

ASTRONOMY 143: The History of the Universe
Fall Quarter 2009 · Mon Wed Fri 10:00 - 11:18 am · Scott Lab E004



"Where do we come from? What are we? Where are we going?" – Paul Gauguin, 1897

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Required text: *Your Cosmic Context*, by Duncan & Tyler (ISBN 0132400103)

Class website: www.astronomy.ohio-state.edu/~ryden/ast143/
The website will contain notes for each lecture, the course syllabus, the assigned problem sets, and additional astronomy links.

Lectures: Please **silence your cellphone** and **turn off any wireless devices** during lecture. (Exceptions will be made for assistive technology for the vision- or hearing-impaired.)

Grading policy: Your course grade will be determined from the results of a midterm exam (30%), a final exam (30%), and eight take-home problem sets (a total of 40%). The midterm exam will be on **Friday, October 30**, at

class time. The final exam will be on **Tuesday, December 8, at 9:30 am**. Problem sets will be handed out on Wednesdays, and will be due the following Wednesday at class time. (Because Veterans Day falls on a Wednesday this year, problem sets will be handed out and collected on Friday that week.) A problem set will typically contain three mathematically-based problems and one very brief essay.

The midterm and final exam will be closed-book, closed-notes tests. The final exam will be cumulative, covering the entire course. If you know in advance that you will miss an exam because of attendance at a University-sponsored activity, please contact the professor at least one week prior to the scheduled exam date, in order to arrange a makeup exam. If you miss the midterm due to a sudden illness or other emergency, please contact the professor as soon as possible after the missed exam, in order to schedule a makeup exam. If you miss the **final** exam, you will receive a grade of incomplete (I) for the course; it will be your responsibility to contact the professor as soon as possible to make up the final exam.

To avoid a penalty, problem sets must be handed in by 5 pm on the Wednesday they are due. If they are handed in between 5 pm Wednesday and 5 pm Thursday, they will suffer a deduction of 25 points (out of 100). If they are handed in between 5 pm Thursday and 5 pm Friday, they will suffer a deduction of 50 points (out of 100). No problem sets will be accepted more than 48 hours after they are due. The problem sets and exams will be graded on a standard C+ curve; this means that the median grade of the class will approximately correspond to a C+.

General Education Curriculum (GEC) Goals: Astronomy 143 is a GEC Physical Science Course in the Natural Science category. The goals for this course include:

- Understanding the theories and methods of modern cosmology, and their relation to other ideas in the physical sciences.
- Investigating the relation between science and technology.
- Exploring the effects of science and technology on human society.

In Astronomy 143, the specific learning objectives to achieve these course goals include:

- Investigating the basic facts, principles, theories, and methods of modern science as practiced in cosmology.

- Learning important events in the history of humanity's study of the universe.
- Explaining the role of modern technology in the investigation of the universe
- Considering how increased knowledge of the size and age of the universe has affected humanity's philosophical viewpoint.

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and cheating on examinations. Instructors shall report all instances of alleged misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct (studentaffairs.osu.edu/pdfs/csc_12-31-07.pdf).

Disability Services: Students with disabilities that have been certified by the Office for Disability Services will be accommodated; please inform the professor as soon as possible of your needs. The Office for Disability Studies is located in 150 Pomerene Hall, 1760 Neil Avenue, telephone 292-3307, TDD 292-0901, www.ods.ohio-state.edu.

Tentative Course Outline

- Wed, Sep 23: Introduction
- Fri, Sep 25: Origins of Cosmology
- Mon, Sep 28: Ancient Cosmology (Reading = Ch. 1, 2)
- Wed, Sep 30: Renaissance Cosmology (Problem Set 1 handed out)
- Fri, Oct 2: Tools of Modern Cosmology
- Mon, Oct 5: Light (Reading = Ch. 3)
- Wed, Oct 7: What is a Star? (P.S. 1 collected, 2 handed out)
- Fri, Oct 9: What is a Galaxy?
- Mon, Oct 12: Gravity (Reading = Ch. 4)
- Wed, Oct 14: Stars & Galaxies in Motion (P.S. 2 collected, 3 handed out)

- Fri, Oct 16: The Elusive Dark Matter
- Mon, Oct 19: Why is it Dark at Night? (Reading = Ch. 5, 6)
- Wed, Oct 21: The Expanding Universe (P.S. 3 collected, 4 handed out)
- Fri, Oct 23: Newton versus Einstein
- Mon, Oct 26: Is the Universe Infinite? (Reading = Ch. 7)
- Wed, Oct 28: The Very Elusive Dark Energy (P.S. 4 collected)
- Fri, Oct 30: MIDTERM EXAM
- Mon, Nov 2: The Cosmic Microwave Background (Reading = Ch. 8)
- Wed, Nov 4: More Fun with Microwaves (P.S. 5 handed out)
- Fri, Nov 6: Energy & Power
- Mon, Nov 9: Stars as Nuclear Reactors (Reading = Ch. 9)
- Wed, Nov 11: VACATION (no class)
- Fri, Nov 13: The Early Universe as a Nuclear Reactor (P.S. 5 collected, 6 handed out)
- Mon, Nov 16: The Hot Big Bang (Reading = Ch. 10, 11)
- Wed, Nov 18: Density of the Universe (P.S. 6 collected, 7 handed out)
- Fri, Nov 20: Destiny of the Universe
- Mon, Nov 23: Why is the Universe Lumpy? (Reading = Ch. 12)
- Wed, Nov 25: The Inflationary Universe (P.S. 7 collected, 8 handed out)
- Fri, Nov 27: VACATION (no class)
- Mon, Nov 30: Origin of Planets (Reading = Ch. 13, 14)
- Wed, Dec 2: Origin of Life (P.S. 8 collected)
- Fri, Dec 4: “Where do we come from? What are we? Where are we going?”