

Programme Information		
Programme Title	Programme Code	HECoS Code
Advanced Materials Science and Engineering	J2U3T	For Registry Use Only
Advanced Materials Science and Engineering: Specialising in Materials for the Energy Transition	J2U3E	
MSc Advanced Materials Science and Engineering: Specialising in Theory and Simulation of Materials	J2U31	

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
MSc	1 calendar year (12 months)	Full-Time	Annually in October	90	180
PG Diploma	N/A	N/A	N/A	60	120
PG Certificate	N/A	N/A	N/A	30	60

The PG Diploma and PG Certificate are exit awards and are not available for entry. Specialisms will not be included in exit award titles. You must apply to and join the MSc.

Ownership			
Awarding Institution	Imperial College London	Faculty	Faculty of Engineering
Teaching Institution	Imperial College London	Department	Materials
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	Master's Degree in Engineering
FHEQ Level	7
EHEA Level	2nd Cycle

External Accreditor(s) (if applicable)			
External Accreditor 1:	Institute of Materials, Minerals and Mining (IoM3)		
Accreditation received:	2023	Accreditation renewal:	2028

Collaborative Provision			
Collaborative partner	Collaboration type	Agreement effective date	Agreement expiry date

N/A	N/A	N/A	N/A
Specification Details			
Programme Lead		Johannes Lischner	
Student cohorts covered by specification		2024-25 entry	
Date of introduction of programme		October 11	
Date of programme specification/revision		October 23	

Programme Overview

The aim of the MSc in Advanced Materials Science and Engineering is to provide a comprehensive understanding of all aspects related to the applications and development in Materials Science and Engineering today. We motivate you to develop your ability to research, design, assess, implement, and review solutions to real-life engineering problems across a wide range of materials. This degree programme prepares you to become independent, ethical, and responsible Materials Science and Engineering professionals with a global appeal. Our modules are taught by expert academics, through formal lecturing and student-led course works. You will have access to world-leading knowledge and infrastructure by working on currently active research projects as part of established research groups.

You will be given the option to specialise in materials for the energy transition, and if you meet the additional criteria will be eligible for the following extra annotation on your degree certificate: Specialising in Materials for the Energy Transition.

You will be given the option to specialise in theory and simulation of materials, and if you meet the additional criteria will be eligible for the following extra annotation on your degree certificate: Specialising in Theory and Simulation of Materials.

This broad and flexible degree allows engineers and scientists from a variety of backgrounds (notably Materials, Mechanical Engineering, Civil Engineering, Chemical Engineering, Physics or Chemistry) to build on their experience and expertise. It supplements strong bases in engineering and sciences with transferable skills training to take you to the next stage of their career in academia or industry, and is accredited by the Institute of Materials, Mineral and Mining (IOM3).

Learning Outcomes

On completing the PG Certificate in Advanced Materials Science and Engineering you will be able to:

1. Apply knowledge of the properties of a variety of materials to engineering or scientific problems.
2. Use tools (experimental or computational) to determine the properties of materials.
3. Employ critical thinking to interpret new information about materials.

In addition, for the PG Diploma you will be able to:

4. Employ specialised knowledge of specific materials types or range of applications to engineering or scientific problems.
5. Plan and conduct a programme of original research.
6. Produce a written report which presents in the manner of a scientific publication a literature review, research methodology, research results, discussion and conclusions.
7. Create and deliver a clear presentation to an expert audience summarising the background, results and conclusions of a research project.

In addition, for the MSc you will be able to:

8. Synthesise and evaluate information from a variety of sources to arrive at a coherent conclusion.
9. Create a systematic plan for using characterisation techniques to discover specific properties of a material.
10. Employ a range of modelling tools applicable to a broad spectrum of materials types at different length and time scales.

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	<p>Normally a first or 2:1 UK Bachelor's Degree with Honours in an engineering or science discipline (Materials, Mechanical Engineering, Civil Engineering, Chemical Engineering or Physics or Chemistry).</p> <p>Students from the BEng programme in Materials Science and Engineering (JF52) and in the BEng in Materials with Management (J5N2) at Imperial College are not eligible to apply for entry into the MSc in Advanced Materials Science and Engineering.</p> <p>For further information on entry requirements, please go to www.imperial.ac.uk/study/apply/postgraduate-taught/entry-requirements/</p>
Non-academic Requirements	N/A
English Language Requirement	<p>Standard requirement (PG) Please check for other Accepted English Qualifications</p>
Admissions Test/Interview	Interviews are not currently used but are being considered.

The programme's competency standards documents can be found at: www.imperial.ac.uk/materials/study/pgt/msc-materials/

Learning & Teaching Approach

Learning and Teaching Delivery Methods

The teaching in this programme is designed to deliver the following: learning of information about materials; development of research skills; the ability to think critically about new information; problem solving skills; the ability to communicate technical information clearly. We use lectures to communicate information, workshops to develop problem solving skills, lab and computer activities to develop research skills, literature review writing to develop critical thinking, and report writing and presentations to develop communication skills. Lecture class sizes vary with module, but range between about 100 to around 30. Workshops contain about 30 people, and study groups for independent learning have about 10 people.

Please refer to the Student Success Guide for advice on learning:

www.imperial.ac.uk/students/success-guide/

Overall Workload

Your overall workload consists of face-to-face sessions and independent learning. While your actual contact hours may vary according to the optional 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. Therefore, the expected total study time is 2,250 hours per year.

You will spend about 7% of your time (around 160 hours) attending lectures, about 2% of your time in workshops, and about 91% of your time in independent study, which includes the research project.

