Imperial College London

Module Specification (Curricu

Basic details

UID		Cohorts covered (Earliest cohort)	2025-26
Long title	Opto-electronic Devices		
New code	PHYS70032	New short title	
Brief description of module *(approx. 600 chars.)*	An introduction to the most important device components from the worlds of opti telecommunication, space lighting, optical displays and sustainable energy produ acquire advanced mastery of the principles of diode laser action and design, and how quantum theory can be harnessed to improve performance in nano-scale de consider the key factors affecting the use of photovoltaics and LED lighting as p energy future. You will examine the operation of optical displays, how the huma works and the way in which it perceives light and colour, and the operating princi displays and their development.		
Available as a standalone module/ short course?	N		

Statutory details

	ECTS	CATS	Non-credit	
Credit value	5	10	N	HECOS codes
FHEQ level	Level 7			

Allocation of study hours

	Hours	
Lectures	15	
Group teaching	5	*Incl. seminars, tutorials, problem classes.*
Lab/ practical		
Other scheduled	10	*Incl. project supervision, fieldwork, external visits.*
Independent study	95	*Incl. wider reading/ practice, follow-up work, completion of assess*
Placement		*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	Term 2	Other	

Ownership

Primary department	Physics
Additional teaching departments	

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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		Chris	Phillips

Learning and teaching

Module description

Learning outcomes	On completion of this module students will be able to: - compute the effect of band structure and carrier statistics in determining the characteris and the operation of associated lasers, LEDs and detectors - model the way light interacts with electrons in crystalline materials - use photometric units and chromaticity diagrams to characterise the human visual perce colour - critique the key performance characteristics of optical displays and their impact on displ
Module content	Semiconductor Crystals, doping, law of Mass Action. P-N junctions.LEDs. LEDs for space Lasers. Diode Lasers for telecommunications, data and research. Photovoltaics, 1st, 2nd ideas and key performance limits. Low dimensional systems, basic quantum theory and ho device performance in Quantum Well lasers. Intersubband devices for emission and detec infrared. Optical Display Characteristics (Brightness, Colour hue and saturation, Contrast, Viewing Response time, Memory, Resolution, Durability); Visual perception; Colour charts; Display (Thin film electroluminescence, Field emission, Organic LED, Inorganic LED, Fluorescent li emissive (Liquid crystal, Micromirror, Electrochromic, Electrophoretic)
Learning and Teaching Approach	Students will be taught through a combination of lectures and classworks (where a timetab for a group problem solving exercise) supported by problem sheets and office hours.
Assessment Strategy	A 2 hour written examination provides 100% summative assessment. Examination questio assess across all of the learning outcomes. Formative assessment is provided through the problem sheets and classworks.
Feedback	Problem sheets are provided and model solutions are provided. An office hour is provided the module to allow for feedback and direct interaction between students and lecturers. Cl opportunity for group discussion and for students to receive feedback on the classwork e
Reading list	

	The material is contemporary and fluid to have appeared in a text book, and the widely distributed online for students to access in a way that best suits their nee

Quality assurance

Date of first approval	
Date of last revision	
Date of this approval	
Module leader	Chris Phillips
Notes/ comments	

Office use only

QA Lead	
Department staff	
Date of collection	
Date exported	
Date imported	

Template version

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Latest cohort

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d each week during lassworks provide an xercises.

key resources are
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16/06/2017