Astronomy 123: Galaxies and the Expanding Universe

Administrative:

Syllabus
- Frequently Asked Questions about AST123
- Schombert's Schedule
- Academic Calendar

Math Anxiety
- What to Study?
- Why Big Lecture#Classes?
- Academic Learning Services

Internet Resources:

Solar System Live
- Unit Converter

21st Century Science
- Astronomy/Physics Glossary

AST121: The Solar System

Astronomy Web Textbook
- Temperature Scale

Greek Alphabet
- Exponents and Logarithms

AST122: Birth and Death of Stars

Lectures:
1. Ancient Cosmology
2. Medieval Cosmology
3. Newtonian Cosmology

Week 2:
4. Atomic Theory
5. Clockwork Universe
6. Quantum Physics
7. Antimatter

Week 3:
8. Elementary Particles
9. Fundamental Forces
  Oct 21: Exam #1
10. Relativity

Week 4:
11. Mass/Energy Equivalence
12. Galaxies

Week 5:
13. Distance Scale
14. Creation
15. Geometry of the Universe

Week 6:
16. Dynamics of the Universe
17. Early Universe
18. Inflation
  Nov 11: Exam #2
19. Anthropic Principle

Week 7:
20. Baryogenesis
21. Nucleosynthesis
22. Cosmic Background

Week 8:
23. Dark Matter
24. Large Scale Structure

Week 9:
25. Galaxy Formation
26. Fate of the Universe
  Dec 4: Exam #3

Quiz Schedule:

Quiz #01/Lecture#01 - Oct 05
Quiz #02/Lecture#02 - Oct 05
Quiz #03/Lecture#03 - Oct 05
Quiz #04/Lecture#04 - Oct 13
Quiz #05/Lecture#05 - Oct 13
Quiz #06/Lecture#06 - Oct 13
Quiz #07/Lecture#07 - Oct 19
Quiz #08/Lecture#08 - Oct 19
Quiz #09/Lecture#09 - Oct 19
Quiz #10/Lecture#10 - Oct 26
Quiz #11/Lecture#11 - Oct 26
Quiz #12/Lecture#12 - Oct 26
Quiz #13/Lecture#13 - Nov 02

Quiz #14/Lecture#14 - Nov 02
Quiz #15/Lecture#15 - Nov 02
Quiz #16/Lecture#16 - Nov 09
Quiz #17/Lecture#17 - Nov 09
Quiz #18/Lecture#18 - Nov 09
Quiz #19/Lecture#19 - Nov 16
Quiz #20/Lecture#20 - Nov 16
Quiz #21/Lecture#21 - Nov 16
Quiz #22/Lecture#22 - Nov 23
Quiz #23/Lecture#23 - Nov 23
Quiz #24/Lecture#24 - Nov 23
Quiz #25/Lecture#25 - Nov 30
Quiz #26/Lecture#26 - Nov 30

All quizzes must be done by midnight of the dates listed above
Scores and answers will be available after each deadline

Check Quiz Scores

Class Discussion Page

The background graphic of these pages is from a chart in Johannes Kepler's 1606 celestial atlas entitled De Stella Nova.
Course Content:

The past 10 years has seen an explosion in our understanding of the contents, formation and evolution of the Universe. Changes in our fundamental physics, combined with discoveries from space and ground-based telescopes, have led to a radically different model of our place in the Universe and its origins. The field of cosmology is science's newest endeavor into the most basic questions of humankind's existence; where do we come from and what is our fate? Cosmology is the meeting point of observational astronomy, philosophy and particle physics. However, unlike philosophy, cosmology engages Nature providing a foundation based in observation and experience.

The specific goals of this class are to:

- To gain an understanding of basic science that underlies Astronomy (the forum is modern cosmology).
- To explore the properties of the objects that make up our Universe.
- To formulate a coherent philosophy for interpreting the observational evidence of the hot Big Bang and relating this worldview to new areas of research.

Course Organization:

All lectures in this course will be delivered electronically. The lecture pages will be on the Web in HTML (hypertext mark-up language) format so that they are accessible from any computer, either at home or on campus. The address for this course is zebu.uoregon.edu/~js/ast123.

