

MSc 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

Award(s)	MSc			
Programme Title	Optics and Photonics			
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			
Mode and Period of Study	1 academic year, full-time or 2 academic years, 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 Accreditor(s)	N/A			
Specification Details				
Student cohorts covered by specification	2016-17 Entry			
Person responsible for the specification	Dr Kenny Weir			
Date of introduction of programme	October 2001			
Date of programme specification/revision	March 2017			

Description of Programme Contents

Optics is of key importance to many industrial sectors including medicine, ICT and high-tech manufacturing.

Imperial has offered an advanced course 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 course includes substantial laboratory and project work, often based within industry. There is also a chance to undertake a self-study project in an area of your choice. You 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	2:1 Honours degree in physics, mathematics or electrical engineering, or evidence of appropriate qualifications.
Non-academic Requirements	None
English Language Requirement	Standard requirement

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Learning & Teaching Strategy

Scheduled Learning & Teaching Methods	<ul style="list-style-type: none"> • Lectures • Problem classes • E-learning • Tutorials • 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 • Practical • Repots • Oral presentation • Viva • Poster
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Academic Feedback Policy

The feedback policy will follow the guidelines of the Department of Physics, where written feedback should be provided to the student within two weeks of the work being submitted.

Many of the lecture courses have classworks, which allow students to work through problems under the guidance of the lecturer.

Re-sit Policy

The College's Policy on Re-sits is available at: www.imperial.ac.uk/registry/exams/resit

Mitigating Circumstances Policy

The College's Policy on Mitigating Circumstances is available at: www.imperial.ac.uk/registry/exams

Assessment Structure

Marking Scheme

The MSc consists of three elements:

- Taught modules, accounting for 40% of the total programme mark, and
- Laboratory work, accounting for 25% of the total programme mark, and
- Project work, accounting for 35% of the total programme mark.

The marking scheme for the elements and components will follow the 'Regulations for the Examinations of Masters Degrees'

Pass:

- In order to be awarded a result of pass, a candidate must achieve at least 50% in each element.

Merit:

- In order to be awarded a result of merit, a candidate must achieve at least 60% in each element.
- Where appropriate, a Board of Examiners may award a result of merit where a candidate has achieved an aggregate mark of 60% or greater across the programme as a whole AND has obtained a mark of 60% or greater in each element with the exception of one element AND has obtained a mark of 50% or greater in this latter element.

Distinction:

- In order to be awarded a result of distinction, a candidate must achieve at least 70% in each element.
- Where appropriate, a Board of Examiners may award a result of distinction where a candidate has achieved an aggregate mark of 70% or greater across the programme as a whole AND has obtained a mark of 70% or greater in each element with the exception of one element AND has obtained a mark of 60% or greater in this latter element.

Module Weightings			
Element (% Weighting)	Module	% Module Weighting	
Taught (40%)	Imaging	12.5%	
	Lasers	12.5%	
	Optical Measurement and Devices	12.5%	
	From elective group (A)	EITHER: Optical Communications AND Information Theory	6.25% each
		OR: Plasmonics and Metamaterials	12.5%
	1 x module from elective group (A)	12.5% each	
Modules from elective group (B) to the value of 24 ECTS	12.5% or 6.25% each*		
Laboratory (25%)	Laboratory	100%	
Project (35%)	Self-Study Project	14.28%	
	Final Project	85.71%	

*Module weightings are dependent on the size of the module e.g. modules worth 3 ECTS are weighted at 6.25%. Modules worth 6 ECTS are weighted at 12.5%.

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	Lasers	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
PH4-OP	Optical Communications	Elective (A)	13	62	0	75	100%	0%	0%	7	3
PH4-IT	Information Theory	Elective (A)	13	62	0	75	100%	0%	0%	7	3
PH4-PM	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 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

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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	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:

<http://www3.imperial.ac.uk/registry/proceduresandregulations/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-statutes-ordinances-and-regulations/>

Imperial College London is regulated by the Higher Education Funding Council for England (HEFCE)

<http://www.hefce.ac.uk/reg/of/>