Astronomy 340 - Fall 2008
"Origin of the Universe"

SYLLABUS

Instructor

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Teaching Assistant/Grader

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Office hours: Tu, Th 10:00am-11:00am

Class Schedule

Lectures on Tuesday and Thursday from 11:00am to 12:15pm
Room CSS 2400
No open laptops are allowed during the lectures. If you feel you need to use one please talk to me.

Course Web Page

The web site for this course can be found at

`http://www.astro.umd.edu/~ricotti/NEWWEB/teaching/ASTR340_08.html`

It will contain links to course information, assignments and (probably) copies of past lecture notes.

Course Description

The course is an introduction to modern Cosmology intended primarily for non-science majors. We will study the progression of our knowledge about the origin and evolution of the universe through history, with particular emphasis on modern cosmological results. Topics include: early cosmological models, geocentric vs. heliocentric theory, curvature of space, Hubble's Law, Big Bang Theory, microwave background radiation, evolution of stars and galaxies, dark matter, active galaxies, quasars and the future of the universe. Modern Cosmology uses the laws of Physics to construct models of the universe that describe how it evolved from simple initial conditions. The current cosmological paradigm has been quite successful at explaining many of the amazing aspects of the Universe

around us. In order to do so, however, cosmologists introduced new concepts such as "dark matter" and "dark energy". What physics are behind these concepts, and whether such hypotheses will stand the test of time, is the subject of much current research.

Course Prerequisite

The course is intended for non-science majors and assumes high-school-level algebra, and either ASTR 100 or 101 as a prerequisite. See also the official UMD info on this course.

Required Texts

- Foundations of Modern Cosmology 2/e, by John F. Hawley and Katherine A. Holcomb. Oxford University Press, ISBN 0-19-853096-X
  Authors' website for the textbook: "http://astsun.astro.virginia.edu/∼jh8h/Foundations/"

See the course web page for lecture notes.

Course Assignments and Grading

Final grades for this course will be computed based on cumulative points in the areas below, according to the weights listed:

- Attendance and participation 10%
- Homework 40%
- Midterm exam 20%
- Final exam 30%

Final letter grades will be curved, based on the total points received. The letter grades are assigned as:

- A 85-100% of total possible points
- B 70-84% of total possible points
- C 55-69% of total possible points
- D 40-54% of total possible points
- F below 40% of total possible points

with +/- within A, B, and C. There will be no extra credit.

Homework will typically be assigned once a week, due the following week, and must be turned in at the beginning of class. You should expect about 10 assignments during the semester.

Homeworks will be considered late by the end of class and will no longer be accepted. If for some reason you cannot make it to class, you should either ask a friend/classmate to hand in your assignment for you, or make sure that it gets to the instructor beforehand. If, for whatever reason, the University is officially closed on the due date for an assignment, the due date will be moved to the next lecture.

Midterm exam: There will be one in-class examination on the 23rd of October 2008

during the normal class time (to be confirmed). This exam will be closed book. The exam will consist of a section of short answer questions, followed by longer essay and problem solving questions.

Final exam: As per the University rules, the final exam for this course will be held on December 15th between 8:00am and 10:00am in CSS2400. The final exam will cover all material discussed in this course. The format of the final exam will be the same as the midterm exam, with a section of short answer questions and a section of longer essay or problem solving questions.

Students who are ill or have another valid excuse must explain the circumstances to the instructor before the due date of an assignment or exam, and then complete the work within the following week, in order to get full credit. Any illnesses or emergencies need to be properly documented.

Points will not be given for any extra credit projects. It is important to complete all the regular assignments to get the most you can out of the class!

Students with Special Needs

Students with a documented disability who wish to discuss academic accommodations should contact me as soon as possible.

Academic Integrity

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. University standards regarding academic integrity apply to all work performed for credit in this course, and as a student you are responsible for upholding these standards. Particulars of the University's Code are printed in the Undergraduate Catalog, and a description of what constitutes academic dishonesty is also given in the on-line Schedule of Classes. In brief, the Code requires that you must never engage in acts of academic dishonesty at any time. Acts of academic dishonesty include cheating, fabrication, plagiarism, or helping another person to do any of these things. Violation of the Code carries very serious consequences; for more information, please visit http://www.shc.umd.edu.

The rules regarding academic integrity apply to homework as well as to exams. As a part of these rules, you must give credit to any book, published article, or web page that you have used to help you with a particular assignment. These rules also apply to unpublished sources of information. In particular, students are encouraged to discuss assignments and other class material with each other, but every student must personally think through and write up his or her own answers to the homework questions.

To further exhibit your commitment to academic integrity, remember to sign the Honor Pledge on all examinations and assignments:

"I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination."

Tentative Course Outline

Class	Date	Lecture	Reading
		Part I: History of Cosmology	
#1	Sep 02	Introduction to the course	Ch.1
#2	Sep 04	Geocentric cosmology and astronomy	Ch.2
#3	Sep 09	Renaissance empiricism and the heliocentric model	Ch.2
#4	Sep 11	The Universe of physical law	Ch.3
		Part II: Relativity	
#5	Sep 16	The age of the Earth and the Cosmos	Ch.3
#6	Sep 18	Principles of space and time	Ch.6
#7	Sep 23	Special relativity	Ch.7
#8	Sep 25	Special relativity	Ch.7
#9	Sep 30	Special relativity	Ch.7
#10	Oct 02	General relativity	Ch.8
#11	Oct 07	General relativity	Ch.8
#12	Oct 09	Black Holes	Ch.9
		Part III: Modern Cosmology	
#13	Oct 14	The Universe beyond our Galaxy	Ch.10
#14	Oct 16	Cosmological expansion	Ch.10
#15	Oct 21	Geometry and evolution of the Universe	Ch.11
–	Oct 23	*Midterm Exam:CSS2400, 11:00am–12:15pm*	–
#16	Oct 28	Geometry and evolution of the Universe	Ch.11
#17	Oct 30	The Big Bang and early Universe	Ch.12
#18	Nov 04	The Big Bang and early Universe	Ch.12
#19	Nov 06	The Big Bang and early Universe	Ch.12
		Part IV: Contemporary Cosmology	
#20	Nov 11	Measurement of cosmological parameters	Ch.13
#21	Nov 13	Measurement of cosmological parameters	Ch.13
#22	Nov 18	Cosmic background radiation	Ch.14
#23	Nov 20	Cosmic background radiation	Ch.14
#24	Nov 25	Dark matter and cosmic structure formation	Ch.15
–	Nov 27	No Lecture: Thanksgiving	–
#25	Dec 02	Dark matter and cosmic structure formation	Ch.15
#26	Dec 04	Cosmological inflation	Ch.16
#27	Dec 09	Cosmological inflation	Ch.16
#28	Dec 11	Last class/review	–
–	Dec 15	*Final exam: CSS2400, 8:00am–10:00am*	–