Programme Information		
Programme Title	Programme Code	HECoS Code
Photonics	F3U6	For Registry Use Only

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
MRes	1 calendar year (12 months)	Full-time	Annually in October	90	180
PG Certificate	N/A	N/A	*	30	60
* The PG Certificate is an exit award and is not available for entry. You must apply to and join the MRes					

Ownership			
Awarding Institution	Imperial College London	Faculty	Faculty of Natural Sciences
Teaching Institution	Imperial College London	Department	Physics
Associateship	Diploma of Imperial College (DIC)	Main Location(s) of Study	South Kensington Campus
External Reference			
Relevant QAA Benchmark Statement(s) and/or other external reference points		N/A	
FHEQ Level		7	
EHEA Level		2nd Cycle	
External Accreditor(s) (if applicable)			
External Accreditor 1:	N/A		
Accreditation received:	N/A	Accreditation renewal:	N/A
Collaborative Provision			
Collaborative partner	Collaboration type	Agreement effective date	Agreement expiry date
N/A	N/A	N/A	N/A
Specification Details			
Programme Lead		Professor Christopher Dunsby Dr Mary Matthews Dr James McGinty Professor Mark Neil	

Student cohorts covered by specification	2025-26 entry
Date of introduction of programme	October 09
Date of programme specification/revision	March 26

Programme Overview

Photonics is of key importance in many areas of research in natural science engineering and medicine. Preparing students for academic research in these areas benefits greatly form a formal training in fundamental aspects of optics, and the development of an extended project at the forefront of current research activity. Building on foundations taken from the MSc in Optics and Photonics, the MRes in Photonics is intended to provide this training. Imperial has offered an advanced programme in optics for over 90 years and the MRes Photonics draws on our experience as one of the largest centres for optics-based research and application in the UK.

This programme forms the first year of a 1+3 structure for students who have been offered a place to take up a PhD on completion of the programme, if they do not already have the significant grounding in Photonics necessary for their PhD project.

The main coursework (lectures and laboratory work), which takes place in the first term, consists of practical laboratory work and three lecture-based modules that together provide a key grounding in some of the essential knowledge and skills underpinning photonics. You choose further lectures from the elective modules available (either in Term 1 or Term 2). The laboratory work provides key training in basic skills and techniques widely used in photonics research. The main module of your studies is a nine-month, full-time MRes research project starting in January which is usually carried out in an academic research group, working at the forefront of their current research.

Graduates of this course have the fundamental knowledge of photonics, specialist skills and knowledge in the specific area around their project and are well qualified to go on to doctoral studies at Imperial.

Learning Outcomes

On successful completion of the programme, our aim is that you will have achieved the following Learning Outcomes, based on the different activities, and be able to:

1) Use theoretical knowledge of the fundamental laws and principles of optics and photonics, and appropriate mathematical techniques applied to the physical world to solve real-world problems in optics.
2) Organise as part of a team the design, and execute safely, a series of experiments or computations, including the identification and use of appropriate specialist equipment
3) Evaluate and select appropriate theoretical knowledge of optical principles and mathematical techniques to support practical work
4) Model and simulate complete optical experiments and systems using appropriate specialist software
5) Determine the strength and validity of results obtained from experiments, models or simulations, include appropriate consideration of errors, and draw conclusions
6) Report the results of experimental work in writing
7) Evaluate the inter-relationships between a range of complex/advanced topics in optics and photonics, and explain their application
8) Critically examine the scientific literature to design an experimental, theoretical and/or computational investigation that extends current knowledge in the field
9) Execute independently an extended research project, analyse the results and formulate new knowledge that can be applied to real-world situations and contribute to the development of that research field.
10) Present the details of the research project, the work carried out, results and conclusions to a specialist audience orally and in writing

Students not eligible for the MRes may be awarded an alternative award (see “Progression and Classification”). For the award of the PG Certificate (30 ECTS), students would achieve the learning outcomes 1-6.

The Imperial Graduate Attributes are a set of core competencies which we expect students to achieve through completion of any Imperial degree programme. The Graduate Attributes are available at: www.imperial.ac.uk/about/education/our-graduates/

Entry Requirements	
Academic Requirement	Normally a first class (1st) UK Bachelor's Degree with Honours in Physics. Other scientific disciplines (e.g. engineering, chemistry, mathematics) may be considered (or a comparable qualification recognised by the university) on an individual basis. For further information on entry requirements, please go to www.imperial.ac.uk/study/apply/postgraduate-taught/entry-requirements/accepted-qualifications/
Non-academic Requirements	Applicants with relevant work experience (or a comparable qualification recognised by the university) will be considered on a case-by-case basis and in accordance with Imperial's MRes entry requirements.
English Language Requirement	Standard requirement (PG) Please check for other Accepted English Qualifications
Admissions Test/Interview	All applicants will be interviewed.

