

MSc in Optics and Photonics

This document provides a definitive record of the main features of the programme and the learning outcomes that a typical student may reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities provided. This programme specification is intended as a reference point for prospective students, current students, external examiners and academic and support staff involved in delivering the programme and enabling student development and achievement.

Programme Information

Programme Title	Optics and Photonics		
Award(s)	MSc		
Programme Code	F3U4 (1YFT)	F3U424 (2YPT)	
Awarding Institution	Imperial College London		
Teaching Institution	Imperial College London		
Faculty	Faculty of Natural Sciences		
Department	Department of Physics		
Associateship	Royal College of Science		
Main Location of Study	South Kensington Campus		
Mode and Period of Study	1 academic year (12 months), full-time or 2 academic years (24 months), part-time		
Cohort Entry Points	Annually in October		
Relevant QAA Benchmark Statement(s) and/or other external reference points	Master's Awards in Physics, Astronomy and Astrophysics		
Total Credits	ECTS:	90	CATS: 180
FHEQ Level	Level 7		
EHEA Level	2 nd cycle		
External Accrator(s)	N/A		
Specification Details			
Student cohorts covered by specification	2020-21 entry		
Person responsible for the specification	Dr Kenny Weir		
Date of introduction of programme	October 2001		

Date of programme specification/revision	May 2018
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Programme Overview

Imperial has offered an advanced programme in optics for over 80 years and the current MSc in Optics and Photonics draws on our experience as one of the largest centres for optics-based research and application in the UK.

The main coursework (i.e. lectures and laboratory work) takes place in the first two terms. The first term consists of foundation modules and laboratory work. In the second term, students choose further lectures from the optional modules available, and there is a laboratory project to design and build a working optical system. There is also a chance to undertake a self-study project in an area of your choice. Students finish with a four-month, full-time project, which may be in industry, an academic research group or abroad.

Graduates of this course are well qualified to apply their knowledge in a wide range of industrial contexts, as well as in a research environment. They find employment with a variety of careers in industry and many move on to doctoral studies at leading universities in the UK and abroad.

Learning Outcomes

The Imperial Graduate Attributes are a set of core competencies which we expect students to achieve through completion of any Imperial College degree programme. The Graduate Attributes are available at: www.imperial.ac.uk/students/academic-support/graduate-attributes

Knowledge and Understanding of:

- The most fundamental laws and principles of optics; along with their application (some at the forefront of the discipline)
- Research techniques which might include research and summation of the literature, designing appropriate experiments to test physical principles and presenting their results making their assumptions and approximations explicit;
- How to plan, execute and report the results of an experiment;
- How to use mathematical tools to describe the physical world.

Intellectual Skills:

- Apply theoretical knowledge of optical principles and mathematical techniques to practical problems;
- Use mathematical techniques and interpret mathematical models of physical behaviour;
- Demonstrate the ability to plan, undertake, and report on a programme of original work; including the planning and execution of experiments, the analysis and interpretation of experimental results, and an assessment of the errors involved.
- Research and examine critically the scientific literature.

Practical Skills:

- Plan and execute safely a series of experiments or computations, including the identification and use of specialist equipment;
- Use laboratory methods or computer-based tools to generate data;
- Analyse results, determine their strength and validity with an appreciation of the errors, and make recommendations;
- Prepare technical reports;
- Give technical presentations;

- Use the scientific literature effectively.

Transferable Skills:

- Problem-solving skills;
- Investigative skills;
- Communication skills;
- Analytical skills;
- IT skills;
- Personal skills.

Entry Requirements

Academic Requirement	Normally a 2:1 UK Bachelor’s Degree with Honours in Physics, Mathematics or Electrical Engineering, (or a comparable qualification recognised by the College)
English Language Requirement	Standard requirement IELTS score of 6.5 overall (minimum 6.0 in all elements)

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Learning & Teaching Strategy

Scheduled Learning & Teaching Methods	<ul style="list-style-type: none"> • Lectures • Problem classes • E-learning • Practical classes
E-learning & Blended Learning Methods	<ul style="list-style-type: none"> • Blackboard • Panopto
Project and Placement Learning Methods	<ul style="list-style-type: none"> • Individual Project

Assessment Strategy

Assessment Methods	<ul style="list-style-type: none"> • Examinations • Coursework • Laboratory reports • Project reports • Oral presentation
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Academic Feedback Policy

The feedback policy will follow the guidelines of the Department of Physics, where feedback for minor pieces of coursework should be provided to the student within two weeks of the work being submitted. Feedback for major pieces of coursework should be provided within four weeks, though marks may not be available until after the Board of Examiners meeting.

Re-sit Policy

In line with College policy, students who are unsuccessful in any of their examinations may usually be allowed an opportunity to re-sit at the discretion of the Board of Examiners.

Specific information regarding re-sits for Taught Master's degrees can be found in the relevant Academic Regulations available at: <https://www.imperial.ac.uk/about/governance/academic-governance/regulations/>

Mitigating Circumstances Policy

Students may be eligible to apply for mitigation if they have suffered from serious and unforeseen circumstances during the course of their studies that have adversely affected their ability to complete an assessment task and/or their performance in a piece of assessment.

