

MSc Advanced Mechanical Engineering

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 intended as a reference point for prospective students, current students, external examiners and academic and support staff involved in delivering the programme and enabling student development and achievement.

Programme Information

Programme Title	Advanced Mechanical Engineering			
Award(s)	MSc			
Programme Code	H3U8	H3U824	H3U836	
Awarding Institution	Imperial College London			
Teaching Institution	Imperial College London			
Faculty	Faculty of Engineering			
Department	Department of Mechanical Engineering			
Associateship	City and Guilds of London Institute (ACGI)			
Main Location of Study	South Kensington Campus			
Mode and Period of Study	1 academic year, full-time 2 or 3 academic years, part-time			
Cohort Entry Points	Annually in October			
Relevant QAA Benchmark Statement(s) and/or other external reference points	Master's Degrees in Engineering			
Total Credits	ECTS:	90	UK Credit:	180
FHEQ Level	Level 7			
EHEA Level	2 nd cycle			
External Accreditor(s)	N/A			
Specification Details				
Student cohorts covered by specification	2021-22 entry			
Person responsible for the specification	Ulrich Hansen, Director AME Course			
Date of introduction of programme				

Date of programme specification/revision	October 2021
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Programme Overview

The MSc course provides students with a knowledge and understanding of the 'state-of-the-art' in one or more of the many areas of mechanical engineering in which the Department has acknowledged expertise. This combines with the potential for students to develop their abilities in subjects such as numerical analysis and signal processing, which are useful in all areas of mechanical engineering and are associated with the application of computers in engineering practice.

The principal component of the course is the individual project, which is usually associated with current research activity or industrial consultancy, allowing you to gain substantial expertise in one particular area.

Further expertise is developed by taking taught course modules. Students can study an unusually broad range of subjects in the Department as a result of our position as one of the largest university engineering departments in the UK.

The success of the course can be measured by the large proportion of graduates who go on to find appropriate and challenging posts in industry, government, and universities at home and abroad.

Learning Outcomes

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

Knowledge and Understanding of:

- To understand and be able to apply effectively theories, principles and concepts to advanced engineering research and other projects.
- To have an advanced understanding of engineering, science, mathematics and other engineering science disciplines needed for advanced engineering problem solving.

Intellectual Skills

- To assimilate, digest and interpret information.
- To show good reasoning and creativity in the solutions of theoretical and practical problems.
- To be able to integrate information and numerical data from different sources and relate them appropriately to a task.
- To show flair in performing experimental and other project work. Also, in the analysis of findings and the presentation of reports.
- To plan, conduct and write up a programme of research.

Practical Skills

- To plan and execute effectively a series of experiments, projects and other coursework with the safe use of laboratory, workshop and other equipment.
- To analyse experimental results and determine their strength and validity.
- To develop the use of computers and computer programmes.
- To show competence in the design of experimental rigs and the use of workshop tools and machines where necessary.

Professional Skills

- To communicate effectively by oral presentations, written reports and a research dissertation.
- To read across from one subject to another and from one problem to another.
- To build on ideas of others when working as a team.
- To learn effectively for the purpose of continuing professional development.

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 College).
Non-academic Requirements	None
English Language Requirement	Standard requirement IELTS score of 6.5 overall (minimum 6.0 in all elements)

The programme's competency standards document can be found at:

https://bb.imperial.ac.uk/webapps/blackboard/content/listContent.jsp?course_id=6309_1&content_id=540

Learning & Teaching Strategy

Scheduled Learning & Teaching Methods (subject to Covid situation)	<ul style="list-style-type: none">• Lectures• Problem sheets• Tutorials• Laboratory Work
E-learning & Blended Learning Methods	<ul style="list-style-type: none">• Online teaching
Project and Placement Learning Methods (subject to Covid situation)	<ul style="list-style-type: none">• Group practical exercises• Research Project

Assessment Strategy

Assessment Methods	<ul style="list-style-type: none">• Written Exams• Coursework
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Academic Feedback Policy

Where appropriate, feedback will be provided within 10 working days of submission of a piece of coursework. In circumstances where this is not possible, students will be notified in advance.

Re-sit Policy

The College's Policy on Re-sits is available at: <http://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: <http://www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/>

Programme Structure

Full-time	Term One	Term Two	Term Three	Term Four
Core Modules	0	0	0	0
Elective Modules	7	7	0	0
Projects	1	1	1	1
Part-time (Year One)	Term One	Term Two	Term Three	Term Four
Core Modules	0	0	0	0
Elective Modules	5	5	0	0
Projects	0	0	0	0
Part-time (Year Two)	Term One	Term Two	Term Three	Term Four
Core Modules	0	0	0	0
Elective Modules	2	2	0	0
Projects	1	1	1	1

Assessment Dates & Deadlines

Written Examinations	April-May
Coursework Assessments	Continuous
Project Deadlines	Mid-September
Practical Assessments	Continuous

Assessment Structure

Marking Scheme

Pass

A candidate must:

- Pass the taught courses element part of the course by passing in seven subjects assessed by examination and coursework with an overall mark for each subject taken of 50% or above; and
- Pass the research project element of the course with a mark of 50% or above.

