Programme Information		
Programme Title	Programme Code	HECoS Code
Soft Electronic Materials	F3U8	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. It may be awarded as an exit award at the discretion of the Board of Examiners. 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 and/or White City
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 Ji-Seon Kim	

Student cohorts covered by specification	2023-24 entry
Date of introduction of programme	October 09
Date of programme specification/revision	April 23

Programme Overview

The MRes programme in Soft Electronic Materials (SEM) provides a thorough foundation in the science and application of soft electronic materials.

On this full-time one-year (12 month) MRes programme consisting of a multidisciplinary research project, you will attend taught core modules that cover the physics, chemistry, materials, and engineering of SEM, advanced practical skills training workshops, transferable skills courses, journal clubs, and regular group discussion sessions. The aim is to bring your cohort up to the same academic standard in terms of SEM whether your background is in chemistry, physics, or other discipline. On the programme you will learn the core physical concepts and the research skills of SEM necessary for post-graduate study in the field or for a technical career outside academia. Research activities are wide-ranging, spanning from fundamental science, including modelling of semiconductor molecules and materials (organic, inorganic and hybrid), their synthesis and characterisation, to practical applications, including designing and processing of various optoelectronic devices (e.g. solar cells, light-emitting diodes, sensors, energy storage/conversion devices) and measuring and analysing their performance. Given the nature of the field, this programme is both highly interdisciplinary and spans the spectrum from fundamental research through to application-driven technology development.

The MRes in SEM sits within the umbrella of Imperial's Centre for Processable Electronics (CPE). This provides a highly stimulating learning environment for students, and an extended network of other researchers and academics with which to collaborate, as well as extensive external collaboration opportunities. The CPE organises regular colloquia featuring renowned international speakers, themed symposia and workshops, and international exchange visits.

Learning Outcomes

On successful completion of the MRes programme, you will be able to:

1. Demonstrate mastery of the laws and principles of the physics and materials science of SEM and their applications
2. Explain theoretical/ computational models of complex structures, properties and processes in SEM
3. Develop and solve physical models of SEM by applying advanced mathematical tools and techniques
4. Address problems in other research fields (eg renewable energy, solar power, optoelectronics, sensors, healthcare, wearable electronics) by applying physical models of SEM
5. Design a research experiment (innovation) to validate a theory
6. Analyse and interpret experimental results
7. Critically analyse scientific literature on a range of SEM topics
8. Complete work and meet deadlines through effective time management
9. Plan, undertake, and report on a programme of original research work
10. Communicate outcomes of research effectively, both in writing and orally, to specialised and non-specialised audiences
11. Collaborate productively as an effective part of a team

Exit award
Students who attain a PG Certificate (30 ECTS) will have met learning outcomes 1-4 above.

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

Entry Requirements

Academic Requirement	Normally a 2:1 UK Bachelor's Degree with Honours in physics, chemistry, materials science, electrical engineering, chemical engineering or related disciplines (or a comparable qualification recognised by the College).

	For further information on entry requirements, please go to PG: www.imperial.ac.uk/study/apply/postgraduate-taught/entry-requirements/accepted-qualifications/
Non-academic Requirements	Applicants with relevant work experience as determined by the Programme Director and management team (or a comparable qualification recognised by the College) will be considered on a case-by-case basis and in accordance with the College's MRes entry requirements.
English Language Requirement	Standard requirement (PG) Please check for other Accepted English Qualifications
Admissions Test/Interview	Borderline applicants, and those whose background and/or qualification is non-standard will be interviewed by the Programme Director and a representative from the management team.

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 and classwork, laboratory classes (including computational work), transferable skills workshops, and directed supervision on projects.

The programme consists of four core modules:

- *Fundamentals of Organic and Inorganic Semiconductors and Materials Synthesis and Processing* is carried out in term 1 and consists of a series of lectures and tutorial sessions. It is assessed through written examination
- *Device Physics and Applications and Materials Characterisation* is carried out in term 1 and consists of a series of lectures and tutorial sessions. It is assessed through written examination
- A *Literature Review and Project Proposal* is carried out in term 1 and is assessed through written a literature review and project proposal document
- A *Masters Research Project* is carried out throughout the year (with research starting from Term 2). It is assessed through a written research report and oral presentation. Along with research work, you attend computational workshops, a Journal Club, and Advanced Practical Skills courses.

Lectures are supported with teaching material that may include notes, problem sheets and solutions and other resources. Some lectures are supported with teaching activities such as tutorial sessions for Q&A with lecturers and group problem solving. All of the material lecturers provide is available online via Blackboard. Lecturers may provide office hours as informal drop-in question and answer sessions for you.

There are 3 x 5-hour Computational Workshops in Term 1, which consist of short lectures followed by problem solving sessions with demonstrator help available. The Computational Workshops form part of the Masters Research Project module to prepare you with the necessary skills to carry out their research.

