

Module code

SPP-3408

Type of module

Undergraduate: Applied Physics – Elective

Physics of the Universe



Modular credits

4

Total student
engagement

56 hours

Prerequisite

**SPP-1203 Classical
Mechanics**

Anti-requisite

None

Aims

To introduce students to the fundamental principles of astronomy, astrophysics, and cosmology, developing an understanding of the physical processes that govern stars, galaxies, and the universe, and equipping them with the tools to analyse and interpret astronomical observations.

Module learning outcomes (MLO)

On successful completion of this module, a student will be expected to be able to:

MLO 1

Apply physical laws and principles to explain astronomical and cosmological phenomena.

MLO 2

Analyse observational data and evidence to interpret the properties and evolution of stars, galaxies, and the universe.

MLO 3

Evaluate models of the universe and their implications for its structure, composition, and expansion.

MLO 4

Integrate concepts from astronomy, astrophysics, and cosmology to explain large-scale physical processes in the universe.

MLO 5

Synthesise observational evidence and theoretical understanding to construct reasoned explanations of current challenges in modern astrophysics and cosmology.

Module contents

Scales and structure of the universe	Celestial coordinates and sky observation	Electromagnetic spectrum and radiation
Telescopes and satellite observatories	Light, spectra, and redshift	Stellar formation and classification
Stellar evolution and remnants	Solar system structure and dynamics	Exoplanet detection and properties
Galaxies and their evolution	Dark matter and galactic rotation	Cosmic expansion and Hubble's Law
Big Bang and early universe	Dark energy and cosmic fate	

Assessment

60% **40%**
Examination Coursework



■ Examination — 60% ■ Weekly assignments — 10% ■ Tests — 10% ■ Group Project — 20%

Formative assessment

Weekly discussion,
quizzes, and feedback

Summative assessment

COMPONENT	WEIGHTING
Examination	60%
Coursework	40%
Individual	20%
Weekly assignments	10%
Tests	10%
Group	20%
Group Project	20%

Graduate attributes and skills

Programme learning objectives (PLO) addressed

- 1 PLO 1 (Core Disciplinary Knowledge)
- 3 PLO 3 (Experimental and Instrumentation Skills)
- 6 PLO 6 (Communication and Professionalism)

- 2 PLO 2 (Critical Thinking and Comparative Analysis)
- 4 PLO 4 (Numerical and Analytical Competence)

Sustainability concept addressed

- 9 SDG 9 Industry, Innovation, and Infrastructure

Digital skills/software used (not limited to)

- General-purpose applications (e.g. Microsoft Office)
- Multimedia applications (e.g. VLC Media Player)
- Database software (e.g. ASTAP)
- Web browsers (e.g. Google Chrome)
- Computational, simulation, and visualisation software (e.g. Stellarium)

Micro-credentialling option

No

Stackable towards GenBESTARI Undergraduate Degree Programme or other relevant Lifelong Learning Programmes

No

Document details

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