



UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Elements of Astrophysics

2627-3-E3001Q054

Aims

The aim of the course is to provide a

- knowledge and understanding of issues related to modern astrophysics;
 - knowledge and understanding applied to concrete examples of astrophysical systems through the resolution of quantitative problems in the fields of stellar and extragalactic astrophysics and cosmology;
- At the end of the course the student will be able to describe the properties of the most important astrophysical sources from both a theoretical and observational point of view.

Contents

Stellar astrophysics. Compact Objects. Accretion processes. Compact object binaries and gravitational waves. Properties of galaxies and galaxy clusters. Cosmological model.

Detailed program

1. Introduction to basic concepts
2. Stars: basic observations
3. Stellar Physics
4. Stellar Evolution
5. Star Formation and the Interstellar Medium
6. Exoplanets
7. The Milky Way and other Galaxies
8. Cosmology: Basic Observations

- 9. Big Bang Cosmology
- 10. Test and Probes of Big Bang Cosmology

Prerequisites

Physics 1 (including special relativity), Physics 2 (electromagnetic radiation), Physics 3 (black body radiation, wave-particle duality).

Teaching form

The course consists of 24 lectures of 2 hours each, delivered in person. During the lectures, the main theoretical and observational foundations of modern astrophysics will be presented, and exercises will be carried out on the topics covered, representative of those that will appear in the exam. In addition to the lectures, the instructor is also available to students, by appointment arranged via email, to answer questions and requests for clarification.

Textbook and teaching resource

- Dan Maoz: Astrophysics in a nutshell. Ed. Princeton University Press.

Semester

III year, first semester

Assessment method

The final exam consists of a written test aimed at ascertaining mastery of the different topics covered in class.

The written exam will consist of two exercises worth 5 points each, one exercise worth 10 points, and one open-ended question worth 10 points.

Books, forms and notes cannot be used during written tests. There are no tests planned during the course.

Following a positive written exam ($\geq 18/30$), the student can optionally take an oral exam, or maintain the written grade. The oral exam is assigned a score between -5 (completely insufficient) and +5 (excellent). If the oral exam is taken, the final grade is given by the sum of the written grade and the oral grade. If the overall grade is less than 18, the exam is considered not passed and the written exam must also be repeated. If the final grade is equal to or higher than 33, the "cum laude" is also awarded. If the grade obtained at the oral exam is rejected, then the written exam must also be retaken.

For Erasmus students: it is possible to take the exam in English on request.

Office hours

Via appointment (on line or in person).

Sustainable Development Goals

QUALITY EDUCATION
