GS 107 : PHYSICAL SCIENCE: ASTRONOMY

Transcript title

Physical Science: Astronomy

Credits

4

Grade mode

Standard letter grades

Contact hours total

60

Lecture hours

30

Lab hours

30

Recommended preparation

one year of high school algebra or equivalent or concurrent enrollment in MTH 60.

Description

Introduction to astronomy including solar system, stellar systems and cosmology. Some individual observing may be required.

Learning outcomes

Matter/Energy: Students will be able to use these ideas to perform appropriate calculations and evaluate scientific experiments or statements in the world around them:
1. All matter is built up from simpler particles. Atoms contain a positively charged nucleus surrounded by negatively charged electrons. The electrons are the primary determinant of how atoms interact with each other.
2. As a result of the basic structure of atoms they release energy in characteristic patterns called spectra.
3. Fusion and fission are distinct nuclear processes that lead to the release of significant amounts of energy.
4. Forces which hold the nucleus of an atom together are very strong. This is why such great amounts of energy are released from nuclear reactions in the sun and other stars
5. Energy appears in different forms. Some examples are heat energy, chemical energy, mechanical energy, gravitational energy, and light.
6. Whenever the amount of energy in one place or form diminishes, the amount in other places or forms increases by the same amount. Energy cannot be created or destroyed.
Forces: Students will be able to use these ideas to perform appropriate calculations and evaluate scientific experiments or statements in the world around them:
1. Gravitational force is an attraction between masses. The strength of the force is proportional to both masses involved and weakens rapidly (inverse square law) with increasing distance.
2. Kepler's Laws are a reflection of the gravitational force as it affects orbiting objects.
3. Gravitational forces affect all matter in the universe which permits us to investigate and model the behavior of far away objects and structures in the universe.
Light: Students will be able to use these ideas to perform appropriate calculations and evaluate scientific experiments or statements in the world around them:
1. Light is an electromagnetic wave which has particle like features in some circumstances. The central characteristics of light are it's wavelength and speed.
2. Electromagnetic radiation comes in many "styles" characterized by their wavelength or frequency.
3. We use a range of instruments to observe light from the universe at different wavelengths.
Structural Models: Students will be able to use these ideas to perform appropriate calculations and evaluate scientific experiments or statements in the world around them:
1. Our solar system is a plausible model for the typical movements and structures of objects in a planetary system.
2. Stars are not simple balls of fire but more complex structures that vary with star type.
3. Galaxies have a wide range of forms and properties that reflect their origins and history.
4. The underlying structure of the universe is slowly being revealed by current instruments and has fascinating implications.
Evolutionary Models: Students will be able to use these ideas to perform appropriate calculations and evaluate scientific experiments or statements in the world around them:
1. Our solar system is a plausible model for the formation and evolution of planetary systems.
2. Stars are not simple static balls of fire but evolving objects whose lives move along a range of paths.
3. As we look deeper into the history of the universe we are beginning to better understand the stages in the formation and evolution of galaxies.

General education/Related instruction lists

- Science Lab