

AST 10S

Introduction to the Solar System Winter 2013

Instructor: Prof. Pat Boeshaar (boeshaar@physics.ucdavis.edu)

Office: Physics 233

Phone: 754-9246

Office Hours: T Th 1:30-3:00 p.m. or by appointment

Text: Universe: The Solar System (4nd ed., 2011) ISBN 0-7167-4016-1
By Roger A. Freedman and William J. Kaufmann III

You may purchase a used version: the previous 2nd Edition or 3th Editions, The material in all three is basically the same, with similar page numbers.

Stellarium v0.11.1 is free Planetarium software available on the web.

<http://www.stellarium.org/>

Note: Ast10 Lab is not required for this course, but if you so wish, may be taken separately after you have taken either Ast10S or Ast10G.

Ast10 Lab (1 Credit) will be offered in the Spring, Summer I & II, and Fall Terms.

Overview:

This course will give you the opportunity to examine your immediate cosmic backyard outside of planet Earth and learn how science pieces together the evidence of our origin and place in the larger universe. We will start simply: by discovering what you observe in the sky on a clear night, and how the Sun, Moon and planets move through the day, month, and year. You will learn how the earliest civilizations tried to understand what they saw in the sky and how scientific breakthroughs explained all of these motions with exquisite accuracy, linking Earth and the cosmos together under the same physical laws and forever changing our view of our place in the universe. A special emphasis will be placed on how we interpret what we “see” with our eyes, Earth-bound and space-borne telescopes, and in all forms of light. We will survey the Terrestrial and Jovian planets, moons and minor bodies of the solar system, examining the clues they provide as to how the Solar System evolved into the entity we see today...then travel outward to visit some of the newly discovered worlds around distant stars, systems totally unlike our own.

No previous astronomy or physics is assumed. Any mathematics if employed will be limited to the most simple arithmetic and geometry.

Goals of the Course: To appreciate the discovery process by which we have come to understand *how* our home solar system came to be as we know it today...and that includes carbon-based life forms. To gain a broader perspective of our unique place in a unique solar system. To apply what you learn to your own broader personal interests.

Learning Objectives & Class Notes will be uploaded to the **Smartsite** class web sites (under Resources) before each week's lectures.

Course Requirements:

- 1. **Two midterm exams** 20% each

February 7 - Thursday

February 28 - Thursday

Makeup midterms will be given **only under extraordinary** circumstances, such as a severe illness/injury or a death in the immediate family. If at all possible, please contact the professor ahead of time should such an event occur. Make-up exams are typically given with the final exam and consist of 10 essay-type questions.

NO extra credit work of any sort will be accepted to bring up a poor exam performance or replace a missed exam **except that handed out in the last weeks of the class.**

- 2. A **two hour final exam**, approximately 1/5 of which is comprehensive 25%
in nature, i.e. reviews material from the 1st two exams
March 20, Wednesday 3:30 – 5:30 p.m. in Roesler 66

- 3. **Homework Assignments/In Class Quizzes** 35%

During the semester you will be provided with many different homework assignments that are designed to help you assess your understanding of the material covered. In some cases the homework will consist of completing an in-class Tutorial on your own. In other cases an assignment will be provided as a separate handout. Completing the tutorials and making sure your answers are correct will be your responsibility.

Quick Quizzes (on occasional classes with fore warning)

Participation (Speak up! I'll do my best to answer your queries. Immediate rewards given)

The lowest or missed in-class quiz/homework assignment grade will be dropped

- ▶ An **extra credit assignment** will be given to the class in the last two weeks of the term.
This will be worth up to 5 points added onto your final grade/100 points

Grades will be posted on the Smartsite class web site Gradebook.

NOTE: All exams will be composed of a combination of multiple choice (about 50-60% of the credit) plus brief answer/discussion type questions (about 40-50% of the credit). The emphasis will be on understanding the overall picture of what we have learned as opposed to mere memorization of facts, e.g. such as a planet's mass. The questions will come from the homework, the in-class tutorials, the class objectives and notes, as supported by the text. **Sample exam questions** for the individual exams will be available on the **Smartsite** course web sites prior to each exam.

Details:

► Answers to the exams and homework plus grade scales will be posted in glass cases #11 & #13 at the very end of the corridor to the left when entering the Physics building. Homework will be assigned on certain **Tuesdays or Thursdays** and will be due the **following Tuesday or Thursday (placed IN THE BOX on the table AT THE FRONT OF THE ROOM)**. In case you miss receiving a copy of the homework when it is handed out, a copy of the assignment will be placed on the *smartsite* class web sites. Please monitor the class web site regularly for class notes and assignments.

