Programme Information		
Programme Title	Programme Code	HECoS Code
Engineering Fluid Mechanics for the Offshore, Coastal and Built Environments	H141	For Registry Use Only

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
MSc	1 Calendar Year	Full-Time	Annually in October	90	180
PG Diploma – H141D	N/A	Full-Time	N/A	60	120
PG Certificate	N/A	Full-Time	N/A	30	60
The PG Certificate and PG Diploma are exit awards and not available for entry. They are not accredited by the relevant professional bodies. You 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	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 Degrees in Engineering	
FHEQ Level		Level 7	
EHEA Level		2nd Cycle	
External Accreditor(s) (if applicable)			
External Accreditor 1:	Joint Board of Moderators (JBM)		
Accreditation received:	2021	Accreditation renewal:	2026
External Accreditor 2:	Institution of Civil Engineers (ICE)		
Accreditation received:	2021	Accreditation renewal:	2026
External Accreditor 3:	The Institution of Structural Engineers (IStructE)		
Accreditation received:	2021	Accreditation renewal:	2026

External Accreditor 4:	Institute of Highway Engineers (IHIE)		
Accreditation received:	2021	Accreditation renewal:	2026
External Accreditor 5:	The Chartered Institute of Highways & Transportation (CIHT)		
Accreditation received:	2021	Accreditation renewal:	2026
External Accreditor 6:	The Permanent Way Institution		
Accreditation received:	2021	Accreditation renewal:	2026
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 Adrian Callaghan	
Student cohorts covered by specification		2024-25 entry	
Date of introduction of programme		October 17	
Date of programme specification/revision		August 23	

Programme Overview

The MSc in Engineering Fluid Mechanics for the Offshore, Coastal and Built Environments aims to equip graduates with the knowledge and skills to be future leaders in addressing many important engineering challenges involving fluid mechanics. The MSc programme was established in 2017 in response to a clear need for engineers with specialist expertise in fluid mechanics and an ability to apply this across a multitude of environments. The comprehensive programme caters for both engineers and scientists by combining rigorous treatment of fundamental fluid mechanics principles with applied design activities, which are carried out in conjunction with internationally-leading industrial partners. Many applications in the offshore, coastal and built environments feature prominently throughout the programme and the content and skills are widely transferable beyond these examples.

The full-time programme is offered over a period of 12 months and is structured in three parts. The taught component of the programme is delivered across the Autumn and Spring Terms, and the third Summer Term is devoted to an individual research project. The focus of the taught modules in the Autumn Term is towards developing a fundamental knowledge of fluid mechanics that underpins the more applied material which is taught in the Spring Term. The individual research project allows detailed exploration of a particular aspect of theoretical or applied fluid mechanics through a combination of experimental, analytical or numerical approaches.

Pre-sessional material is also made available to facilitate revision of background skills in mathematics and data manipulation prior to commencement of the programme in each academic year. The material includes a Mathematics Primer and a Matlab Primer and is not assessable.

In joining our MSc programme, you will be educated in a broad range of fluid-mechanics-related subject areas that equip you with a comprehensive view of fluid mechanics applications in civil engineering. The knowledge you will gain allows you to address civil and environmental engineering challenges in the key offshore, coastal and built environments. Examples of these challenges include mitigating against rising sea-levels and climate change, improving health, safety, well-being and sustainable design in a range of environments and advancing renewable energy production and the process of decarbonisation. Fluid mechanics knowledge is essential to address areas such as the design of coastal defences, the calculation of wave and current-induced forces on offshore fixed and floating structures, prediction of the spread of harmful pollutants and viruses in our natural and urban environments,

improving the efficiency of wind turbines and wave energy converters and reduction of the energy consumed when heating and cooling our buildings. The fundamental scientific and engineering knowledge you will gain is reinforced through numerous complementary activities such as industry-led applied design projects, hands-on laboratory practicals and a cutting-edge research project. It may be possible for projects to be carried out partly or wholly at an external organisation and requests will be considered on a case by case basis by the Director of the Programme.

