

AS 701 - INTRODUCTION TO ASTROPHYSICS

COURSE OVERVIEW - FALL 2013

COURSE DESCRIPTION:

This course is an introduction to astronomical and astrophysical topics emphasizing fundamental radiative and gravitational physics, properties of stars, stellar structure, stellar evolution, dynamics of binary stars systems and star clusters, types of galaxies, galactic structure and dynamics, active galaxies and some cosmological topics.

COURSE STRUCTURE AND PHILOSOPHY:

The course is intended to provide students with a setting in which they can survey many of the most important topics in astronomy and astrophysics. It is aimed at filling in gaps in the backgrounds of students with an undergraduate astronomy degree and in providing those with a physics degree the opportunity to become acquainted with the major astronomical and astrophysical ideas and terminology as well as current research problems. Each week, reading material in the text will be assigned. Lectures will be given to clarify particularly subtle points and to elaborate further on important topics not discussed in the text. The course will be conducted partly in a problem-solving format. Some of the class time will be spent on working through problems that will be assigned from the text or from handouts distributed in class.

CLASS TIMES:

Tuesdays and Thursdays 9:30AM - 11:00 AM in CAS Room 502

INSTRUCTOR:

Professor Kenneth Brecher, CAS Room 518 (enter through Room 514), x 3423

OFFICE HOURS:

Tuesdays and Thursdays, 11:00 – 12:30

TEXT:

The textbook is An Introduction to Modern Astrophysics by Bradley W. Carroll and Dale A. Ostlie (Addison-Wesley, Pub., 2007, second addition). The associated Web site is at

http://wps.aw.com/aw_carroll_ostlie_astro_2e/48/12319/3153833.cw/index.html

A copy of the text along with other useful references will be put on reserve in the Astronomy Department Library. Handouts will also be distributed throughout the semester.

GRADING:

The course grade will be partly based on the problem sets and partly on class preparation and presentation, so active participation in class is an integral part of the course. There will be both a midterm examination and a final examination. The relative weighting of the course components is: 35% homework and class participation; 25% midterm examination; 40% final examination.

AS 701 SCHEDULE OF LECTURE TOPICS - FALL 2013

<u>Date</u>	<u>Topic</u>	<u>Text Chapter(s)*</u>
Sept. 3	Course Overview, Readings, Questionnaire, Diagnostic Exam	
Sept. 5	Introduction to Astrophysics	Preface, 1
Sept. 10	Kepler's Laws, Newtonian Gravity, Virial Theorem	2
Sept. 12	Finish Gravity, Start Light	2, 3
Sept. 18	Light	3
Sept. 19	Special Relativity	4
Sept. 24	Finish Relativity, Interaction of Light and Matter	4, 5
Sept. 26	Finish Light and Matter, Telescopes	5, 6
Oct. 1	Binary Stars	7
Oct. 3	Stellar Spectra	8
Oct. 8	Stellar Atmospheres	9
Oct. 10	Stellar Atmospheres	9
Oct. 17	Stellar Structure and Interiors	10, 11.1 plus handout
Oct. 22	Stellar Structure and Interiors	10, 11.1 plus handout
Oct. 24	Sun (Active Sun, Magnetic Fields)	11.2, 11.3
Oct. 29	Midterm Examination	1 – 11.1
Oct. 31	Interstellar Medium and Star Formation	12
Nov. 5	Stellar Evolution	13
Nov. 7	Stellar Pulsation	14
Nov. 12	Stellar Death	15
Nov. 14	Degenerate Stars	16
Nov. 19	Black Holes	17
Nov. 21	Close Binary Star Systems	18
Dec. 3	Milky Way Galaxy	24
Dec. 5	Spiral, Elliptical Galaxies, Hubble Sequence	25
Dec. 10	Galaxy Evolution	26
Dec. 12	Hubble Law, Galaxy Clusters, Active Galaxies	27, 28
Dec. 16 or?	Final Examination	1 – 28 (minus 19 - 23)

*to be read by this date

Version 1: 9/3/2013

-Kenneth Brecher