Imperial College London

Module Specification (Curriculum Review)

Basic details

			Earliest cohort	Latest cohort
UID		Cohorts covered	2022-23	

Long title	Suns, Stars and Planets
New code	PHYS50006
New short title	Suns, Stars & Planets
Brief description of module *(approx. 600 chars.)*	By studying this module, students will become familiar with the structure and evolution of the Sun and other stars. Students will also learn about the key physical principles that determine the current state of the planets in our own Solar System, and that allow us to detect and begin to characterise planets in other star systems.

333 characters

Available as a standalone module/ short course? N

Statutory details

	ECTS	CATS	Non-credit	HECOS codes
Credit value	5	10	N	
FHEQ level	5			

Allocation of study hours

	Hours	
Lectures	22	
Group teaching	0	*Incl. seminars, tutorials, problem classes.*
Lab/ practical	0	
Other scheduled	11	*Incl. project supervision, fieldwork, external visits.*
Independent study	92	*Incl. wider reading/ practice, follow-up work, completion of assessments, revisions.*
Placement	0	*Incl. work-based learning and study that occurs overseas.*
Total hours	125	
ECTS ratio	25.00	

Project/placement activity

Is placement activity allowed? No

Module delivery

Delivery mode	Taught/ Campus	Other	
Delivery term		Other	Term 3

Ownership

Primary department: Physics

Additional teaching departments	None
Delivery campus	South Kensington

Collaborative delivery

Collaborative delivery?	N

External institution	N/A
External department	N/A
External campus	N/A

Associated staff

Role	CID	Given name	Surname
Module Leader		Juliet	Pickering

Learning and teaching

Module description

Learning outcomes	On completion of this module you will be able to: • Demonstrate familiarity with the stellar structure equations and explain the physical concepts underpinning them • Derive scaling relations from the stellar structure equations • Discuss how the derived scalings compare to observed relations for main-sequence stars • Describe the characteristics of the internal structure as well as the outer layers of the Sun • Describe the current state of planets and smaller bodies in our own Solar System, including internal structure, atmospheric structure and surface temperature. • Demonstrate an appreciation of the wide range of physics and chemistry that determines the current state of planetary and small body surfaces. • Describe the methods used to detect planets around other stars, including the limitations and selection effects inherent in these methods
Module content	• Stellar Structure: stellar structure equations, energy generation and transport; hydrostatic equilibrium; the Schwarzschild convective stability criterion. • Scaling laws resulting from the stellar-structure equations as applied to main-sequence stars; comparisons to observed scaling relations; the role of mass in determining stellar characteristics • Sun: Internal structure and outer layers (atmosphere); the Sun in context • Stars: Life-cycle basics; the Hertzsprung-Russell diagram; Concepts of magnitude, parallax and proper motion in stellar astronomy • Planets and smaller bodies in our own Solar System: internal structure, atmospheric structure and surface temperature; prediction of surface temperatures for objects without atmospheres; Kepler’s laws of planetary motion; Methods used to detect planets around other stars, including the limitations and selection effects inherent in these methods; Exoplanets; Current state of the search for life elsewhere in the universe

Learning and Teaching Approach	Students will be taught using a combination of lectures, office hours, and directed exercises on theoretical work
Assessment Strategy	A written exam (2h) in term 3 covering all learning outcomes will comprise the summative assessment and will contribute 100% of the module mark. The exam will test competences in any of the listed learning outcomes.
Feedback	General feedback on written examinations for each module is provided in the form of written reports from the examiners for the students.
Reading list	Self-contained lecture notes are provided to the students, so there is no text book required for this module. For students wishing to explore the topic further, a range of (fully optional) textbooks are listed as suitable sources. These include •Principles of Astrophysics, by Charles R. Keeton, Springer •The Stars: their structure and evolution, by Roger J. Taylor, CUP, 2nd edition •An Introduction to the Sun and Stars, Simon F. Green & Mark H. Jones (eds), CUP •Planets & Planetary Systems, by Stephen Eales, Wiley-Blackwell •Transiting Exoplanets, by Carole Haswell, CUP •Exploring the Solar System, by Peter Bond, Wiley-Blackwell •An Introduction to the Solar System, David A. Rothery, Neil McBride & Iain Gilmour (eds), CUP •An Introduction to Astrobiology, David A. Rothery, Iain Gilmour & Mark Sephton (eds), CUP

Quality assurance

Date of first approval	
Date of last revision	
Date of this approval	
Module leader	Juliet Pickering

Office use only

QA Lead	
Department staff	
Date of collection	
Date exported	
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Notes/ comments

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