The programme's competency standards documents can be found at: www.imperial.ac.uk/media/imperial-college/faculty-of-natural-sciences/department-of-physics/public/students/current-students/pgt/FoNS-Competence-Standards---Physics-PGT.pdf

Learning & Teaching Approach

Learning and Teaching Delivery Methods

The programme is delivered using a range of methods including lectures, classworks, laboratory classes (including computational work) and directed supervision on projects. It is not possible for projects to be carried out partly or wholly at an external organisation.

Lectures are 50-minute oral presentations. The lecturer provides supporting material that may include notes, problem sheets and solutions and other resources. Learning is guided through classworks (where a timetabled session is used for a group problem solving exercise) and regular problem sheets. Lectures may be 'flipped', where recorded material is provided in advance of classwork and group exercises. All of the material that lecturers provide is available online via Blackboard. Lecturers provide office hours as informal drop-in question and answer sessions for students.

Practical/Laboratory is timetabled for a total of 100 hours over Term 1. Your first laboratory work will be short well scripted experiments so that you can understand the operation of key optical experimental equipment, understand the basic procedures and the protocols of safe working in the laboratory and keep a good laboratory notebook. As your work develops in the laboratory your experiments will be less scripted and you will be expected to plan the progression of your experiment. Some of these experiments will involve computation, modelling or simulation. In the laboratory you will work in a group of 2 or 3 students. You will write up your work individually and will be asked to write reports in a range of different formats that are routinely required in reporting scientific work.

Project work is carried out individually. You will complete a nine-month research project, incorporating a literature review of the research area.

Your Master's research project is agreed through discussion with staff at the beginning of Term 1 (or more often before you join the programme) so preparation for the major project work can be incorporated into your choice of modules.
Each project is supervised by a member of staff. Typically you will meet your project supervisor weekly, though it may vary depending on the nature of your project. You will begin your project work at the beginning of Term 2, working full-time on your project (apart from preparation for exams in April/May. At the end of Term 2 you will submit a report and give a short oral assessment on your literature review. In September, at the end of the project of the project, you will submit a dissertation and give a final short oral assessment.

Overall Workload

Your overall workload consists of scheduled contact time including lectures, classworks, laboratory and project work, and independent learning. While your actual contact hours may vary according to the elective modules you choose to study, the following gives an indication of how much time you will need to allocate to different activities at each level of the programme. At Imperial, each ECTS credit taken equates to an expected total study time of 25 hours. Depending on the combination of elective modules taken, you will normally accumulate either 90 or 92.5 ECTS for the MRes. Therefore, the expected total study time is 2250-2312.5 hours over entire MRes programme (including the summer). This is composed of approximately 562.5-625 hours associated with the taught modules, 187.5 hours associated with laboratory work and 1500 hours associated with project work. Should you choose electives such that your total is 92.5 ECTS, the Programme Lead will discuss this with you so that you are aware of the additional workload.

Assessment Strategy

Assessment Methods

The assessment method is largely determined by the nature of the module.

Most lectured/taught modules are predominantly assessed summatively by written examinations in January and April/May, but some include assessed coursework and/or practical work.

Laboratory work is assessed by written reports. You will be asked to write these reports in different styles to reflect the different ways in which scientific work is reported. These are marked by staff before being returned to you.

The MRes research project are assessed by written reports (for the literature reviews approximately 6,000 words, and for the final research project 30,000 words) and two short oral assessments (each of 20 minutes including questions).

This choice of assessments across the different activities ensures that the assessments are more evenly spread across the year, with regular deadlines for laboratory report submission across term 1, and written examinations coming after periods when there are no scheduled activities.

The balance of the different assessment also reflects the emphasis on laboratory and practical work. This table shows an indicative relative weighting of the different assessments over the programme. The exact balance will depend on your chosen electives.

Written examinations	26%
Laboratory work	8%
Project work (9 months)	66%

Academic Feedback Policy

Feedback will be provided for all assessments carried out as part of this programme and takes many forms depending on the nature and learning outcomes of the module involved. Examples of feedback mechanisms include:

- Oral feedback to a group may be provided during or after lectures
- Oral feedback and guidance while you are working in the laboratory
- Personal feedback may follow from discussion with lecturers after lectures or during office hours
- Personal feedback from your project supervisors
- Personal feedback on your oral presentations
- Interactive feedback may follow from peer group discussion
- Written feedback may take the form of solutions to coursework or writing on formal reports
- In July you will give a short oral presentation on your progress and project plans which provides an opportunity for formative feedback

Other aspects of feedback come from taking time to think about what you do or do not understand well, and from other discussions with teaching staff, lab demonstrators, project supervisors and your classmates.

