

PX144-6 Introduction to Astronomy

21/22

Department

Physics

Level

Undergraduate Level 1

Module leader

Daniel Bayliss

Credit value

6

Module duration

5 weeks

Assessment

100% exam

Study location

University of Warwick main campus, Coventry

Description

Introductory description

The Universe contains a bewildering variety of objects - black-holes, red giants, white dwarfs, brown dwarfs, gamma-ray bursts and globular clusters - to name a few. The module introduces these, and shows how, with the application of physics, we have come to know their distances, sizes, masses and natures. The module starts with the Sun and planets and moves on to the Universe as a whole.

[Module web page](#)

Module aims

To introduce the constituent objects of the Universe and the physics which allows us to estimate their distances, sizes, masses and natures. The module will show how our knowledge of the Universe beyond Earth relies upon the application and extrapolation of physics developed in the laboratory.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Description of the main constituents of the Universe with typical sizes, masses and distances covering: the Solar System. Stars and star clusters Angles, distances & sizes: angular size and the small-angle approximation; trigonometric parallax; simple telescopes; distance methods based upon the inverse square law of brightness.

Masses: the Doppler effect and the measurement of speed from spectra; the use of speeds and sizes to derive masses in the Solar System, binary stars, star clusters and galaxies.

Physical properties of stars: stellar temperatures; spectra and elemental compositions. Physical conditions within stars.

Galaxies: normal & active; the Milky Way; galaxy interactions; galaxy clusters.

The Universe: Hubble's discovery of the expansion of the Universe; implication of a finite age; the Cosmic Microwave Background; the composition of the Universe.

Learning outcomes

By the end of the module, students should be able to:

- List and describe the main constituents of the Universe
- Describe methods for measuring the distances of stars and galaxies and work through example computations
- Estimate the masses of stars and galaxies given information on size or angle, distance and speed
- Explain how the surface temperature of stars is measured and how the physical conditions of their interiors are inferred

Indicative reading list

Marc Kutner, Astronomy: a Physical perspective, CUP.

[View reading list on Talis Aspire](#)

Subject specific skills

Knowledge of mathematics and physics. Skills in modelling, reasoning, thinking.

Transferable skills

Analytical, communication, problem-solving, self-study

Study

Study time

Type	Required
Lectures	15 sessions of 1 hour (25%)
Private study	45 hours (75%)
Total	60 hours

Private study description

Working through lecture notes, solving problems, wider reading, discussing with others taking the module, revising for exam, practising on past exam papers

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group B1

	Weighting	Study time
In-person Examination	100%	
Answer 2 questions		

Feedback on assessment

Personal tutor, group feedback

[Past exam papers for PX144](#)

Availability

Courses

This module is Core for:

- UPXA-F3F5 Undergraduate Physics with Astrophysics (BSc)
 - Year 1 of F3F5 Physics with Astrophysics
 - Year 1 of F3F5 Physics with Astrophysics
- Year 1 of UPXA-F3FA Undergraduate Physics with Astrophysics (MPhys)

This module is Optional for:

- Year 1 of USTA-G300 Undergraduate Master of Mathematics, Operational Research, Statistics and Economics
- Year 1 of UPXA-FG33 Undergraduate Mathematics and Physics (BSc MMathPhys)
- UPXA-GF13 Undergraduate Mathematics and Physics (BSc)
 - Year 1 of GF13 Mathematics and Physics
 - Year 1 of GF13 Mathematics and Physics
- UPXA-FG31 Undergraduate Mathematics and Physics (MMathPhys)
 - Year 1 of FG31 Mathematics and Physics (MMathPhys)
 - Year 1 of FG31 Mathematics and Physics (MMathPhys)
- Year 1 of USTA-G1G3 Undergraduate Mathematics and Statistics (BSc MMathStat)
- USTA-GG14 Undergraduate Mathematics and Statistics (BSc)
 - Year 1 of GG14 Mathematics and Statistics
 - Year 1 of GG14 Mathematics and Statistics
- USTA-Y602 Undergraduate Mathematics, Operational Research, Statistics and Economics
 - Year 1 of Y602 Mathematics, Operational Research, Stats, Economics
 - Year 1 of Y602 Mathematics, Operational Research, Stats, Economics
- UPXA-F300 Undergraduate Physics (BSc)
 - Year 1 of F300 Physics
 - Year 1 of F300 Physics
 - Year 1 of F300 Physics
- UPXA-F303 Undergraduate Physics (MPhys)
 - Year 1 of F300 Physics
 - Year 1 of F303 Physics (MPhys)
- Year 1 of UPXA-F3N1 Undergraduate Physics and Business Studies
- Year 1 of UPXA-F3N2 Undergraduate Physics with Business Studies

This module is Option list B for:

- UMAA-G100 Undergraduate Mathematics (BSc)
 - Year 1 of G100 Mathematics
 - Year 1 of G100 Mathematics
 - Year 1 of G100 Mathematics
- UMAA-G103 Undergraduate Mathematics (MMath)
 - Year 1 of G100 Mathematics
 - Year 1 of G103 Mathematics (MMath)
 - Year 1 of G103 Mathematics (MMath)
- Year 1 of UMAA-G106 Undergraduate Mathematics (MMath) with Study in Europe
- Year 1 of UMAA-G1NC Undergraduate Mathematics and Business Studies
- Year 1 of UMAA-G1N2 Undergraduate Mathematics and Business Studies (with Intercalated Year)
- Year 1 of UMAA-GL11 Undergraduate Mathematics and Economics
- Year 1 of UECA-GL12 Undergraduate Mathematics and Economics (with Intercalated Year)
- UMAA-GV17 Undergraduate Mathematics and Philosophy
 - Year 1 of GV17 Mathematics and Philosophy
 - Year 1 of GV17 Mathematics and Philosophy
 - Year 1 of GV17 Mathematics and Philosophy
- UMAA-GV18 Undergraduate Mathematics and Philosophy with Intercalated Year

- Year 1 of GV18 Mathematics and Philosophy with Intercolated Year
- Year 1 of GV18 Mathematics and Philosophy with Intercolated Year
- Year 1 of UMAA-G101 Undergraduate Mathematics with Intercolated Year