There are two advanced practical skills courses that also form part of the Masters Research Project module to prepare you with the necessary skills to carry out their research. The OLED Device Fabrication course consists of 1 half-day lecture and 1 half-day practical session. The OPV Device Fabrication course takes place over 2.5 days. These practical training sessions are laboratory-based where a facilities manager will guide you through all steps involved in the fabrication and testing of devices. In addition, there is at least one advanced practical skills course delivered in Term 2 by an external organisation (e.g. printing course by Swansea University or advanced characterisation course by NPL). This course will take place for 2-3 days at the external organisation. Accommodation and travel will be arranged by the programme management team and will be provided at no additional cost.

Project work is carried out individually. You are assigned a research project based on their preferences (a list of available projects is presented to you at the start of the programme) and conduct a review of the scientific literature and write a report explaining the background to the topic, its development and its current status. Each topic has a member of staff assigned as the project supervisor and you are encouraged to meet with your supervisor regularly to discuss your progress and plans. You begin experimental work from Term 2 when all core

lectures and classwork, laboratory classes (including computational work) are complete, you can work full-time on their research project for the rest of the programme's duration. At the end of the Masters research project, you will submit a written report and give a short oral presentation, both of which are assessed.

A series of voluntary transferable skills courses are available and are delivered by the Graduate School. The courses include: Plagiarism Awareness, Science, Research and Integrity, Preparing your Literature Review and Preparing a PhD Proposal.

Overall Workload
Your overall workload consists of face-to-face sessions, practical/lab work and independent learning. While your actual contact hours may vary, 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. Therefore, the expected total study time is 2250 hours over entire MRes programme (including the summer). This is composed of approximately 60 hours of lectures, 253 hours of other scheduled and group teaching time, 1237 hours of independent study and 700 hours of lab/practical work.

In Term 1 you will typically spend approximately 20% of your time in lectures and group teaching activities, with the remainder on independent study. The rest of year, Terms 2 and 3 and the summer, will be focused on your own research project. Time on laboratory/practical work vs independent study will vary depending on the project chosen, but will typically be 60% laboratory/practical based (research, computational workshops and advanced practical skills).

As this programme is interdisciplinary and attracts students from different backgrounds (e.g. physics, chemistry, materials and engineering), we aim to bring all students up to the similar level of understanding in SEM through intensive taught modules and classwork in Term 1 and so you are best prepared to conduct your original individual research project from Term 2 onwards.

Assessment Strategy

Assessment Methods

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

The two taught modules are assessed by written examinations in Term 2 (February).

The literature review and project proposal are to be written in Term 1 (December). It is an assessed written report of an in-depth critical review of the subject matter chosen for an individual research project.

The Masters research project will be written up in the form of a thesis, which will be assessed. Submission of the thesis is in the final month of the programme (September). You will also deliver an oral presentation on their research projects at the end of the year, which will be assessed.

Both the literature review and project proposal report and the research project thesis will be marked by the primary supervisor (50% weighting) and an independent marker (50% weighting).

This table shows the relative weighting of the different assessments over the programme.

Written examinations	33%
Literature review and project proposal	11%
Project work (including research project report and practical oral presentation)	56%

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, both formative and summative, include:

Formative

- Problem classes and feedback during tutorial sessions
- Oral feedback to the group during or after lectures

- Personal feedback may follow from discussion with lecturers after lectures or during office hours
- Oral feedback and guidance while you are working in the laboratory
- Personal feedback from your project supervisors
- Personal feedback on your oral presentations
- Interactive feedback may follow from peer group discussion

Mid-term review: approximately half-way during the Masters research project you will give a short oral presentation on your progress and project plans which provides an opportunity for formative oral and/or written feedback from supervisors and/or other academics.

At the end of your Masters research project you will give an oral presentation on your results and will receive oral and/or written feedback from supervisors and/or other academics.

Summative

Summative individual feedback will be given to you via formal mark on your:

- Written exams
- Literature review and project proposal report
- Masters research project report
- Masters research project oral presentation

Cohort-level feedback will be given to students on their overall written exams.

For formal assessments the College'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.

The College'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
The College's Policy on Re-sits is available at: www.imperial.ac.uk/about/governance/academic-governance/academic-policy/exams-and-assessment/

Mitigating Circumstances Policy
The College'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 modules.**					
Code	Module Title	Core	Group	Term	Credits
PHYS70044	Device Physics and Applications and Materials Characterisation	Core		Autumn	15
PHYS70046	Fundamentals of Organic and Inorganic Semiconductors and Materials Synthesis and Processing	Core		Autumn	15
PHYS70045	Literature Review and Project Proposal	Core		Autumn	10
PHYS70047	Masters Research Project	Core		Spring-Summer	50
				Credit Total	90

[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 College 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 and the designated dissertation or final major project module 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 Awards:

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

Programme Specific Regulations

N/A

Supporting Information
The Programme Handbook is available at: www.imperial.ac.uk/physics/students/current-students/taught-postgraduates/
The Module Handbook is available from the department.
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: 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". www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/
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.