We are using the computer network in this class for several reasons:

- Network literacy is a key college skill.
- Since the course material is always available, there is less of a need to scramble to take notes during class. You can focus on paying attention. I recommend printing the week's lectures on Sunday, and bringing those pages to class to jot your own notes in the margins.
- There is lots of material out there on the Internet which is relevant for this class.
Even though the web notes replace the need for a textbook, they do not replace your need to attend class. A great deal of material is discussed in lecture that is not in the web notes and will appear on the exams. And difficult concepts in the web lectures will be clarified in class. So please attend.

Use the email system. Often professors only hear from students through office hours, and those students are usually the ones having trouble in the course. When you study or review your notes, send me questions by email. Also email me suggestions and comments about the course, particularly in the first few weeks in order to have an impact during the term.

Grading:

Grading will consist of the following:

- Three exams worth 2/3 of your grade (60 points each)
- On-line quizzes at the end of every lecture worth 1/3 of your grade

The two exams are large, difficult multiple choice exams. The first exam (midterm) covers the 1st half of the course, the second (final) covers the 2nd half (only). The exams are designed using material from the lectures, so mastery of both is required for a good grade. Not taking an exam will automatically fail you from the course.

It's very useful not to wait till the last minute to study for an exam. If you miss an exam due to
illness you must contact me as soon as possible after the exam. Missing an exam for a good reason usually means an oral make-up exam (these are torture, so you want to avoid missing an exam at all costs).

Notice there is no final exam during final exam week. The three exams taking during the classtime consist of all the exams towards your grade.

Grades will be posted at this site using the last 6 digits of your SS#

You must obtain 1/2 the total points of the course to pass (135 out of 270 points). The students above 135 points will be graded on the following curve:

25% will receive C's
45% will receive B’s
30% will receive A’s

On-line Quizes:

In order to get you to engage the lectures, the class has a quiz system at each web lecture. At the bottom of each lecture you will find a "quiz" button. Hit it and take a quiz of 10 questions. You can restart a quiz and any point, take it with open book, notes or web pages.

These quiz questions count the same as an exam question. Your final grade will be based on the exam scores plus quiz scores. Not doing the quizzes will be the same as not taking an exam. You will find that the quiz material comes from the web lectures and things discussed in class.

NOTE, you have only a limited window to take the quiz, the schedule is posted on the class web
page (typically you have a few days after the lecture). Miss the date and you will be unable to take the quiz (the point of the quizzes is to get you to study before the night of the exams, hence the deadline).

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**Optional Textbook:**

Some students are uncomfortable with a pure web-based course and would prefer a textbook to study. A good astronomy textbook is available in the bookstore called 'Astronomy Today' by Chaisson and McMillan. If you find the material on the web is insufficient, I recommend this textbook. The following chapters correspond to the class lectures:

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Chapter</th>
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<tbody>
<tr>
<td>Lectures 1-3</td>
<td>Chapter 2</td>
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<tr>
<td>Lectures 4-6</td>
<td>Chapters 3 and 4</td>
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<td>Lectures 7-9</td>
<td>Chapter 22</td>
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<td>Lectures 11-12</td>
<td>Chapter 27</td>
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<td>Lectures 13-15</td>
<td>Chapter 24</td>
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<td>Lectures 16-19</td>
<td>Chapters 25 and 26</td>
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<tr>
<td>Lectures 21-28</td>
<td>Chapter 27</td>
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I also recommend a new book, "Cosmology" by Harrison. More in depth, but well worth the read.

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**Academic Honesty:**

A recent survey of UOregen upperclassmen has indicated that 91% admit to cheating on a written assignment or exam. Every effort will be made in this class to deter dishonesty through classroom procedures. You are all welcome to work in groups on Homework assignments, however exams must be based on individual work only (i.e. don't look at someone else's exam). It is degrading to impose draconian security measures to enforce honesty. Instead, we will use the *honor system* in this course and allow each of you to uphold your personal standards of conduct. For those of you who have failed to develop your own ethics, the University has designed the Student Conduct Program.

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**Accommodations:**

If you have a documented disability and anticipate needing accommodations in this course, please
see me as soon as possible. And please request that the Counselor for Students with Disabilities (H. Gerdes, hgerdes@oregon) send a letter verifying your disability.