Home

Department of Physics and Astronomy
Hunter College
of the
City University of New York

Astronomy 100 Syllabus

TITLE: Astronomy 100, Introduction to Astronomy

Three hours per week three credits. This is an introductory, one-semester basic astronomy 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.

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, origin of the Solar System, the Sun and stellar evolution, galaxies, dark matter and dark energy, cosmology, Hubble's Law and the expanding Universe, from the Big Bang to the present, future scenarios.

Textbook and Homework Material: *The Essential Cosmic Perspective, Eighth Edition. Jeffrey O Bennett, Megan Donahue, Nicholas Schneider, Mark Voit.*

MyLabsPlus with Mastering Astronomy for homework assignments

Grade Requirements

- The course grade will be determined on the basis of three Midterm Exams, Homework Assignment and a Final Exam.
- There will be NO EXTRA CREDIT assignments in this course.
- Midterm exams will cover the material in the lectures and readings since the previous midterm, as indicated in the Lecture and Exam schedule of the semester.
- The final exam will be cumulative.
- If you miss the final exam for a valid reason, e.g. serious medical condition and you present a proof of your condition you will receive a grade of incomplete (IN)

Item	Format	%Toward Grade
Midterm I	40 Multiple choice questions	
Midterm II	40 Multiple choice questions	Drop lowest midterm. Best two midterms Count 40%
Midterm III	40 Multiple choice questions	
Weekly Homework	Various format	30%

Final Exam	80 Multiple choice questions	30%
Total		100%

Learning Outcomes:

- Develop a perspective of the basic observational features of the night sky, explain the relationship between distance and time.
- Understand the Scientific Method and differentiate between a scientific theory and pseudoscience,
- Describe the orbits of planets using the Universal Law of Gravitation and Conservation laws governing their motion.
- Describe how various ground and space telescopes work and explain the importance of optical resolution.
- Describe the structure of the interior and surface of the Sun and how the Sun produces energy in its core.
- Describe the relationship between luminosity, temperature, and mass of a star
- Explain how spectroscopy can be used to identify materials (chemical fingerprinting)
- Explain how the mass of stars determines stellar evolution.
- Describe the various types of galaxies and how their mass is estimated.
- Understand the large scale structure of the Universe and Hubble's Law and the expansion of the Universe.
- Explain the method of detection of exoplanets and the possibility of life. Describe the Drake equation.

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.

Accessibility

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 AccessABILITY located in Room E1124 to secure necessary academic accommodations.

Hunter College does not discriminate against any student on the basis of pregnancy or related conditions. Absences due to medical conditions relating to pregnancy will be excused for as long as deemed medically necessary by a student's doctor and students will be given the opportunity to make up missed work. Students needing assistance can seek accommodations from the Office of AccessABILITY.

Lecture and Exam Schedule

Week	Lecture Topic	Reading Assignment
1	Introduction To Mastering Astronomy, Our Place in The Universe and the Big Bang. The Scale of The Universe, Space Ship Earth	1.1 – 1.4

2	Discovering The Universe: Celestial Sphere, Constellations, Understanding Local Skies, Seasons The Moon, Phases of the Moon, Lunar and Solar Eclipses.	2.1 – 2.4
3	The Ancient Mystery of the Planets. Celestial Timekeeping: Astronomical Time Periods, The Calendar	S1.1 – S1.4
4	The Science of Astronomy: Early Astronomy, The Copernican Revolution: Tycho Brahe, Kepler, Kepler's Laws, Galileo, The Nature of Science	3.1 – 3.4
	Midterm I: Chapters 1, 2, 3 and S1	
5	Describing Motion, Newton's Laws of Motion, Conservation Laws in Astronomy. Law of Universal Gravitation. Gravitational Potential Energy, Orbits, Tides	4.1 – 4.4
6	Light and Matter: Properties of Light, Wave Nature of Light, Photons, Properties and Phases of Matter	5.1 – 5.2
7	Atomic Structure, Absorption and Emission of Light by Atoms and Spectra. Thermal Radiation, Continuous Emission and Absorption Spectra. Doppler Effect.	5.3 – 5.4
8	Telescopes	6.1 – 6.4
	Midterm II: Chapters 4, 5 and 6	
9	The building Blocks of the Universe Our Star, structure of the Sun from core to corona, energy production in the core. Solar weather and climate	S1 – S4 14.1 – 14.4
10	Stars: Stellar Luminosity, Stellar Surface Temperature, Stellar Masses. The Hertzsprung-Russell Diagram, star clusters, age of a cluster	15.1 -15.4
11	Star Birth: Interstellar medium, stellar nurseries and stages of star birth. From protostar to Main-sequence, Ranges of Masses of New-Born stars, Brown dwarfs. Star clusters	16.1 – 16.4 17.1 – 17.4

	Lives of Low-Mass star, High-Mass stars and Close Binaries. Mass Exchange Between close binaries	
	Midterm III: Chapters S4, 14, 15, 16 and 17	
12	Death of stars: Stellar Black Holes, properties of Blackholes and Gamma ray bursts (GRBs)	18.1 – 18.4
13	Galaxies. Hubble's Law and the Expansion of The Universe, Age of The Universe	19.1 – 19.4 20.1 – 20.4
14	Dark Matter and Dark Energy. Gravitational Lensing, Clusters of Galaxies and Fate of the Universe	22.1 – 22.4
	Final Exam: Cumulative	