

## Basic details

UID	<input type="text"/>	Cohorts covered	Earliest cohort <input type="text" value="2025-26"/>
Long title	<input type="text" value="Opto-electronic Devices"/>		
New code	<input type="text" value="PHYS70032"/>	New short title	<input type="text"/>
Brief description of module (approx. 600 chars.)	<input type="text" value="An introduction to the most important device components from the worlds of optical telecommunication, space lighting, optical displays and sustainable energy production. You will 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 devices. You will consider the key factors affecting the use of photovoltaics and LED lighting as part of our energy future. You will examine the operation of optical displays, how the human eye works and the way in which it perceives light and colour, and the operating principles of optical displays and their development."/>		
Available as a standalone module/ short course?	<input type="text" value="N"/>		

## Statutory details

	ECTS	CATS	Non-credit	HECOS codes
Credit value	<input type="text" value="5"/>	<input type="text" value="10"/>	<input type="text" value="N"/>	
FHEQ level	<input type="text" value="Level 7"/>			

## Allocation of study hours

	Hours	
Lectures	<input type="text" value="15"/>	
Group teaching	<input type="text" value="5"/>	<i>Incl. seminars, tutorials, problem classes.</i>
Lab/ practical	<input type="text"/>	
Other scheduled	<input type="text" value="10"/>	<i>Incl. project supervision, fieldwork, external visits.</i>
Independent study	<input type="text" value="95"/>	<i>Incl. wider reading/ practice, follow-up work, completion of assessments.</i>
Placement	<input type="text"/>	<i>Incl. work-based learning and study that occurs overseas.</i>
Total hours	<input type="text" value="125"/>	
ECTS ratio	<input type="text" value="25.00"/>	

## Project/placement activity

Is placement activity allowed?	<input type="text" value="No"/>
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## Module delivery

Delivery mode	<input type="text" value="Taught/ Campus"/>	Other	<input type="text"/>
Delivery term	<input type="text" value="Term 2"/>	Other	<input type="text"/>

## Ownership

Primary department	<input type="text" value="Physics"/>
Additional teaching departments	<input type="text"/>

Delivery campus **South Kensington**

## Collaborative delivery

Collaborative delivery? **N**

External institution  
External department  
External campus

N/A  
N/A  
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: <ul style="list-style-type: none"><li>- compute the effect of band structure and carrier statistics in determining the characteristics and the operation of associated lasers, LEDs and detectors</li><li>- model the way light interacts with electrons in crystalline materials</li><li>- use photometric units and chromaticity diagrams to characterise the human visual perception of colour</li><li>- critique the key performance characteristics of optical displays and their impact on display technology</li></ul>
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 order ideas and key performance limits. Low dimensional systems, basic quantum theory and how it affects device performance in Quantum Well lasers. Intersubband devices for emission and detection in the infrared. Optical Display Characteristics (Brightness, Colour hue and saturation, Contrast, Viewing angle, Response time, Memory, Resolution, Durability); Visual perception; Colour charts; Display technologies (Thin film electroluminescence, Field emission, Organic LED, Inorganic LED, Fluorescent lamp, Plasma emissive (Liquid crystal, Micromirror, Electrochromic, Electrophoretic)
Learning and Teaching Approach	Students will be taught through a combination of lectures and classworks (where a timetable 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 questions will 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 at the end of the module to allow for feedback and direct interaction between students and lecturers. Classwork provides an opportunity for group discussion and for students to receive feedback on the classwork exercises.
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 need

## Quality assurance

Date of first approval   
Date of last revision   
Date of this approval

Module leader

Notes/ comments

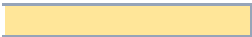
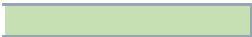
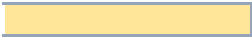
## Office use only

QA Lead   
Department staff   
Date of collection

Date exported   
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# lum Review)

Latest cohort



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16/06/2017