

COURSE OUTLINE

Astronomy 103

I. Catalog Statement

Astronomy 103 – Topics in Modern Astronomy – 3 Units

Prerequisite: Astronomy 110 or 120

Astronomy 103 is designed for students who have completed a survey course in astronomy. This course deals with recent developments in astronomy. Specific topics covered are exploration of the solar system with spacecraft, general relativity and black holes, active galaxies and cosmology.

Lecture: 3 hours

II. Objectives

Students will be able to:

1. Know and understand the details of several case studies of modern astronomy at work
2. Evaluate whether certain ideas of astronomy are well established, debatable, or highly speculative and in need of a lot more work.

III. Text

Universe (current edition), William Kaufmann, III, Freeman

IV. Course Outline

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| A. Star Atlases and Catalogues | 5 hours |
| 1. Early star maps made using only naked eye observations | |
| 2. Star maps made using telescope observations | |
| 3. Star maps made using photography | |
| B. The Starry Sky Above | 2 hours |
| 1. Bright stars and constellations seen this time of year | |
| 2. Burnham's <u>Celestial Handbook</u> | |
| C. Comets | 3 hours |
| 1. Halley's Comet before and after spacecraft studies | |
| 2. Computer studies of the orbits of comets | |
| D. Spectroscopy | 4 hours |
| 1. Starlight | |
| 2. The light from emission nebulae | |
| E. Stellar Evolution | 12 hours |
| 1. White dwarfs and planetary nebulae | |
| 2. Supernovas and neutron stars; SN 1987A | |

- 3. General relativity and black holes
 - a. Einstein's theory
 - b. Penrose diagrams of space-time
- F. "Normal" Galaxies, Active Galaxies, Active Galaxies and Quasars 12 hours
 - 1. Galaxies in the Local Group
 - 2. Galaxies in the Virgo Cluster
 - 3. Active galaxies: radio galaxies, compact galaxies and quasars
- G. Cosmology 10 hours
 - 1. Hubble's work: the Universe is expanding
 - 2. Microwave background radiation: the Universe is slightly warm
 - 3. The Big Bang Theory
 - 4. Inflationary models of the early Universe

V. Examination/Evaluation Procedures

Four one-hour examinations, in-class exercises, hand-in assignments and a final examination. Essay topics are included.

VI. Special Features

Several Macintosh exercises are used to supplement the lecture material. Field trips are held to view the sky from Angeles Crest and Stony Ridge Observatory.