Our MSc programme is delivered through teaching and project supervision by academics who are leaders in their fields with strong backgrounds across diverse subject areas such as coastal and offshore engineering, fluid loading, computational analysis, urban fluid mechanics, building ventilation, oceanography, mathematics and physics. Our academic staff will challenge you throughout the programme, both as an individual and during teamwork in groups, providing you with experiences that will develop your technical competence and your communication, leadership, interpersonal and time-management skills, ensuring that you have the experience and skillset to thrive in industry, consultancy or academia.

The programme is delivered in the Department of Civil and Environmental Engineering of Imperial College London. The department is recognised as world-leading in the field of civil and environmental engineering and Imperial is a world-renowned research and teaching university that is consistently ranked in the top 10 worldwide. During this MSc programme, you will have access to staff and a variety of opportunities in the Fluid Mechanics Section and a wide range of facilities, support and activities in the Department and Imperial. Our world-class Hydrodynamics Laboratory and Imperial's High-Performance Computing facilities provide opportunities to conduct rigorous experimental and numerical research that underpins the material taught on the programme.

Graduates from our MSc programme find employment in public, private and third level organisations including in industry, engineering consultancies and PhD research in academic institutions, with some students setting up their own company post-graduation.

Learning Outcomes

On completion of the MSc in Engineering Fluid Mechanics for the Offshore, Coastal and Built Environments Degree programme you will be able to:

1. Demonstrate comprehensive and in-depth knowledge of the essential scientific facts, concepts, principles and theories of fluid mechanics by addressing fluid mechanics related problems in the context of engineering analysis.

2. Identify both a wide range of flow phenomena in civil engineering applications and the governing fluid mechanics.

3. Adopt suitable tools and quantitative techniques to formulate and solve models for predicting civil engineering flows.

4. Interpret and validate model predictions with appreciation of their applicability and the underlying assumptions.

5. Apply the results in the context of specific engineering design problems, with sound judgement and in accord with relevant professional or industry standards.

6. Communicate technical material effectively in oral presentations and in written form, both individually and as part of a team.

7. Adapt and extend fluid mechanics knowledge to unfamiliar civil engineering applications and/or to cope with a degree of uncertainty.

8. Demonstrate knowledge of the interaction between engineering fluid mechanics and external factors including health, safety and wellbeing, risk management, commercial viability, the climate emergency and many broad considerations related to sustainability through the identification of the important relevant physical processes and the ability to quantify their influence.

9. Conduct a piece of independent research within a specified timeframe that demonstrates a contribution to knowledge in an area of engineering fluid mechanics.

10. Interpret state-of-the-art technical and scientific publications related to a research topic and demonstrate the ability to critically appraise the results of others as well as your own.

11. Communicate research effectively, both orally and as a written dissertation.

On completion of the PG Diploma in Engineering Fluid Mechanics for the Offshore, Coastal and Built Environments Degree programme you will be able to fulfil either the learning outcomes 1–8 above (corresponding to a comprehensive level across the taught modules) or the learning outcomes 1A–6A below (corresponding to a selective level across the taught modules) and 9–11 above (corresponding to the individual research project).

1A. Demonstrate knowledge of the essential scientific facts, concepts, principles and theories of fluid mechanics by addressing fluid mechanics related problems in the context of engineering analysis.

2A. Identify a range of flow phenomena in civil engineering applications and the governing fluid mechanics.

3A. Recommend suitable approaches to formulate and solve models for predicting civil engineering flows.

4A. Interpret and validate model predictions with appreciation of their applicability.

5A. Apply the results in the context of specific engineering design problems, in accord with relevant professional or industry standards.

6A. Communicate technical material effectively in both oral presentations and written form as part of a team.

On completion of the PG Certificate in Engineering Fluid Mechanics for the Offshore, Coastal and Built Environments Degree programme you will be able to fulfil the learning outcomes 1A–6A above (corresponding to a selective level across the taught modules).

