestial Timekeeping (ch.2, S1)
3. The Science of Astronomy, The Copernican Revolution. (ch.3)
4. Motion, Energy, and Gravity (ch.4)
5. Light and Matter (ch.5)
6. Telescopes (ch.6)
7. The Sun (ch.14)
8. Surveying the Stars (ch.15)
9. Formation of Stars (ch.16)
10. Evolution of Stars (ch.17)
11. Final Stages of Stars (ch.18)
12. Our Galaxy, the Milky Way (ch.19)
13. Other Galaxies. Measuring Cosmic Distances (ch.20)
14. Evolution of Galaxies (ch.21)
15. Dark Matter and Dark Energy. Fate of the Universe (ch.22)
16. The Big Bang and the Early Universe (ch.23)
17. Life in the Universe (ch.24)