

Department of Civil and Environmental Engineering

Programme Information		
Programme Title	Programme Code	HECoS Code
MSc in Advanced Materials for Sustainable Infrastructure	H2G1 H2G124	For Registry Use Only

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
MSc	1 Calendar year [12 months] 2 Calendar years [24 months]	Full-time Part-time	Annually in October	90	180

All students must apply to and join the MSc.

Ownership			
Awarding Institution	Imperial College London	Faculty	Faculty of Engineering
Teaching Institution	Imperial College London	Department	Civil and Environmental Engineering
Associateship	N/A	Main Location(s) of Study	South Kensington Campus
External Reference			
Relevant QAA Benchmark Statement(s) and/or other external reference points		Master's Degrees in Engineering	
FHEQ Level		Level 7 - Master's	
EHEA Level		2nd Cycle	
External Accreditor(s) (if applicable)			
External Accreditor 1:	Joint Board of Moderators		
Accreditation received:	Pending	Accreditation renewal:	2021
Collaborative Provision			
Collaborative partner	Collaboration type	Agreement effective date	Agreement expiry date
N/A	N/A	N/A	N/A
Specification Details			
Programme Lead	Dr Hong Wong		

Student cohorts covered by specification	2021-22 entry
Date of introduction of programme	October 19
Date of programme specification/revision	December 20

Programme Overview

The MSc Advanced Materials for Sustainable Infrastructure will educate future Civil and Structural Engineers wishing to have an in-depth understanding of the behaviour and characteristics of civil engineering materials and the ability to develop sustainable designs for construction.

The students will have access to the College's new world-class Advanced Infrastructure Materials Laboratory, housed in the Department, to perform and observe experimental investigations; this will allow students to cement principles introduced on the taught part of the programme. They will also undertake a research project with academics within the UK's top-rated Civil & Environmental Engineering Department.

Learning Outcomes

Upon successful completion of the programme students should be able to:

- Assess the properties required of a material, and select appropriate materials for different civil engineering applications
- Explain how the chemical composition and microstructure of materials affect their properties and behaviour
- Evaluate problems affecting infrastructure materials and devise means of avoiding them
- Distinguish the latest advances, and explain the underpinning science, for a wide range of infrastructure materials
- Recommend appropriate test methods and monitoring techniques to characterise infrastructure materials and interpret the data obtained
- Understand the principles, applications and limitations of numerical models as applied to materials and devise a physical model of an aspect of material behaviour
- Plan a durability survey to assess the condition of a civil engineering structure and, where necessary, decide on the most appropriate method(s) for its repair
- Apply the principles of sustainability to a range of issues relating to the built environment
- Plan, conduct, write up and orally present a programme of original independent research in an area of infrastructure materials science with open-mindedness, critical enquiry and using the scientific literature effectively, under the guidance of academic staff
- Appraise and solve problems using a multidisciplinary approach, applying professional judgments to balance costs, benefits, safety and social and environmental impact

Knowledge and Understanding of:

- A selection of the major topics in the subject, their recognition and underlying fundamental principles.
- Research techniques which might include information retrieval, experimental design and statistics, modelling and safety.
- The essential facts, concepts, principles and theories relevant to the students' chosen areas of research.
- Management and communication skills, including problem definition, project design, decision processes, teamwork, written and oral reports, and scientific publications.

Intellectual/Thinking Skills:

- Analyse and solve problems using a multidisciplinary approach, applying professional judgements to balance costs, benefits, safety and social and environmental impact.
- Integrate and critically evaluate information.
- Formulate and apply appropriate solutions.
- Plan, conduct and write-up a programme of individual research.

Practical Skills:

- Plan and execute safely a series of experiments or computations.
- Use laboratory methods or computer-based tools to generate data.

- Analyse results, determine their strength and validity, and make recommendations.
- Prepare technical and design reports.
- Give technical presentations.
- Use the scientific literature effectively.

Transferable Skills:

- Communicate effectively through oral presentations, computer processing and presentations, and written reports.
- Apply knowledge and modelling skills.
- Management skills: decision processes, objective criteria, problem definition, project design and evaluation needs.
- Integrate and evaluate information from a variety of sources.
- Transfer techniques and solutions from one discipline to another.
- Use Information and Communications Technology.
- Manage resources and time.
- Learn independently with open-mindedness and critical enquiry.
- Learn effectively for the purpose of continuing professional development.