Merit

A candidate must:

- Pass both the Taught Courses element and the Research Project element each with an overall average mark of 60% or above.
- A student who achieves an overall average mark for the MSc course as whole of 60% or above, and who passes both the Taught Courses and Research Project each with an overall average mark of 50% or above may at the discretion of the Board of Examiners be recommended to pass with Merit.

Distinction

A candidate must:

- Pass both the Taught Courses element and the Research Project element each with an overall average mark of 70% or above.
- A student who achieves an overall average mark for the MSc course as whole of 70% or above, and who passes both the Taught Courses and Research Project each with an overall average mark of 60% or above may at the discretion of the Board of Examiners be recommended to pass with Distinction.

Module Weightings	
Module	% Module Weighting
7 x modules made up from groups (B) and (C) at least five of which must be from Group (C) OR 1 module from group (A) and 5 x modules from group (B) and (C) at least three of which must be from Group (C)	50%
Research Project	50%

Indicative Module List											
Code	Title	Core/ Elective	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Written Exam	% Course- work	% Practical	FHEQ Level	ECTS
	Research Project	CORE	60	1065	0	1125	0	100	0	7	45
ME4-MAET	Aircraft Engine Technology	ELECTIVE (A)	42	258	0	300	50	50	0	7	12
ME4-MMPT	Metal Processing Technology	ELECTIVE (A)	47	252	0	300	50	50	0	7	12
ME4-MMTT	Mechanical Transmission Technology	ELECTIVE (A)	42	258	0	300	50	50	0	7	12
ME4-MFCTT	Future Clean Transport Technology	ELECTIVE (A)	42	258	0	300	50	50	0	7	12
ME3-HCCM	Computational Continuum Mechanics	ELECTIVE (B)	27	123	0	150	100	0	0	6	6
ME3-HFFM	Fundamentals of Fracture Mechanics	ELECTIVE (B)	31	119	0	150	100	0	0	6	6
ME3-HNUCN	Introduction to Nuclear Energy	ELECTIVE (B)	30	120	0	150	100	0	0	6	6
ME3-HSPAP	Structure, Properties and Applications of Polymers	ELECTIVE (B)	25	125	0	150	100	0	0	6	6
ME3-HMTM	Manufacturing Technology and Management	ELECTIVE (B)	39	111	0	150	50	25	25	6	6
ME3-HTRB	Tribology	ELECTIVE (B)	27	123	0	150	75	25	0	6	6
ME4-MASA	Advanced Stress Analysis	ELECTIVE (C)	33	142	0	175	100	0	0	7	7

Indicative Module List											
Code	Title	Core/ Elective	L&T Hours	Ind. Study Hours	Place- ment Hours	Total Hours	% Written Exam	% Course- work	% Practical	FHEQ Level	ECTS
ME4-MCNTL	Advanced Control	ELECTIVE (C)	26	149	0	175	100	0	0	7	7
ME4-MAVE	Advanced Vibration Engineering	ELECTIVE (C)	22	153	0	175	60	30	10	7	7
ME4-MCMB	Combustion	ELECTIVE (C)	21	154	0	175	100	0	0	7	7
ME4-MCFD	Computational Fluid Dynamics	ELECTIVE (C)	25	150	0	175	25	75	0	7	7
ME4-MCPM	Composite Materials	ELECTIVE (C)	25	150	0	175	100	0	0	7	7
ME4-MMCL	Machine Learning	ELECTIVE (C)	30	145	0	175	50	0	50	7	7
ME4-MFEAA	Finite Element Analysis and Applications	ELECTIVE (C)	24	151	0	175	60	20	20	7	7
ME4-MNDP	Interfacing and Data Processing	ELECTIVE (C)	32	143	0	175	60	40	0	7	7
ME4-MNURP	Nuclear Reactor Physics	ELECTIVE (C)	32	143	0	175	100	0	0	7	7
ME4-MNUTH	Nuclear Thermal Hydraulics	ELECTIVE (C)	32	143	0	175	100	0	0	7	7

Supporting Information

The Programme Handbook is available at:

<https://share.imperial.ac.uk/foe/MechEng/pgadmin/PG%20Document%20Repository/Advanced%20Mechanical%20Engineering%20Handbook%202016-17.pdf>

The Module Handbook is available at: N/A

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:

<http://www.imperial.ac.uk/about/governance/academic-governance/senate-subcommittees/>

The College's Academic and Examination Regulations can be found at:

<http://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".

<http://www.imperial.ac.uk/admin-services/secretariat/college-governance/charters-statutes-ordinances-and-regulations/>

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<https://www.officeforstudents.org.uk/>