Imperial College London

Module Specification (Curriculum Review)

Basic details

			Earliest cohort	Latest cohort
UID		Cohorts covered	2024-25	

Long title: Lasers

New code: PHYS60006 | New short title: Lasers

Brief description of module *(approx. 600 chars.)*: Few modern devices have had the widespread impact that lasers have in science, industry, medicine, communication, and even popular culture. This course aims to give students an quantitative understanding of the fundamentals of laser physics. It builds on their existing knowledge of electromagnetism, quantum physics, atomic physics, and optics to explain the underlying physics and operation of lasers.

403 characters

Available as a standalone module/ short course? Y

Statutory details

	ECTS	CATS	Non-credit
Credit value	5	10	N

HECOS codes:

FHEQ level: Level 6

Allocation of study hours

	Hours	
Lectures	16	
Group teaching	0	*Incl. seminars, tutorials, problem classes.*
Lab/ practical	0	
Other scheduled	24	*Incl. project supervision, fieldwork, external visits.*
Independent study	85	*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	Term 2	Other	Term 2, 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	1429	Michael	Damzen

Learning and teaching

Module description

Learning outcomes	Students will develop a mathematically rigorous understanding of laser physics. They will learn the basic mechanisms of laser action and how real-world lasers operate. Students will obtain an appreciation of the spatial, temporal and spectral properties of laser emission and how these properties can be controlled through the physical properties of the laser device.
Module content	The course covers key topics in laser physics including radiative transitions, line broadening, laser amplification and laser oscillation, Gaussian beams and pulsed lasers.
Learning and Teaching Approach	Students will be taught over one term using a combination of lectures, office hours, problem sheets and regular quiz questions and occasional challenge questions to engage student thinking on key lecture material.
Assessment Strategy	100% summative assessment based on final 2-hour exam.
Feedback	Feedback will be provided via office hours, detailed model solutions to the problem sheets and answers to in-lecture and Blackboard quizzes The discussion board on Blackboard will also be used.
Reading list	Recommended texts: Principles of Lasers by Orazio Svelto ISBN 1441913017 Laser Physics by Peter Milonni and Joseph Eberly ISBN: 978047038771 Lasers by Anthony Siegman ISBN: 0198557132

Quality assurance

Office use only

Date of first approval		QA Lead	
Date of last revision		Department staff	
Date of this approval		Date of collection	
		Date exported	
Module leader	Michael Damzen	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	2hr Written Exam	100%	40%	N
		100%		