

ASTRONOMY 309 – SPRING 2005

GALAXIES, QUASARS, AND THE UNIVERSE

Unique No. 46775

Course Web Page:

http://www.as.utexas.edu/astronomy/education/spring05/komatsu/komatsu_309r.html

Instructor

Dr. Eiichiro Komatsu
Office: RLM 16.210
Hours: MW 5-6; Other times by appointment
Phone: 471-1483
Email: komatsu@astro.as.utexas.edu

Teaching Assistant

Nick Sterling
Office: RLM 17.312
Hours: T 2-3; Th 4-5; Other times by appointment
Phone: 471-7418
Email: sterling@astro.as.utexas.edu
Note: Sterling is unavailable during February 10-14 and April 14-16.

COURSE OBJECTIVES

This course provides an overview of the basic physical picture as well as historical accounts of classic and modern cosmology. Cosmology has been one of the central interests of human beings. Ancient people had a very different picture of the universe than we have now. Since then, our picture of the universe has evolved tremendously as our understanding of physics has advanced, while at early times religious reasons were also necessary to develop cosmological models. Recently, cosmology has entered a new era with precision observations, which revealed new cosmological puzzles that will probably lead us to discover new physics. The lecture will cover cosmological models, expansion of the universe, redshifts, the early universe, cosmic inflation, dark matter and energy, special and general relativity, as well as stars, galaxies, quasars and black holes.

PREREQUISITES

AST301, 302, or 303, or an equivalent descriptive introduction to astronomy of one semester or more.

TEXTBOOK

COSMOLOGY, 2ND EDITION

Author: Edward Harrison
Cambridge University Press

CLASS & HELP SESSIONS

- Class meets at WEL 3.502 on MWF 9-10.
- Help sessions will be scheduled for help with the homework and exams.
 - Location: RLM 15.216B; Time: 5-6pm

HOMEWORK & EXAMS

- There will be **5** homework assignments. These will be written assignments and reports. All written assignments must be in computer-generated format - **no hand written work**. Some of the assignments may involve problem-solving and math.
- Homework assignments will not be counted after the due date. Homework can be done in groups (and I encourage this) but you must hand in your own work. Homeworks that are duplicates will have severe penalties. You may get help on homework (or anything else) from the professor or TA during office hours, help sessions, or by appointment.
- The midterm and final will consist of multiple choices. The penalty for cheating on an exam is a score of zero for the exam, and the zero will be included to calculate the final grade.

GRADING

- The course grade will be evaluated on the basis of:
50% homework (5 homework assignments due Feb 18, Mar 11, Apr 1,15,29)
25% midterm(Mar 21)
25% final (May 6)
- Midterm and Final exams will be multiple-choice questions. There will be make-up examinations **ONLY** for students with valid excuses. (Reasons for absence must be presented in advance of examination.) The lowest homework score will be dropped (so you can miss one homework).
- The following grading scale will be used: **90+=A; 80-89=B; 70-79=C; 60-69=D**. Any average below 60 is failing.
IMPORTANT NOTICE: the new grading scale has been adopted: 85+=A; 75-84=B; 65-74=C; 55-64=D. Any average below 54 is failing. (Eiichiro Komatsu; April 4)

CLASS ATTENDANCE

- I strongly recommend that you attend classes. The textbook covers the materials only broadly and is probably difficult for you to understand if you only read it and do not attend classes. Although I will basically follow the contents of the textbook, many that are not in the book will be lectured in class.
- Please sit on the front seats – do not sit in the back! I will often use chalkboard, and the lecture room is too large for you to read what I write on the chalkboard if you sit far in the back. Also, please let me know if you cannot read things on the chalkboard.
- Feel free to ask questions during or after lecture. Sometimes I do not notice that you are raising your hand, so please call my name when I do not seem to recognize you.

- Please do not leave the lecture room until lecture ends.

COURSE SCHEDULE

I encourage you to read relevant chapters before coming to class.

Jan 19	W	Orientation		
Jan 21	F	What Is Cosmology?	Ch.1	
Jan 24,26,28	MWF	History of Cosmology	Ch.2,3,4	
Jan 31/Feb 2,4	MWF	Stars	Ch.5	
Feb 7,9,11	MWF	Galaxies and Quasars	Ch.6	
Feb 14,16,18	MWF	Space and Time	Ch.7,8,9	HW#1 due F
Feb 21,23,25	MWF	Curved Space	Ch.10	
Feb 28/Mar 2,4	MWF	Relativity	Ch.11,12	
Mar 7,9,11	MWF	Black Holes	Ch.13	HW#2 due F

Mar 14,16,19 *NO CLASS (Spring Break)*

Mar 21 **M** **In-class Midterm Exam** **Ch.1-13**

Mar 23	W	Expansion of the Universe	Ch.14	
Mar 25	F	Redshifts	Ch.15	
Mar 28,30/Apr 1	MWF	Cosmological Models	Ch.16,17,18	HW#3 due F
Apr 4,6,8	MWF	Observational Cosmology	Ch.19	
Apr 11,13,15	MWF	The Early Universe	Ch.20	HW#4 due F
Apr 18,20,22	MWF	Inflationary Universe	Ch.21,22	
Apr 25	M	Dark Matter and Energy	Special Topic	
Apr 27	W	The Cosmic Numbers	Ch.23	
Apr 29	F	Darkness at Night	Ch.24	HW#5 due
May 2	M	Creation of the Universe	Ch.25	
May 4	W	Life in the Universe	Ch.26	

May 6 **F** **In-class Final Exam** **Ch.14-26**

HELP SESSIONS (5-6pm at RLM 15.216B)

Feb 16	W	For HW1
Mar 7	M	For HW2 and Midterm Exam
Mar 9	W	For HW2 and Midterm Exam
Mar 30	W	For HW3
Apr 13	W	For HW4
Apr 27	W	For HW5
May 2	M	For Final Exam
May 4	W	For Final Exam