The College's Policy on Mitigating Circumstances is available at:

<https://www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/>

Programme Structure

Full-time	Term One	Term Two	Term Three
Core Modules - Lectures	3	0	0
Core Modules - Practical	1	1	0
Elective Modules	1	8	0
Projects	0	1	1
Part-time (Year One)	Term One	Term Two	Term Three
Core Modules	2	0	0
Core Modules - Practical	Agreed with Programme Organiser		
Elective Modules			
Projects	0	0	0
Part-time (Year Two)	Term One	Term Two	Term Three
Core Modules	2	0	0
Core Modules - Practical	Agreed with Programme Organiser		
Elective Modules			
Projects	0	1	1

Assessment Dates & Deadlines

Written Examinations	January and May
Coursework Assessments	Continuous
Project Deadlines	September
Practical Assessments	Continuous
Assessment Structure	
Marking Scheme	
<p>A candidate must achieve at least an aggregate mark of 50% in each of the grouped modules, Lecture modules, Laboratory modules and Project module.</p> <p>Pass:</p> <ul style="list-style-type: none"> • A candidate must achieve an aggregate mark of 50% or higher in each of the grouped modules (laboratory, examinations and project) <p>Merit:</p> <ul style="list-style-type: none"> • A candidate must achieve an aggregate mark of 60% or higher AND a mark of 60% or higher for at least two of grouped modules (laboratory, examinations or project) AND an aggregate mark of 50% or higher for the remaining group of modules. <p>Distinction:</p> <ul style="list-style-type: none"> • A candidate must achieve an aggregate mark of 70% or higher and a mark of 70% or higher for at least two of grouped modules (laboratory, examinations or project) and an aggregate mark of 60% or higher for the remaining group of modules. 	

Module Weightings	
Module	% Module Weighting
Imaging	5%
Laser Fundamentals	5%
Optical Measurement and Devices	5%
Modules from elective group A (6 ECTS)	5%
Modules from elective group B (24 ECTS)	20%
Optics MSc Laboratory	25%
Self-Study Project	5%
Final Project	30%

Indicative Module List											
Code	Title	Core/ Elective	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Written Exam	% Course- work	% Practical	FHEQ Level	ECTS
PH9-OIM	Imaging	Core	28	122	0	150	100%	0%	0%	7	6
PH9-OLA	Laser Fundamentals	Core	28	122	0	150	100%	0%	0%	7	6
PH9-OOMD	Optical Measurement and Devices	Core	28	122	0	150	100%	0%	0%	7	6
PO4.4A	Optical Communications	Elective (A)	13	62	0	75	100%	0%	0%	7	3
PO4.4B	Information Theory	Elective (A)	13	62	0	75	100%	0%	0%	7	3
PO4.9	Plasmonics and Metamaterials	Elective (A)	27	123	0	150	100%	0%	0%	7	6
PH9-MSTPM	Advanced Topics in Nanophotonics	Elective (B)	24	126	0	150	100%	0%	0%	7	6
PH9-OBO	Biomedical Optics	Elective (B)	12	63	0	75	100%	0%	0%	7	3
PH9-OLT	Laser Device Technology	Elective (B)	12	63	0	75	100%	0%	0%	7	3
PH9-OLO	Laser Optics	Elective (B)	12	63	0	75	100%	0%	0%	7	3
PH9-ONO	Nonlinear Optics	Elective (B)	12	63	0	75	100%	0%	0%	7	3
PH9-OOD	Optical Design	Elective (B)	24	126	0	150	66%	34%	0%	7	6
PH9-OODL	Optical Design Laboratory	Elective (B)	60	90	0	150	0%	100%	0%	7	6
PH9-ODDIS	Optical Displays	Elective (B)	12	63	0	75	100%	0%	0%	7	3

Indicative Module List											
Code	Title	Core/ Elective	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Written Exam	% Course- work	% Practical	FHEQ Level	ECTS
PH9-OFT	Optical Fibre Technology	Elective (B)	12	63	0	75	100%	0%	0%	7	3
PH9-OOCD	Optoelectronic Components and Devices	Elective (B)	12	63	0	75	100%	0%	0%	7	3
PH9-OPS	Photonic Structures	Elective (B)	12	63	0	75	100%	0%	0%	7	3
PH9-OSSP	Self-Study Project	Core	0	50	0	50	0%	80%	20%	7	2
PH9-OLAB	Optics MSc Laboratory	Core	160	140	0	300	0%	100%	0%	7	12
PH9-OPRJ	Project	Core	0	700	0	700	0%	80%	20%	7	28

Supporting Information

The Programme Handbook is available at:

<http://www.imperial.ac.uk/naturalsciences/departments/physics/students/current-students/taught-postgraduates/>

The Module Handbook is available at:

<http://www.imperial.ac.uk/naturalsciences/departments/physics/students/current-students/taught-postgraduates/>

The College's entry requirements for postgraduate programmes can be found at:

www.imperial.ac.uk/study/pg/apply/requirements

The College's Quality & Enhancement Framework is available at:

www.imperial.ac.uk/registry/proceduresandregulations/qualityassurance

The College's Academic and Examination Regulations can be found at:

<https://www.imperial.ac.uk/about/governance/academic-governance/regulations>

Imperial College is an independent corporation whose legal status derives from a Royal Charter granted under Letters Patent in 1907. In 2007 a Supplemental Charter and Statutes was granted by HM Queen Elizabeth II. This Supplemental Charter, which came into force on the date of the College's Centenary, 8th July 2007, established the College as a University with the name and style of "The Imperial College of Science, Technology and Medicine".

<http://www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/charter-and-statutes/>

Imperial College London is regulated by the Office for Students (OfS)

<https://www.officeforstudents.org.uk/>