The Imperial Graduate Attributes are a set of core competencies which we expect students to achieve through completion of any Imperial degree programme. The Graduate Attributes are available at: www.imperial.ac.uk/about/education/our-graduates/

Entry Requirements	
Academic Requirement	A good Upper Second or First Class Degree result (or International equivalent), in engineering or another numerate discipline, or Masters level degree qualification. Good mathematical skills (B or above at A-level or equivalent qualification). Relevant Postgraduate industrial experience is favoured. English Language qualification (where relevant). For further information on entry requirements, please go to www.imperial.ac.uk/study/pg/apply/requirements/pgacademic
Non-academic Requirements	Applicants who do not meet the academic requirements above, but who have substantial relevant industrial and professional experience may be admitted following interview with the MSc Programme Director and successful submission as a Special Case according to the Special Cases Policy for Admission: www.imperial.ac.uk/about/governance/academic-governance/academic-policy/admissions/
English Language Requirement	Standard requirement (PG) Please check for other Accepted English Qualifications
Admissions Test/Interview	Applicants may be invited to attend a post-application interview, either in-person or online.

The programme's competency standards documents are available from the department.

Learning & Teaching Approach

Learning and Teaching Delivery Methods

The MSc programme utilises a variety of methods to deliver learning and teaching to the class of approximately 30 students, including:

- Lectures: typically delivered as part of 3 hour timetabled blocks in either traditional or online lecture formats during the Autumn and Spring terms. Lecture content is accompanied by a variety of recordings, electronic resources and additional supplementary material to support self-study.
- Tutorials and Workshops: typically delivered as part of 3 hour timetabled blocks during the Autumn and Spring terms. Tutorial content is designed to reinforce learning through a combination of hands-on and self-paced problem-solving, in-class discussion, worked examples and both individual and peer-to-peer assistance. Workshops (e.g. hands-on computer practicals) may be used to focus on specific material, coursework or skills.
- Experimental demonstrations: you will benefit from the opportunity to study in the Hydrodynamics Laboratory a variety of fluid mechanical phenomena introduced in the taught modules together with the experimental techniques and approaches used.
- Group work exercises and Design Projects: you will benefit from learning opportunities involving your peers and develop teamwork skills and experience to address problems that are broader and more substantial than could be tackled individually in the time available within the programme. Typical group sizes are 2–10 people.
- Seminars: attendance at a variety of fluid mechanics and Departmental research seminars is encouraged as a means of broadening your experience in a highly multidisciplinary field.
- Individual research project: while undertaking your research project between May and August, you will receive individual guidance and advice from a member of academic staff expert in the subject.

The programme delivery will support you to develop a broad range of skills through hands-on practice in communication, presentation, teamwork and use of specialist software. Many of these skills below are typically involved in completing the coursework:

- Scientific report writing
- Soft skills such as team communication, organisation and coordination, project planning and time-management
- Group report compilation
- Oral presentations
- Computational fluid dynamics software
- Software for scientific data manipulation, analysis and visualisation
- Programming and coding

Overall Workload

Your overall workload consists of face-to-face sessions and independent learning. 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 per year. Typically in the Autumn and Spring terms you will spend 25%-30% of your time on lectures, tutorials, seminars and group work (around 400 hours) and the remaining 70%-75% of your time on independent study. The research project involves 100% of your time as independent study

Assessment Strategy

Assessment Methods

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

- Individual and group coursework assignments
- Group projects, reports and presentations
- Written examinations, which take place in January for the Autumn term modules and in late April/May for the Spring term modules.
- Individual research project presentation and dissertation

The Programme uses a range of summative and formative assessment methods to maximise student learning. Summative assessment refers to those forms of assessment set out above that will test your achievement of module objectives, allow you to demonstrate that you have met the intended learning outcomes of each module and contribute towards the programme-level intended learning outcomes. Formative assessments support you during the programme to identify areas of strengths and weaknesses and to improve your learning, but do not contribute directly towards your marks. We utilise a range of formative assessments such as tutorial and problem-solving exercises (in-class and for self-study), online quizzes, discussions, etc.

