Imperial College London

Module Specification (Curriculum Review)

Basic details

			Earliest cohort	Latest cohort
UID		Cohorts covered	2021-22	

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		John	Tisch

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 a number of Python programming exercises, where students will model different aspects of laser operation to develop a deeper understanding of the physics.
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 programming exercises. In-lecture and Blackboard quizzes will be used to test understanding. The discussion board on Blackboard will also be used.
Reading list	Recommended texts: Laser Fundamentals by William Silfvast ISBN 9780521541053 Laser Physics by Simon Hooker and Colin Webb ISBN 0198506910

Quality assurance

Date of first approval	
Date of last revision	
Date of this approval	
Module leader	John Tisch

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

Programme structure

Associated programmes

UID	Legacy code	Programme title	Core?

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%		