IMPERIAL

Programme Information		
Programme Title	**Programme Code**	**HECoS Code**
Advanced Mechanical Engineering	H3U8 H3U824 H3U836	For Registry Use Only

Award	Length of Study	Mode of Study	Entry Point(s)	Total Credits	
				ECTS	CATS
MSc – H3U8	1 calendar year (12 months)	Full-Time	Annually in October	90	180
MSc – H3U824	2 calendar years (24 months)	Part-Time	Annually in October	90	180
MSc – H3U836	3 calendar years (36 months)	Part-Time	Annually in October	90	180
PG Diploma – H3U8D	N/A	N/A	N/A	60	120
PG Certificate	N/A	N/A	N/A	30	60
The PG Certificate and PG Diploma are exit awards and are not available for entry. You must apply to and join the MSc.					

Ownership			
Awarding Institution	Imperial College London	Faculty	Faculty of Engineering
Teaching Institution	Imperial College London	Department	Mechanical 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 Degree in Engineering	
FHEQ Level		Level 7	
EHEA Level		2nd Cycle	
External Accreditor(s) (if applicable)			
External Accreditor 1:	Institute of Mechanical Engineers		
Accreditation received:	2022	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. Ulrich Hansen
Student cohorts covered by specification	2025-26 entry
Date of introduction of programme	October 76
Date of programme specification/revision	August 23

Programme Overview

The Advanced Mechanical Engineering (AME) MSc Programme will provide you with the knowledge and understanding of the state-of-the-art in one or more of the many areas of mechanical engineering within our department.

The Department of Mechanical Engineering is one of the largest mechanical engineering departments in the world, with topics ranging from traditional topics, such as aerotechnologies, materials mechanics and engine performance, to more recent engineering topics, such as medical engineering, robotics, clean energy and fire science. The programme will enable you to develop abilities which are transferable to all areas of mechanical engineering.

The principal component of the programme is the individual project, which is usually associated with current research activity or industrial consultancy, providing you access to world-leading knowledge and infrastructure allowing you to gain substantial expertise in a particular area.

You will develop further expertise by taking taught modules taught by expert academics. The programme is broad and flexible, and you choose 6 of 24 taught subjects according to curiosity and your envisaged career path.

The AME cohort always consists of a very diverse mix of nationalities, ethnicities, cultural and scientific backgrounds. The resulting student experience of different perspectives and establishing life-long personal and professional relationships across the world is considered an important part of the programme.

If you wish to follow the programme as a part time student, you need to discuss and have agreed a plan for your studies with the Programme Director.

Learning Outcomes

On completion of your studies for the MSc you will be able to:

1. Solve real world problems based on fundamental theories, principles and concepts used in mechanical engineering.
2. Outline and assess the importance of current problems and/or new insights from the forefront of research and development.
3. Justify the appropriate choice of engineering materials and components for various applications based on a thorough understanding of a wide range of materials and components.
4. Plan and conduct a research project and communicate the findings.
5. Critically assess concepts relevant to mechanical engineering, typically at the interface to other disciplines, ultimately to devise an effective approach to address a new or unfamiliar problem.
6. Derive new insight based on critical analysis of new (research) data and information.
7. Employ engineering analysis tools in tackling unfamiliar problems and assess their limitations, such as those with uncertain or incomplete data or specifications.
8. Ascertain the best combination and use of theoretical, numerical or experimental methodology to overcome obstacles and assess and mitigate deficiencies.
9. Produce a written report which presents in the manner of a scientific publication a literature review, research methodology, research results, discussion and conclusions.

10. Create and deliver a clear presentation to an expert audience summarising the background, results and conclusions of a research project.
11. Synthesize a comprehensive range of fundamental engineering concepts, theories, and principles and apply them to a range of complex and specialised areas of engineering of industrial importance and through critical analyses to reach coherent conclusions.
12. Assess the state of the art methods in a range of engineering subjects, analyse complex data, and simulate and model industrially relevant scenarios.
13. Argue the importance of professional and ethical standards.
14. Use tools for project planning, management and finance including accounting and investment appraisal and evaluations of risk issues including health & safety, environmental and commercial risk, regulatory requirements, intellectual property and its protection and innovation strategies for products and systems to fulfil new needs.

On completion of your studies for the PG Diploma in Advanced Mechanical Engineering you will have achieved learning outcomes 4 to 10 above. You will have achieved also other of the learning outcomes listed above but this will depend on which taught modules you have passed.

On completion of your studies for the PG Certificate in Advanced Mechanical Engineering you will have achieved some of the learning outcomes 1 to 3 and 11 to 14 listed above, which will depend on the taught modules you have passed.

Entry Requirements

Academic Requirement	Normally a strong first class (1st) UK Bachelor's Degree with Honours in Engineering or Science (or a comparable qualification recognised by the university)
Non-academic Requirements	None
English Language Requirement	Standard requirement (PG) Please check for other Accepted English Qualifications
Admissions Test/Interview	Interviews are not normally used

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

Learning & Teaching Approach

Teaching
You will be taught through a combination of lectures, tutorials, team-based learning, laboratory demonstrations, experiments, guest lectures and presentations. Lectures make use of recordings and several interactive technologies including experimental demonstrations. Tutorials will enable you to discuss and develop your understanding of topics covered in lectures. Tutorial group sizes vary between modules but typically from 10 to 20 students.

Independent learning
You are expected to spend significant time on independent study outside of face-to-face contact time. This will typically include accessing and interacting with resources online, reading journal articles and books, undertaking research in the library, reviewing lecture notes and watching lecture recordings, working on individual and group projects, working on coursework assignments, solving tutorial questions and revising for exams.