The balance of the summative assessment across the programme is as follows:

Coursework/practicals	48%
Examinations	52%

Academic Feedback Policy

Feedback is provided throughout the programme and in each module using a variety of approaches, as appropriate to the form of assessment. Formative assessments are typically accompanied by verbal or self-assessed feedback at individual, group and class levels during scheduled contact hours (e.g. lectures, tutorials, practical sessions, demonstrations and office hours). Example solutions for tutorial problems are typically made available to students up to 2 weeks after the tutorial has been issued to support learning and self-assessment throughout the course of each module. Peer discussion and feedback is facilitated and encouraged as appropriate. Throughout the individual research project, verbal feedback will be offered by project supervisors during regular meetings to discuss and plan progress. Programme level feedback is made available, in addition to general support and advice, during meetings with Personal Tutors and the MSc Director throughout the academic year.

Feedback will be provided within three weeks on the summative assessments submitted as coursework. This feedback will generally involve bespoke written commentary and/or mark sheets to accompany each individual and group submission. General feedback to the class may also be offered in verbal or written form. Provisional feedback, in grade format, on examination/assessment performance will issued within eight weeks of the conclusion of each examination block, i.e. in March and July. The MSc Course Director will schedule individual meetings with those students who have borderline performance or failed modules. The final numerical marks will be provided by the Registry following ratification by the MSc Board of Examiners meeting at the end of the academic year.

Re-sit Policy

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

Mitigating Circumstances Policy

Imperial'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]					
Year 1 - FHEQ Level 7 **You will study all core and compulsory modules.**					
Code	Module Title	Core/ Compulsory	Group	Term	Credits
CIVE70073	Fluid Mechanics Fundamentals	Core		Autumn	5
CIVE70074	Modelling Tools	Compulsory		Autumn-Spring	5
CIVE70075	Transport Processes	Compulsory		Autumn	5
CIVE70076	Wave Mechanics	Compulsory		Autumn	5
CIVE70077	Buoyancy Driven Flows	Compulsory		Autumn	5
CIVE70078	Air-sea Interaction Dynamics	Compulsory		Spring	5
CIVE70079	Computational Analysis	Compulsory		Spring	5
CIVE70080	Fluid Loading	Compulsory		Autumn	5
CIVE70081	Coastal Processes	Compulsory		Spring	5
CIVE70082	Energy Systems	Compulsory		Spring	5
CIVE70083	Urban Fluid Mechanics	Compulsory		Spring	5
CIVE70084	Design Projects	Core		Autumn-Spring	5
CIVE70085	Research Project – Fluid Mechanics	Core		Summer	30
				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 Postgraduate Certificate (PG Cert)
To qualify for the award of a postgraduate certificate you must have a minimum of 30 credits at Level 7

Award of a Postgraduate Diploma (PG Dip)
To qualify for the award of a postgraduate diploma you must have 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).

1. 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 university 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 weighted average mark in the designated 'taught' and 'research' aspects of the programme each 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 programme, students are subject to the standards set by the UK Engineering Council in relation to compensation: a maximum of 10 ECTS credits can be compensated across the entire programme.

Supporting Information
The Programme Handbook is available from the department.
The Module Handbook is available from the department.
Imperial's entry requirements for postgraduate programmes can be found at: www.imperial.ac.uk/study/pg/apply/requirements
Imperial's Quality & Enhancement Framework is available at: www.imperial.ac.uk/registry/proceduresandregulations/qualityassurance
Imperial's Academic and Examination Regulations can be found at: www.imperial.ac.uk/about/governance/academic-governance/regulations
Imperial College London 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 Imperial's Centenary, 8th July 2007, established Imperial 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.