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 an engineering or science-based discipline (or a comparable qualification recognised by the College).
Non-academic Requirements	Applicants who do not meet the academic requirements above, but who has substantial relevant industry experience may be admitted following successful submission as a Special Case according to the Special Cases Policy for Admission: https://www.imperial.ac.uk/media/imperial-college/administration-and-support-services/registry/academic-governance/public/academic-policy/admissions/19-entry/Special-Cases-Policy-for-Admission-to-Postgraduate-Programmes-of-Study---for-2019-entry.pdf
English Language Requirement	Standard requirement IELTS score of 6.5 overall (minimum 6.0 in all elements)
Admissions Test/Interview	A number of applicants will be invited for interview in each application cycle. The interviews are run using an online meeting application, or by telephone.

The programme's competency standards documents can be found at: <http://www.imperial.ac.uk/civil-engineering/prospective-students/postgraduate-taught-admissions/>

Learning & Teaching Approach

Learning and Teaching Delivery Methods

Scheduled learning and teaching methods include:

- Lectures
- Seminars
- Case studies
- Group work exercises
- Formal presentations
- Site visits

E-learning and blended learning methods include:

- Module content available on Blackboard Learn (VLE)

Placement learning methods:

- Students may have the opportunity to undertake their research project on an industrial placement.

Knowledge and Understanding of:

- A selection of the major topics in the subject, their recognition and underlying fundamental principles.
- Research techniques which might include information retrieval, experimental design and statistics, modelling and safety.
- The essential facts, concepts, principles and theories relevant to the students' chosen areas of research.
- Management and communication skills, including problem definition, project design, decision processes, teamwork, written and oral reports, and scientific publications.

Intellectual/Thinking Skills:

- Analyse and solve problems using a multidisciplinary approach, applying professional judgements to balance costs, benefits, safety and social and environmental impact.
- Integrate and critically evaluate information.
- Formulate and apply appropriate solutions.
- Plan, conduct and write-up a programme of individual research.

Practical Skills:

- Plan and execute safely a series of experiments or computations.
- Use laboratory methods or computer-based tools to generate data.
- Analyse results, determine their strength and validity, and make recommendations.
- Prepare technical and design reports.
- Give technical presentations.
- Use the scientific literature effectively.

Transferable Skills:

- Communicate effectively through oral presentations, computer processing and presentations, and written reports.
- Apply knowledge and modelling skills.
- Management skills: decision processes, objective criteria, problem definition, project design and evaluation needs.
- Integrate and evaluate information from a variety of sources.
- Transfer techniques and solutions from one discipline to another.
- Use Information and Communications Technology.
- Manage resources and time.
- Learn independently with open-mindedness and critical enquiry.
- Learn effectively for the purpose of continuing professional development.

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.

Assessment Strategy

Assessment Methods

To complete the requirements of the degree, all assessments must be undertaken to the appropriate level and include the following:

- Written examinations
- Individual and group coursework
- Laboratory practicals
- Oral presentations
- Research project report

Students will be provided with feedback on performance in “Grade” format. This feedback is informal, interim and subject to ratification (approval) by the Board of Examiners of the MSc Cluster in Advanced Materials for Sustainable Infrastructure.

Marks for exams taken in January will be returned in grade format normally within 6 weeks of the last examination. Marks for exams taken in May will be returned in grade format normally within 8 weeks of the last examination.

Academic Feedback Policy

Feedback on coursework will be provided within 2 weeks of the submission date. Provisional examination grade letters will be provided within 6 weeks of the end of the exam block. The final numerical marks will be provided by Registry after the Board of Examiner’s meeting at the end of the academic year.

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/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/

Mitigating Circumstances Policy

The College’s Policy on Mitigating Circumstances is available at: www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/

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
Not applicable	Mandatory	Provided

Programme Structure**Year 1 – FHEQ Level 7****All modules are designated as core and must be taken**

Code	Module Title	Core/ Elective	Group*	Term	Credits
CIVE97093	Concrete Materials	Core	N/A	Spring	5
CIVE97141	Materials Selection	Core	N/A	Autumn	5
CIVE97142	Mechanics of Materials	Core	N/A	Autumn	5
CIVE97144	Metals	Core	N/A	Spring	5
CIVE97145	Geomaterials	Core	N/A	Autumn	5
CIVE97146	Sustainable Development	Core	N/A	Autumn	5
CIVE97162	Cementitious Materials	Core	N/A	Autumn	5
CIVE97147	Numerical Modelling of Materials	Core	N/A	Spring	5
CIVE97149	Masonry, Timber and Glass	Core	N/A	Spring	5
CIVE97151	Assessment, Monitoring and Repair of Structures	Core	N/A	Spring	5
CIVE97150	Polymers and Polymer Composites	Core	N/A	Spring	5
CIVE97152	Characterisation of Materials	Core	N/A	Autumn	5
CIVE97153	Research Project - Materials	Core	N/A	Summer	30
Credit Total					90

* 'Group' refers to module grouping (e.g. a group of electives from which one/two module(s) must be chosen).