For formal summative assessment of coursework Imperial's policy is to provide formal feedback within 10 working days of submission for most exercises and the Department of Physics adheres to this policy. For any exceptions, you will be informed in advance of the coursework being set. Imperial's Policy on Academic Feedback and guidance on issuing provisional marks to students is available at: www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/
Re-sit Policy
Imperial's Policy on Re-sits is available at: www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/
Mitigating Circumstances Policy
Imperial's Policy on Mitigating Circumstances is available at: www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/

Additional Programme Costs		
This section should outline any additional costs relevant to this programme which are not included in students' tuition fees.		
Description	Mandatory/Optional	Approximate cost
N/A	N/A	N/A

Important notice: The Programme Specifications are the result of a large curriculum and pedagogy reform implemented by the Department and supported by the Learning and Teaching Strategy of Imperial College London. The modules, structure and assessments presented in this Programme Specification are correct at time of publication but might change as a result of student and staff feedback and the introduction of new or innovative approaches to teaching and learning. You will be consulted and notified in a timely manner of any changes to this document.

Programme Structure[1]					
FHEQ Level 7 **You will study all core and compulsory modules. You must choose elective modules to a total of 7.5 to 10 ECTS. The choice is free (there are no pre-requisites) but is subject to availability. You are advised to aim for a balance of taught modules in Term 1 and Term 2**					
Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
PHYS70024	Imaging	Compulsory		Autumn	5
PHYS70025	Lasers	Compulsory		Autumn	5
PHYS70026	Optical Measurement and Devices	Compulsory		Autumn	5
PHYS70049	Photonics Laboratory	Core		Autumn	7.5
PHYS70050	MRes Research Project	Core		Spring-Summer	60
PHYS70007	Optical Communications Physics	Elective		Autumn	5
PHYS70010	Quantum Optics	Elective		Autumn	7.5
PHYS70029	Optical Design	Elective		Spring	5
PHYS70017	Laser Technology	Elective		Spring	7.5
PHYS70031	Biomedical Imaging	Elective		Spring	5
PHYS70032	Opto-electronic Devices	Elective		Spring	5
PHYS70033	Fibre and Ultrafast Lasers	Elective		Spring	5
				Credit Total	90-92.5

[1] **Core** modules are those which serve a fundamental role within the curriculum, and for which achievement of the credits for that module is essential for the achievement of the target award. Core modules must therefore be taken and passed in order to achieve that named award. **Compulsory** modules are those which are designated as necessary to be taken as part of the programme syllabus. Compulsory modules can be compensated. **Elective** modules are those which are in the same subject area as the field of study and are offered to students in order to offer an element of choice in the curriculum and from which students are able to select. Elective modules can be compensated.

Progression and Classification

Award and Classification for Postgraduate Students

Award of a Masters Degree
To qualify for the award of a postgraduate degree you must have:

1. accumulated credit to the value of no fewer than 90 credits at Level 7
2. and no more than 15 credits as a Compensated Pass;
3. met any specific requirements for an award as outlined in the approved programme specification for that award.

Classification of Postgraduate Taught Awards

The university sets the class of Degree that may be awarded as follows:

1. Distinction: 70.00% or above
2. Merit: 60.00% or above but less than 70.00%.
3. Pass: 50.00% or above but less than 60.00%.

For a Masters, your classification will be determined through:

- The Programme Overall Weighted Average meeting the threshold for the relevant classification band.

Your degree algorithm provides an appropriate and reliable summary of your performance against the programme learning outcomes. It reflects the design, delivery, and structure of your programme without unduly over-emphasising particular aspects.

Exit Degrees:

Award of a Postgraduate Certificate (PG Cert)
To qualify for the award of a postgraduate certificate a student must have a minimum of 30 credits at Level 7.

Programme Specific Regulations

N/A

Supporting Information
The Programme Handbook is available from the department.
The Module Handbook is available from the department.
Imperial's entry requirements for postgraduate programmes can be found at: www.imperial.ac.uk/study/pg/apply/requirements
Imperial's Quality & Enhancement Framework is available at: www.imperial.ac.uk/registry/proceduresandregulations/qualityassurance
Imperial's Academic and Examination Regulations can be found at: www.imperial.ac.uk/about/governance/academic-governance/regulations
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Imperial College London is regulated by the Office for Students (OfS) www.officeforstudents.org.uk/advice-and-guidance/the-register/
This document provides a definitive record of the main features of the programme and the learning outcomes that you may reasonably be expected to achieve and demonstrate if you take full advantage of the learning opportunities provided. This programme specification is primarily intended as a reference point for prospective and current students, academic and support staff involved in delivering the programme and enabling student development and achievement, for its assessment by internal and external examiners, and in subsequent monitoring and review.