

Astro 102

Astronomy 102 Syllabus

TITLE: Astronomy 102, Laboratory Explorations in Astronomy

3 Credits 3 Hrs Lab

Description

This is an introductory, one-semester astronomy laboratory course designed for non-science majors. The approach in this course is to emphasize the ideas of Astronomy and a qualitative understanding of the physical processes that shape the Universe via laboratory exercises. Each laboratory exercise is self-contained and accompanied with one hour in depth lecture component discussing the fundamental physical principle and methods used based on the co-requisite/per-requisite course, ASTRO 100.

Topics: Basic observational features of the night sky, the Copernican revolution and Kepler's laws of planetary motion, Newton's laws of motion and gravitation, properties of light and spectroscopy, Lenses and telescopes, the Stellar evolution and classification, galaxies, dark matter, dark Energy and Hubble's Law.

Through out the course there will be weekly Lab assignments which are submitted at the end of the lab.

The laboratory exercises of astronomy 102 consists of thirteen experiments that complement the lecture component. Four of the experiments will be traditional experiments performed in the laboratory rooms under the supervision of a lab instructor. The remaining nine experiments are performed using a computer and continual instructor assistance is available. These set of experiment involve various simulation of astronomical processes, obtaining randomized data from the simulations, analyzing the data and answering questions, making calculations and inferences based on the experiment. The lab report can be submitted on line.

On Line Assignment

Weekly problems relevant to the current lab schedule are part of the course and are assigned on line. These involve a set of various types of problems and questions based on simulations, visual and conceptual presentations. Every assignment is done on line and is due the end of the week. Students must register at www.masteringastronomy.com to have access to the assignments.

Objective

After completing this course, students should be able to:

- Describe the various spatial ranges and time scales related to astronomical objects.
- Have some understanding of the scientific method and why it is successful.
- Perform elementary quantitative and physical reasoning.
- Explain the motion of celestial objects and describe properties of astronomical objects, such as asteroids, planets, stars and galaxies.
- Discuss the origin and evolution of astronomical objects and describe the processes using physical laws.
- Discuss the current theory of the origin of the universe and possible future evolution.

Requirements and Grading

This is a rigorous course that requires continuous participation in laboratories and the regular submission of lab reports.

4 in-class lab grade + 6 best online lab grade, each worth 10% =100%

Lab Reports

Each lab report must be submitted on time and late submission is penalized. It is necessary to complete the lab part of the course in order to receive a grade for the course.

Makeup Policy

There will be one lab session week at the end of the semester dedicated to makeup. During this week a student can perform one missed in class experiment.

Credit/No Credit Grading Option

You may choose to be graded in this course on a Credit/No Credit basis.

Attendance

Attendance at all lectures is required in this course. We have found that regular class attendance plays a major part in achieving success in this course. While the text is comprehensive, lectures are an important part of learning the material. If you are not in class you could miss important scheduling and other changes. Another important part of learning is following the development of information. You cannot learn all of astronomy the night before the exam; you must keep up with the material as it is presented and discussed in class.

Disabilities

In compliance with the American Disability Act of 1990 (ADA) and with Section 504 of the Rehabilitation Act of 1973, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical and/ or Learning) consult the Office of Accessibility located in Room E1124 to secure necessary academic accommodations.

Academic Integrity

Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) **as serious offenses against the values of intellectual honesty. The college is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Academic Integrity Procedures.**

Tentative Laboratories Schedule

Week Laboratory Exercise

Experiment

- 1** Introduction: Getting Perspective, Scale of various astronomical objects, distances and The Scientific Notation
- 2** Lunar and Solar Eclipses
- 3** The Motion of Planets stars and planets in the sky
- 4** Elliptical Orbits, example from our solar system

- 5*** Measuring "g" acceleration due to earth gravity.
- 6** Measuring the mass of an object from Newton's of Universal Gravitation. Mass of Jupiter.
- 7*** Geometrical optics and simple refracting telescope
- 8** Black body radiation, Wein' Law and Stefan-Boltzmann Law.
- 9** Parallax and distances to the stars. Brightness.
- 10*** Spectroscopy and identification of chemical elements.
- 11** Classification of stars Hertzsprung-Russell diagrams
- 12** The Hubble Constant and the expansion of the Universe.
- 13** Final Discussion with Lab instructor

* Traditional Experiments done in the Laboratory