Overview

Astrophysics is an observational, rather than an experimental, science. Nearly all the information that astronomers can gather about the Universe at large and the objects within it, comes to us in the form of electromagnetic radiation. In this two-part course students will gain a comprehensive understanding of the observational work required for astronomical research.

Aims & Objectives

The aim of this module is to familiarise students with a wide range of observational techniques in astronomy and astrophysics. Students will gain practical experience in instrument building, planning, documenting and conducting of astronomical observations, measurements, data analysis and report writing.

Learning Outcomes

By the end of the module, students will have a comprehensive knowledge of basic ground-based observational techniques and data-analysis methods and will be able to:

- Plan a set of observations, including scheduling, instrument setup, exposure times, lunar phase.
- Operate optical telescopes competently.
- Acquire optical images of various astronomical objects, including the necessary calibration data.
- Perform photometry using standard astronomical software packages under the Linux operating system.
- Carry out the basic reduction and advanced analysis of optical images.
- Record and write up results in a professional manner.

Synopsis

This is a module that provides a complete overview of the practical part of research in observational astronomy. Students learn how to plan observations with telescopes at the university observatory, followed by data reduction and analysis. Exact topics covered will change annually depending on staff availability; examples include galaxy imaging, exoplanet transits and radio telescope construction. Further sources of data may be made available from international observatories. Students gain experience in observation, data analysis, the Linux operating system, standard astronomical software packages and modelling, and report writing.

Laboratory Hours

Mondays and Thursdays: 14:00 to 17:30, starting in the Honours Laboratory promptly at 14:00. A member of staff or demonstrator will be present to check on the progress of the various assignments, and to provide help where necessary. There are also some evening/night sessions.

Pre-requisites

AS2001 or AS2101, PH2011, PH2012, MT2001 or (MT2501 and MT2503)

Anti-requisites

None

Assessment

Continuous Assessment = 100%

Additional information on continuous assessment etc
Please note that the definitive comments on continuous assessment will be communicated within the module. This section is intended to give an indication of the likely breakdown and timing of the continuous assessment.

This is a 15 credit module, so is expected to take 150 hours of study for the average student at this level. The module's work is finished by revision week, so students can expect to commit about 14 hours a week to the module in weeks 1 to 11, including the Monday and Thursday afternoons scheduled usually in the computing cluster and the time spent observing.

This module has three assessed assignments, which are likely to be due in weeks 5, 8, and 11. This module is 100% continuously assessed. The continuous assessment is expected to take the form of three formal writeups, one for each observing “lab,” and lab book quiz(izes). The first writeup is a collaborative small-group report; the other two reports are written individually by each student.

**Accreditation Matters**
This module may not contain material that is part of the IOP “Core of Physics”, but does contribute to the wider and deeper learning expected in an accredited degree programme. The skills developed in this module, and others, contribute towards the requirements of the IOP “Graduate Skill Base”.

**Recommended Books**
Please view University online record:
http://resourcelists.st-andrews.ac.uk/modules/as4025.html

**General Information**
Please also read the general information in the School's honours handbook.