► The reading assignments have been correlated with the class lectures. You will not be responsible for any details (e.g. equations) in the text not covered in class, this includes most of the: Boxes – Tools of the Astronomer's Trade, unless stated otherwise in the Syllabus. Please note that the text's authors sometime speculate about new observations which may not correlate with comments made in lecture. Since astronomy is such a dynamic science, just remember these are speculations, as the authors note, and refer to the class lecture notes for the currently held viewpoint.

► You may work on your take-home assignments together, but the submitted version must be done by you alone. In the first case of **identical** homework, the credit for the work will be shared by all parties, i.e. each party will get a portion of the grade inversely proportional to the number of those involved. In the second case, all parties will fail. Please become familiar with the **CODE OF ACADEMIC CONDUCT** if you have not already done so.

► **Learning Objectives**, i.e. lecture outlines and study questions for the week, will be posted on the *Smartsite* class web site under Resources, usually by Monday prior to the lectures. These questions will be open for discussion in class or during office hours, but will **NOT** be answered via e-mail. These objectives represent an interactive way in which you can follow what is done in the lectures. **All of my in-class material is already incorporated into the objectives, including many questions that are raised in class. So bring a copy to class and fill in the answers to the questions! The Notes shown in class will also be posted under Resources.**

► Use the free student companion web site at: www.whfreeman.com/universe8e
Self quizzes, interactive drag & drop exercises, animations & videos, active integrated media modules, plus much more are available. You must use either Microsoft's Internet Explorer or Netscape as browsers; and, have the plug-ins, Quicktime and Flash (www.macromedia.com/downloads/), installed to access many of the videos and animations.

► All of these ancillary materials are also available on the Universe CD ROM if it comes with the text.

► Astrophysics is a dynamic science. I will often present new ideas or discoveries NOT discussed in the text. In-class material will also be supplemented with multiple media presentations: slides, videos, and simulations – the content of these media presentations are an integral part of the course, and as such, you are responsible for understanding their content.

► You may **NOT** take Ast10S for credit if you have **completed** Ast 2, Ast 25, or any Physics course (except 7, 10, 137 or 160).

► **Last day to drop the course is Monday, February 4.**
Last day to opt for P/NP grading is Monday, February 11.

Syllabus

WEEK	DATES	TEXT CHAPTERS & SECTIONS	TOPICS/COMMENTS
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#1	Jan 8 Jan 10	Chapter 1.5 & 1.6 Chapter 2.1, 2.2 Chapter 6.1, 6.3	Overview of the Course Observing the Celestial Sphere With and Without Telescopes Introduction to the Night Sky
#2	Jan 15 Jan 17	Chapter 2.3-2.7 Chapter 3, Box 3.1	Implications of Changes on the Sky: Seasons, Lunar Phases, & Eclipses
#3	Jan 22 Jan 24	Chapter 4.2, 4.5, p.70	The Earth's Precession & Planetary Motion
#4	Jan 29 Jan 31	Chapter 4	Lessons from Those Who Have Gone Before: Ptolemy → Copernicus→ Tycho→ Kepler→ Newton
#5	Feb 5 Feb 7	Chapter 5.2-5.3,5.6-5.7, 5.9; Box 5.1, 5.4; Ch.6.5 Chapter 7.3 Fig. 6-24, 6-25	Messages in Light: More Than Meets the Eye A Very Brief Introduction * Midterm #1 - Weeks 1-4
#6	Feb 2 Feb 14	Chapter 7.1-7.4, 8.1-8.5 Chapter 9 (background) Chapter 7.7 Chapters 10, 11	Overview of the Solar System The Moon and Mercury: Battered Landscapes Venus & Mars – Paradise Lost
#7	Feb 19 Feb 21	Chapter 12 Chapter 13, 7.2-7.4	Jupiter & Saturn – The Behemoths of the Solar System Moons of Fire & Ice – Tidal Forces Rule
#8	Feb 26 Feb 28	Chapter 14	Uranus & Neptune – The Chilly Green Giants * Midterm #2 - Weeks 5-7
#9	Mar 5 Mar 7	Chapter 14, 7.5 Chapter 15	Denizens of the Dark: Pluto, the Kuiper Belt - By the Way: What Exactly is a Planet? Asteroids & Comets: Chunky Leftovers
#10	Mar 12 Mar 14	Chapter 7.5-7.6 Chapter 8.6, 8.7, 28.6	Catastrophic Collisions: Does Some NEO Have Earth's Number on It? Distant Other Worlds (if time permits)
#11	March 20	Wednesday	Final Exam 3:30 - 5:30 p.m.