

The University of Arizona
ASTR 204: Great Debates in Astronomy
Dr. Richard Poss
Spring 2013

Description:

Science is not a debating contest, and scientific truth is not determined by rhetorical prowess. Nevertheless, there have always been crucial questions concerning the nature of the universe and our place in it about which experts disagree. In this course we will examine some of the pressing questions in astronomy and how they might be resolved. The focus will be on the clash of different approaches and methods as astronomers have struggled to resolve contradictions in our understanding of the natural order. Each class session will be a combination of lecture and participatory discussion.

Hybrid Course:

This class is a hybrid course, which means it meets half the time in person, and the other half is online. The Tuesday sessions will meet in person in the classroom, while the online portion will meet virtually, distributed over time throughout the week.

Texts: We will make use of the standard D2L website. There you will find texts, images, discussions, assignments, and links to articles.

Course Schedule: *(This class meets 3:30 to 4:45 Tuesdays in Steward N210.)*

Tues. Jan. 15	Introduction and Overview: What Can We Expect in This Class? What is Science? Scientific Method. Types of truth.
Tues. Jan. 22	Exploring the boundaries of science: Marginal Science and Pseudo Science. Science vs. Culture.
Tues. Jan. 29	Basics of naked eye astronomy. Archaeoastronomy: Chaco Canyon and Stonehenge. Ancient Greek Astronomy and the Philosophical Background
Tues. Feb. 5	The Geocentric vs. Heliocentric Debate The Ptolemaic model and Medieval Astronomy. Copernicus and the Renaissance
Tues. Feb. 12	Tycho Brahe and Johannes Kepler Galileo and the Telescope Trial of Galileo: Guilty or Not Guilty?
Tues. Feb. 19	Exam #1 Herschel and the Stellar Universe

- Tues. Feb. 26 The Shapley – Curtis Debate
Hubble and the Expanding Universe.
The Big Bang, and the Nature of Galaxies.
- Tues. Mar. 5 The “Killer Asteroid” Debate: How often do they hit?
What can we do? Solar system structure and dynamics.
Meteors, comets, asteroids, Lagrange points.

March 9 to March 17 – Spring Break – No Classes

- Tues. Mar. 19 The Plurality of Worlds Debate. How to find an exoplanet.
Radial Velocity. Transits, Gravitational Microlensing.
The Kepler Mission.
- Tues. Mar. 26 A Brief History of Rocketry:
Tsiolkovsky, Goddard, Von Braun.
The Mercury and Gemini programs.
- Tues. Apr. 2 **Exam #2**
- Tues. Apr. 9 The Apollo program. Spacelab, the Shuttle program.
The Mir space station and the ISS.
Private space enterprise in the U.S.
International and multinational space programs.
- Tues. Apr. 16 The Human vs. Robotic Exploration Debate.
Arguments and Counter-Arguments.
- Tues. Apr. 23 What is the role of Mars in solar system exploration?
Mars in the American Imagination: Lowell to Viking.
Modern Mars Missions: Pathfinder to HiRise.
Phoenix and Curiosity.
- Tues. Apr. 30 Debates over Environmental Issues in Outer Space:
Space debris, back-contamination, Nuclear power in space.
Ethics of Terraforming. SETI and its implications.

Reading Day: May 2, 2013

Final Exam: Wednesday, May 8, 2013, from 3:30 to 5:30pm, in Steward N210.

University of Arizona
Astronomy 204: Great Debates in Astronomy

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Office Hours: Monday 11:00 to 12:00, and by appointment.

CLASS POLICIES:

HOMEWORKS: For many of the sessions you will have an assignment involving both research and writing. The writing will be either an essay or answers to short questions over the material. These homework assignments will be due *before* the next class session meets, and will be submitted to the drop box on D2L.

CLASS PARTICIPATION: It is important to keep up with the day-to-day business of the class. Expect occasional short quizzes or writing exercises over the previous day's material. Try to marshal your thoughts (favorable or unfavorable) about the material before coming to class. Then argue your point of view when class begins. **You are encouraged to get to know each other during the semester, and to study together if possible.**

ATTENDANCE: Regular attendance is essential. Your attendance and your participation in class discussion are important, and are taken into consideration in preparing your grade. In addition, the exams and writing topics are all geared to class discussion. If you are not present and alert, it will not be possible to do well in this course.

GRADING: Your grade is based on the two mid-term exams, the homework assignments, the final exam, participation in class, and in-class quizzes and writing assignments.

Exam #1	20 %
Exam # 2	20 %
Homework assignments	30 %
Final Exam	20 %
Class Participation (including quizzes and writing exercises)	10 %
	100 %

ESSAYS: Several of the homework assignments will be essays on topics to be worked out over the course of the semester. Essays must be *your own thoughts*. Students will submit an electronic copy (as a pdf. or doc. file) to the Drop Box on D2L. Papers will be double-spaced, typed, and free of grammatical and spelling errors.

INTEGRITY: Absolute academic integrity is expected of every student in all academic activities. All students are expected to be aware of and follow the *University of Arizona Code of Academic Integrity*. The *Code* prohibits all forms of academic dishonesty, including cheating, plagiarism, and fabrication. The repercussions for all of those found guilty of violating the *Code* will include loss of credit for the work (grade=0) and may include failure of the course or more extreme measures.

CONDUCT: Classroom sessions are devoted to lecture, discussion, and debate. *No laptops are allowed during class*. No Ipads, tablets, texting or cell phones are allowed during class. Cell phones must be turned off when class begins. Please do not eat, drink, or read newspapers in class. There will be a good deal of discussion and debate in this course. When another student is speaking to the class, please give them your attention. You are expected to treat your fellow students with dignity and respect.

STUDENTS WITH DISABILITIES: If you anticipate barriers related to the format or requirements of this course, please meet with me so that we can discuss ways to ensure your full participation in the course. If you determine that disability-related accommodations are necessary, please register with Disability Resources (621-3268; drc.arizona.edu) and notify me of your eligibility for reasonable accommodations. We can then plan how best to coordinate your accommodations.

MISSED TESTS: No makeup tests will be administered. The exams are already scheduled and posted on the class schedule. If you know that you will miss a test (before the test), you must make arrangements (for valid reasons) for an exam at a time and date *prior to* the written test. Missing one of the midsemester exams is an automatic loss of 20% of your grade. Missing the final is a loss of 20%.

GRADES: You have one week from the time an exam is returned to challenge any perceived errors. Although rare, there are occasions when grading errors occur, and you should review your returned work.