AS1002 - The Physical Universe (daytime)

Credits: 20.0  Semester: 2
Number of Lectures: 40  Lecturer: Dr Martin Dominik with Dr Hongsheng Zhao
Academic Year: 2018-19

Overview
This module presents a descriptive, largely non-mathematical account of the physical universe, and is designed for those who do not intend to follow a degree programme within the School of Physics and Astronomy. The module has no prerequisites and is divided into two components: concepts in astronomy, dealing with our understanding of the properties and ages of planets, stars and galaxies, their distributions in space, cosmology and the origin of the universe; and concepts in physics, dealing with our understanding of matter, the nature of light, the structure of atoms and of atomic nuclei, fundamental particles and their link to cosmology, and the applications of physics in everyday life.

Aims & Objectives
To present a largely non-mathematical account of fundamental concepts in physics and astronomy.

Learning Outcomes
By the end of the course students should be able to:

- Describe the key components of the scientific method and outline the historical development of key areas in physics and astronomy.
- Appreciate the role of observation and experiment in physics and astronomy.
- Describe and explain a range of fundamental physical and astronomical phenomena, and appreciate the role of sophisticated physical concepts in everyday life.
- Demonstrate functional skills of a physical scientist, such as explaining concepts with diagrams and working with very large/small numbers and understanding the limitations of scientific models.

Synopsis
Concepts in Astronomy (20 lectures)
The development of astronomy - the day and night sky, seasons, time and the calendar. The Copernican revolution. An inventory of the Solar System (planets, moons, comets, meteors, aurorae). The stars as distant sources of light. The development of astrophysics - the properties of stars; stellar evolution and ages - red giants, white dwarfs, supernovae and black holes. The formation of stars, and planetary systems; modern searches for extra-solar planets. An inventory of the Milky Way Galaxy - stars, gas and dust clouds; the size and age of the Galaxy. Other galaxies, their distances and distributions in space - clusters and voids. Peculiar galaxies and quasars. Nonluminous matter. Cosmology - Olber's paradox. The redshifts of galaxies and Hubble's Law. The origin and evolution of the Universe, the formation of galaxies - big bang cosmology and problems. The formation and evolution of the chemical elements.

Concepts in Physics (20 lectures)
Pre-requisites
None - this module is intended to be accessible to all interested students in the University. Those students who are intending to do a degree within the School of Physics and Astronomy should not take this module. Although this module aims to make only limited use of mathematics, competence with mathematics at the level of SQA National 5 (or Standard Grade) or GCSE is required.

Anti-requisites

Assessment
Continuous Assessment = 50%, 2 Hour Examination = 50%

Additional information on continuous assessment etc.

Recommended Books
Please view University online record:
http://resourcelists.st-andrews.ac.uk/modules/as1002.html

General Information
Please also read the additional information in the School's handbook for first and second level modules.