Progression and Classification

The MSc degree assessment comprises two distinct elements, Element 1 (the taught Modules) and Element 2 (the Research Project) – successful candidates must satisfy the Board of Examiners in both elements to be awarded the MSc.

Criteria for the award of the degree

Pass Marks: Element 1 – the pass mark for each Module is 50%; and Element 2 – the pass mark for the Research Dissertation is 50% The degree to be awarded in one of the following classifications:

Award of a PASS degree

A candidate will normally be considered for the award of a Pass degree if they satisfy the following criteria:

- An aggregate mark of 50% or more for Element 1 (taught modules), with no mark below 40% in any module and 50% or more in Element 2 (the Research Project)

Award of a degree with MERIT

A candidate will normally be considered for the award of a degree with Merit if they satisfy the following criteria:

- An aggregate mark of 60% or more for Element 1 (taught modules), with no mark below 50% in any taught module, and no more than 4 marks in the range 50-59%, and 60% or more in Element 2 (the Research Project)
- The MSc to be completed within the minimum registration period.

Award of a degree with DISTINCTION

A candidate will normally be considered for the award of a degree with Distinction if they satisfy the following criteria:

- An aggregate mark of 70% or more for Element 1 (taught modules), with no mark below 60% in any module, and no more than 4 marks in the range 60-69%, and 70% or more in Element 2 (the Research Project)
- The MSc to be completed within the minimum registration period.

Assessment Structure

Programme Element	ECTS	% Weighting
Coursework and Examinations	60	66.7%
Research Project	30	33.3%
Total	90	100%

Programme Specific Regulations

There are no programme specific regulations to be considered.

MSc Advanced Materials for Sustainable Infrastructure										
All Modules are Core - ECTS total of 90, CATS total of 180										
Code	Title	Term	Contact Hours	Ind. Study Hours	Total Hours	% Written Exam	% Course-work	% Practical	FHEQ Level	ECTS
CIVE97093	Concrete Materials	Spring	25	100	125	80%	20%	0%	7	5
CIVE97141	Materials Selection	Autumn	25	100	125	80%	20%	0%	7	5
CIVE97142	Mechanics of Materials	Autumn	30	95	125	100%	0%	0%	7	5
CIVE97145	Geomaterials	Autumn	30	95	125	80%	20%	0%	7	5
CIVE97146	Sustainable Development	Autumn	25	100	125	0%	100%	0%	7	5
CIVE97152	Characterisation of Materials	Autumn	25	100	125	70%	30%	0%	7	5
CIVE97162	Cementitious Materials	Autumn	25	100	125	70%	30%	0%	7	5
CIVE97150	Polymers and Polymer Composites	Spring	25	100	125	60%	30%	0%	7	5
CIVE97144	Metals	Spring	25	100	125	100%	0%	0%	7	5
CIVE97147	Numerical Modelling of Materials	Spring	30	95	125	60%	40%	0%	7	5
CIVE97149	Masonry, Timber and Glass	Spring	30	95	125	100%	0%	0%	7	5
CIVE97151	Assessment, Monitoring and Repair of Structures	Spring	30	95	125	70%	30%	0%	7	5
CIVE97153	Research Project - Materials	Summer	0	750	750	0%	100%	0%	7	30

Supporting Information
The Programme Handbook is available at: https://www.imperial.ac.uk/media/imperial-college/faculty-of-engineering/civil/public/msc/materialsmastershandbook201920_final.pdf
The Module Handbook is available at: https://www.imperial.ac.uk/civil-engineering/prospective-students/postgraduate-taught-admissions/msc-advanced-materials-sustainable-infrastructure/
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 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 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.

Modifications			
Description	Approved	Date	Paper Reference
Not Applicable - Programme introduced October 2019	NA	NA	NA