Assessment Strategy

Assessment Methods

There are two types of assessment: formative and summative. Formative assessment is provided as a way for you to determine how well you understand the material but does not contribute to the final mark. Summative assessment is used to determine your final mark. Most modules include an exam, which will always be summative assessment, that assesses the full taught content of the course: this assesses both recall of information, and the ability to apply the information to solve problems. There are problem sheets for some modules that assess the ability to use material learned, but in a way that reinforces the learning through practice; these can be either formative or summative assessments. There are reports, primarily associated with the research project, that

assess the ability to carry out independent learning, communicate information clearly, exercise critical thinking, organise complex information, and reach conclusions based on that information; this is summative assessment. There are presentations that assess your ability to communicate information clearly. Workshops provide opportunities for formative self-assessment of understanding. A few modules employ other forms of assessment such as poster presentations and infographic summaries of information.

The exact balance of the summative assessment through the programme depends upon which elective modules are taken, but an indicative breakdown is:

Coursework	70%
Exam	30%

Academic Feedback Policy

Academic feedback to students on coursework is primarily delivered through Blackboard Learn and is normally returned to students within 2 academic weeks of submission.

Feedback is provided in several formats, including:

- Oral (during/after lectures, workshops, labs). This is likely to be formative.
- Personal (during academic discussions e.g. office hours, project supervision sessions). This is likely to be formative.
- Interactive (during workshops with academic staff/GTAs). This is likely to be formative.
- Written (solutions to coursework, comments on reports). This is likely to be summative.

Feedback on written examinations is provided in the form of written commentaries which comment on the performance of the entire cohort on each individual question.

During the academic year indicative results will be provided to students, the results are ratified at the Board of Examiners.

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
Personal Protective Equipment	Mandatory	Provided

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					
<p>Year 1 – FHEQ Level 7*</p> <p><u>Compulsory Modules</u> You will study all compulsory modules from Group C.</p> <p><u>Elective Modules</u> You will select 4 electives from groups A, B, E and T which all are assessed.</p> <p><u>Materials for the Energy Transition</u> To be eligible for the extra annotation “<u>Specialising in Materials for the Energy Transition</u>” on your degree certificate you will need to pass all 90 ECTS (this includes compensated passes). Elective modules must be chosen from group E. In addition, your research project will have to be on an energy related topic.</p> <p><u>Theory and Simulation of Materials</u> To be eligible for the extra annotation “<u>Specialising in Theory and Simulation of Materials</u>” on your degree certificate you will need to pass all 90 ECTS (this includes compensated passes). Three elective modules must be from group T, and one from groups A, B, and E. In addition, your research project will have to be on a theory and simulation related topic.</p>					
Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
MATE70001	Characterization of the Structure of Materials	Compulsory	C	Autumn-Summer	7.5
MATE70002	Theory and Simulation of Materials	Compulsory	C	Autumn-Summer	7.5
MATE70003	The Art of Research	Compulsory	C	Autumn-Summer	15
MATE70004	Research Project	Compulsory	C	Autumn-Summer	40
MATE70006	Biomaterials	Elective	B	Autumn	5
MATE70007	Engineering Alloys	Elective	B	Autumn	5
MATE70008	Ceramics and Glasses	Elective	B	Spring	5
MATE70010	Optoelectronic Materials	Elective	E	Spring	5
MATE70011	Surfaces and Interfaces	Elective	E	Spring	5
MATE70012	Nanomaterials	Elective	B	Autumn	5
MATE70013	Advanced Engineering Alloys	Elective	A	Spring	5
MATE70014	Advanced Nanomaterials	Elective	A	Spring	5
MATE70015	Advanced Structural Ceramics	Elective	A	Autumn	5
MATE70016	Advanced Tissue Engineering	Elective	A	Spring	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.

MATE70017	Electroceramics	Elective	E	Autumn	5
MATE70018	Advanced Biomaterials	Elective	A	Spring	5
MATE70019	Nuclear Materials	Elective	E	Autumn	5
MATE70020	Modelling Materials with Density Functional Theory	Elective	T	Autumn	5
MATE70026	Machine Learning for Materials	Elective	T	Spring	5
MATE70025	Mathematics and Quantum Mechanics	Elective	T	Spring	5
CENG60013*	Nuclear Chemical Engineering	Elective	E	Spring	5
MECH70002	Nuclear Reactor Physics	Elective	E	Spring	5
MECH70001	Nuclear Thermal Hydraulics	Elective	E	Autumn	5
Credit Total					90

Award and Classification for Postgraduate Students

Award of a Postgraduate Certificate (PG Cert)

To qualify for the award of a postgraduate certificate you must have a minimum of 30 credits at Level 7 (this may include a maximum of 10 credits from Level 6 where this is approved as part of the award).

Award of a Postgraduate Diploma (PG Dip)

To qualify for the award of a postgraduate diploma you must have:

1. passed modules to the value of no fewer than 60 credits at Level 7 (this may include a maximum of 15 credits from Level 6 where this is approved as part of the award).
2. and no more than 10 credits as a Compensated Pass;

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 or above of which no more than 15 credits may be from credit level 6;
2. and no more than 10 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 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.

Programme Specific Regulations

As an accredited degree, students on this programme are subject to the standards set by the Engineering Council in relation to compensation: a maximum of 10 ECTS can be compensated across the MSc programme.

Supporting Information
The Programme Handbook is available at: www.imperial.ac.uk/materials/study/pgt/msc-materials/
The Module Handbook is available at: www.imperial.ac.uk/materials/study/pgt/msc-materials/
The College's entry requirements for postgraduate programmes can be found at: www.imperial.ac.uk/study/apply/postgraduate-taught/entry-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
<p>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".</p> <p>www.imperial.ac.uk/admin-services/secretariat/college-governance/charters/</p>
Imperial College London is regulated by the Office for Students (OfS) www.officeforstudents.org.uk/advice-and-guidance/the-register/
<p>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.</p>