Research project
You can select from a very broad range of proposed projects typically related to the department's research activity or industrial consultancy. You can also self-propose a project, subject to agreement with the supervisor. A key purpose of the project is to develop your skills as an independent engineer and researcher. However, your project is typically carried out in the supervisor's lab and in collaboration with the supervisor and very likely interacting or collaborating with other researchers in the supervisor's laboratory. 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.

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 2250 hours.

You will spend about 7% of your time attending lectures (around 160 hours), about 5% of your time in tutorials or module related labs, 38% on independent study related to your modules and finally 50% of your time on your project which includes independent work and work in the research laboratory.

Assessment Strategy

Assessment Methods

You can expect a variety of different types of assessment methods: written examinations, online assignments, quizzes, report writing, peer assessments, programming tests, oral presentations.

Nearly all (95%-100%) of formal assessments in the programme are summative, that is the assessment count towards your final mark. There are summative assessments throughout the year including reports and presentations associated with both the taught modules as well as the project. Tutorials provide opportunity for formative self-assessment and frequent meetings with your project supervisor will provide a regular source of informal formative assessments. Some modules have summative group assessments while other modules have formative group assessments. Examinations are intended to assess understanding rather than recall.

The exact balance of summative assessments will depend on your choice of taught modules. However, an indication is given in table below:

	Taught modules (50% of MSc)	Project (50% of MSc)
Coursework	15%	50%
Exam	35 %	

Academic Feedback Policy

Feedback is provided through several formats, including:
▪ Oral (e.g., face to face during or after face-to-face sessions, video)
▪ Personal (e.g., discussion with staff)
▪ Interactive (e.g., Team Based Learning, peer-to-peer, online quizzes)
▪ Written (e.g., solutions, model answers, comments on work which can be used as feedforward)

You will receive feedback on intermediate, developmental assessments such as project plan and progress reports and on coursework assessments. Feedback on overall class exam performance including question-by-question basis is also provided. Feedback is intended to help you learn and you are encouraged to discuss it with your module tutor. Feedback will be provided on module coursework within 2 weeks of submission.

During the year you will be provided with indicative results, the results ratified at the Board of Examiners at the end of the programme.

Imperial'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

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 modules from Group C and exactly one module from Group A which must be passed. You will study exactly 5 modules from Group B. If you studied Mechanical Engineering at Imperial, you must agree your elective choices with the programme Director.

Code	Module Title	Core/ Compulsory/ Elective	Group	Term	Credits
MECH70029	Research Project	Core	C	Autumn-Summer	45
MECH70030	Professional Engineering Skills AME	Core	C	Autumn-Summer	10
MECH70021	Aircraft Engine Technology	Elective	A	Autumn-Spring	10
MECH70006	Metal Processing Technology	Elective	A	Autumn-Spring	10
MECH70003	Future Clean Transport Technology	Elective	A	Autumn-Spring	10
MECH70008	Mechanical Transmissions Technology	Elective	A	Autumn-Spring	10
MECH70022	Advanced Control	Elective	B	Autumn-Spring	5
MECH70019	Advanced Stress Analysis	Elective	B	Autumn-Spring	5
MECH70016	Applied Vibration Engineering	Elective	B	Autumn-Spring	5
MECH70020	Combustion Safety and Fire Dynamics	Elective	B	Spring	5
MECH70015	Computational Fluid Dynamics	Elective	B	Autumn-Spring	5
MECH70017	Mechanics of Composite	Elective	B	Autumn-Spring	5
MECH70009	Interfacing and Data Processing	Elective	B	Autumn	5
MECH70025	Machine Learning	Elective	B	Autumn	5
MECH70002	Nuclear Reactor Physics	Elective	B	Spring	5
MECH70001	Nuclear Thermal Hydraulics	Elective	B	Autumn	5
MECH70005	Fracture Mechanics B	Elective	B	Autumn-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.

MECH70018	Computational Continuum Mechanics B	Elective	B	Autumn	5
MECH70012	Finite Element Analysis and Applications B	Elective	B	Autumn-Spring	5
MECH70026	Energy Systems	Elective	B	Autumn-Spring	5
MECH70027	Environmental and Applied Fluid Dynamics	Elective	B	Autumn-Spring	5
MECH70053	Manufacturing Technology and Management B	Elective	B	Autumn-Spring	5
MECH70054	Introduction to Robotics	Elective	B	Autumn	5
MECH70046	Mechatronics 3B	Elective	B	Autumn-Spring	5
MECH70043	Structure, Properties and Applications of Polymers B	Elective	B	Autumn-Spring	5
MECH70042	Introduction to Nuclear Energy B	Elective	B	Autumn	5
MECH70044	Tribology B	Elective	B	Autumn-Summer	5
MECH70055	Sustainable Engineering Design	Elective	B	Autumn-Summer	5
MECH70057	Robot Dynamics and Control	Elective	B	Autumn-Summer	5
MECH70056	Automotive Design with Motorsport B	Elective	B	Autumn	5
MECH70052	Equality, Diversity and Inclusion in Engineering B	Elective	B	Autumn	5
MATE70029	Nuclear Fusion	Elective		Spring	5
				Credit Total	90

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:
1. passed modules to the value of no fewer than 60 credits at Level.
2. and no more than 10 credits as a Compensated Pass.

Award of a Master's 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 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 Master's, 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

Due to the requirements of the accrediting body, the elective taken from Group A (see section on Programme Structure) must be passed. As an accredited degree, students on this MSc programme 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 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/apply/postgraduate-taught/entry-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
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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.