Imperial College London

Module Specification (Curriculum Review)

Basic details

UID		Cohorts covered	Earliest cohort: 2024-25; Latest cohort:
Long title	Optics and Photonics Laboratory		
New code	PHYS70027	New short title	
Brief description of module *(approx. 600 chars.)*	You will follow a set of experiments ranging from short introductory experiments, through longer experiments and finally an extended self-design project. You will be exposed to a wide variety of optical techniques and phenomena that you will also see in taught lecture modules.		
	279 characters		
Available as a standalone module/ short course?	N		

Statutory details

	ECTS	CATS	Non-credit		
Credit value	15	30	N	HECOS codes	
FHEQ level	Level 7				

Allocation of study hours

	Hours	
Lectures	5	
Group teaching		*Incl. seminars, tutorials, problem classes.*
Lab/ practical	165	
Other scheduled		*Incl. project supervision, fieldwork, external visits.*
Independent study	205	*Incl. wider reading/ practice, follow-up work, completion of assessments, revisions.*
Placement		*Incl. work-based learning and study that occurs overseas.*
Total hours	375	
ECTS ratio	25.00	

Project/placement activity

Is placement activity allowed?	No

Module delivery

Delivery mode	Taught/ Campus	Other	
Delivery term		Other	Term 1 and Term 2

Ownership

Primary department	Physics
Additional teaching departments	
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		Mark	Neil

Learning and teaching

Module description

Learning outcomes	On completion of this module you will be able to: - recognise a range of optical phenomena and their fundamental origins, and understand their significance in the operation of, and/or the limitations they impose in, optical instrumentation - use state of the art optical measurement techniques, optical instruments and components - construct detailed optical instrumentation from simpler components to address specific optical measurements - critically analyse the results of measurements made during experiments, taking account of errors. - model extended optical experiments using your own computer programmes or through dedicated software - Keep a laboratory record - Produce written reports in a variety of scientific formats
Module content	The module will contain practical work related to: - a range of optical phenomena incuding: refraction, diffraction, interference, dispersion, polarisation, imaging; - making use of optical components including: lasers, optical fibres, detectors, cameras, lenses, mirrors, diffraction gratings; - using optical methods: spectrometers, interferometers, computer modelling.
Learning and Teaching Approach	The module consists of 3 sections. 1. **Demonstration Experiments**: Students will follow 15 different demonstration experiments, each completed in a single 3 hour session. A complete laboratory script will be provided for the experiment and students will be required to keep a lab-record of their progress togther with results, their analysis and conclusions. 2. **Standard Experiments**: Students will choose 4 standard experiments that are each completed over four 3 hour laboratory sessions usually spaced out over a week. A script will be provided for the experiment, but students will be encouraged to explore the material in greater depth than in the Demonstration experiments. Students will also keep a record of their experiment in a lab-record and in addition, for each experiment, produce a written report on their work in the lab in the form of a scientific report. A variety of scientific report formats will be used reflecting those used in academic or industrial contexts. 3: **System design**: From a set of suggested topics students choose one topic that they will use as a basis for designing and constructing their own system. Students will initially be expected to develop their own proposal document detailing how they expect to fulfill the brief for their design, including methodology to be used, target specifications, required equipment and an appropriate risk assessment. Over 60 hours in the lab they will construct their system and demonstrate its performance. They will write a final report on the system that they have designed and built. Throughout the lab students will be supported by laboratory instructors who will be able to provide help and advice on the experiments that they are undertaking as well as how to keep a suitable lab-record.

Assessment Strategy	Throughout the laboratory module formative assessment will be provided by the laboratory demonstrators on lab record keeping and for general understanding of the physical phenomena being investigated. Students must complete the **demonstration experiments**. During the **demonstration experiments** students keep a lab-record of their work. There is no summative assessment as these experiments are primarily aimed at ensuring that students are introduced to key phenomena and techniques and understand the importance of, and develop good skills in keeping a complete, accurate and up-to-date lab-record. To reinforce this and as a record of their completion of each experiment, students will be required to submit their lab-record at the end of each laboratory session during the demonstration experiments. **Standard Experiments** are assessed through written reports and will be marked for summative and formative assessment. Students write reports for each of the 4 experiments undertaken, in a range of formats which are appropriate to professional scientific communications: 2 experiments will be assessed by a 2-page conference abstract, 1 experiment will be assessed by a 10-page formal laboratory report, and 1 experiment will be assessed by a 4-page journal style report based on the Optics Letters template. Each report has equal weighting. The **System Design** exercise will be assessed via a formal 20-page report, which will be marked for both summative and formative assessment. The Standard Experiments (together) and the System Design exercise have equal weighting. The aim through all of the laboratory assessment is to assess that the physics being studied has been understood, that appropriate scientific methods have been used and that reports are being written in an appropriate scientific format.
Feedback	Feedback will be given by instructors during laboratory sessions on physical understanding and laboratory record keeping. Written feedback will be provided on the submitted written reports to highlight particular areas of understanding, formatting and style. Verbal feedback will be provided at the proposal stage of the System Design exercise to help students develop their projects in a successful and timely manner.
Reading list	Laboratory scripts to support the individual experiements are provided in the laboratory.

Quality assurance

Date of first approval	
Date of last revision	June 2023
Date of this approval	
Module leader	Mark Neil

Office use only

QA Lead	
Department staff	
Date of collection	
Date exported	
Date imported	

Notes/ comments

Template version 16/06/2017