Imperial College London

Module Specification (Curriculum Review)

Basic details

			Earliest cohort	Latest cohort
UID		Cohorts covered	2025-26	

Long title: Solid State Physics

New code	PHYS60003	New short title	Solid State Physics

Brief description of module *(approx. 600 chars.)*:

This course covers the fundamentals of the physics of solids. We will explore how the properties of solids are determined by microscopic physics. There will be focus on electronic properties of insulators, semiconductors and metals.

233 characters

Available as a standalone module/ short course? N

Statutory details

	ECTS	CATS	Non-credit	HECOS codes
Credit value	7.5	15	N	

FHEQ level: Level 6

Allocation of study hours

	Hours	
Lectures	22	
Group teaching	6	*Incl. seminars, tutorials, problem classes.*
Lab/ practical	0	
Other scheduled	11	*Incl. project supervision, fieldwork, external visits.*
Independent study	148.5	*Incl. wider reading/ practice, follow-up work, completion of assessments, revisions.*
Placement	0	*Incl. work-based learning and study that occurs overseas.*
Total hours	187.5	
ECTS ratio	**25.00**	

Project/placement activity

Is placement activity allowed? No

Module delivery

Delivery mode	Taught/ Campus	Other	
Delivery term		Other	Term 1, exam in 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		Niladri	Banerjee

Learning and teaching

Module description

Learning outcomes	On completion of this module you will be able to: - explain and apply the band theory picture of electrons in solids - distinguish between an insulator, metal or semiconductor - describe electrical conduction in metals - explain the basic electronic properties of a semiconductor
Module content	- Reciprocal lattice and Brillouin zones - Bloch's theorem and electron bands: nearly free electron model and tight-binding models - Fermi surfaces of a metal - Electrical conduction: Drude theory, drift and diffusion - Valence and conduction bands in a semiconductor - Intrinsic and extrinsic semiconductors - pn junction
Learning and Teaching Approach	Students will be taught over a term using a combination of lectures, office hours, directed problem solving in seminars, and exercises in problem sheets for homework. A fraction of problems are for in-course assessment (see below).
Assessment Strategy	An exam covering all learning outcomes will comprise the main part of the summative assessment and will comprise 80% of the module mark. In-course assessments in the form of 3-5 assessed problem sheets (online and handwritten) will comprise 20% of the mark.

Feedback	Formative feedback will be provided throughout the module following formative assessment in forms such as online tests and verbal feedback in seminars by teaching assistants. Feedback for assessed problems are provided as written solutions. Solutions for non-assessed problem sheets are published 1-2 weeks after release of the problems. General feedback on written examinations for each module is provided in the form of written reports from the examiners for the students.
Reading list	No additional books are required to be purchased by the students. Further discussion of material covered by the course, along with relevant problems can be found in: • S. H. Simon, The Oxford Solid State Basics. (OUP, 2013) • J. R. Hook and H. E. Hall, Solid State Physics. (Wiley-Blackwell, 1991) • C. Kittel, Introduction to Solid State Physics 8th edition, John Wiley & Sons, 2004)

Quality assurance

Date of first approval	
Date of last revision	
Date of this approval	
Module leader	Niladri Banerjee

Office use only

QA Lead	
Department staff	
Date of collection	
Date exported	
Date imported	

Notes/ comments

Template version 16/06/2017

Programme structure

Associated modules

UID	Legacy code	Module title	Requisite type

Assessment details

		Pass mark
Grading method	Numeric	40%

Assessments

Assessment type	Assessment description	Weighting	Pass mark	Must pass?
Examination	2-hour written exam	80%	40%	N
Coursework	In-course assessment	20%	40%	N