

Title of Programme: MSc Mechanical Engineering

Programme Code: PEME

Programme Specification

This programme specification is relevant to students entering:
01 September 2024

Associate Dean of School (Academic Quality Assurance):
Mariana Lilley



A programme specification is a collection of key information about a programme of study (or course). It identifies the aims and learning outcomes of the programme, lists the modules that make up each stage (or year) of the programme, and the teaching, learning and assessment methods used by teaching staff. It also describes the structure of the programme, its progression requirements and any programme-specific regulations. This information is therefore useful to potential students to help them choose the right programme of study, to current students on the programme, and to staff teaching and administering the programme.

Summary of amendments to the programme

Date	Section	Amendment
16.08.2024	1.D	Correction to title of MSc Engineering Technology interim award.

If you have any queries regarding the changes please email AQO@herts.ac.uk

Programme Specification MSc Mechanical Engineering

This programme specification (PS) is designed for prospective students, enrolled students, academic staff, and potential employers. It provides a concise summary of the main features of the programme and the intended learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if they take full advantage of the learning opportunities that are provided. More detailed information on the teaching, learning and assessment methods, learning outcomes and content for each module can be found in Definitive Module Documents (DMDs) and Module Information.

Section 1

Awarding Institution/Body	University of Hertfordshire
Teaching Institution	University of Hertfordshire
University/partner campuses	College Lane
Programme accredited by	See Section D
Final Award	MSc
(Qualification)	
All Final Award titles	MSc Mechanical Engineering
(Qualification and Subject)	MSc Mechanical Engineering with Extended Professional Practice
	MSc Mechanical Engineering with Advanced Project
FHEQ level of award	7

A. Programme Rationale

The MSc Mechanical Engineering programme is designed to provide a rigorous and systematic understanding of the field, equipping students with the critical awareness and knowledge required to become a credible mechanical engineer by developing further knowledge in the domain.

The development of skills and advancement of knowledge focus on:

- the selection of materials, process and techniques for the structural analysis, design and construction of engineered components;
- the understanding of the control and dynamics theories used in the design of systems and more specifically their application in a wide variety of engineered systems and subsystems;
- the construction of CAE models and evaluation of results, the limitations of present techniques and the potential future direction of developments in the CAE field;
- appreciation of the need for process, product development and quality and reliability issues relevant to the introduction of products in a cost effective and timely manner;
- critical review of the present knowledge base, its applicability, usage and relevance to enhance product and enterprise performance.

The MSc Mechanical Engineering with Extended Professional Practice award provides students with the opportunity of a placement, working in a relevant engineering environment to further develop the knowledge and skills they gain from the taught modules. The placement usually occurs in the first 2 semester of the second year of enrolment after which the student will return to complete their MSc Individual Project.

The MSc Mechanical Engineering with Advanced Project award aims to develop key employment and professional development skills that students will need to seek employment. Modules in this award will focus on delivering successful projects and develop strategies for successful employment after graduation.

The successful postgraduates of the programme will acquire the knowledge and understanding, intellectual, practical, and transferable skills necessary for the analysis and synthesis of problems in mechanical engineering and manufacturing through a combination of experimental, simulation, research methods and case studies. They can expect to gain work in a range of disciplines within a variety of industries from specialist technical roles to positions of management responsibility.

B. Educational Aims of the Programme

Diversity and Inclusion

Our programmes are purposefully designed to enable all students to engage meaningfully with the curriculum by being accessible and representative. We will support students to shape their learning experience, removing barriers and enabling them to succeed. The curriculum explicitly includes multiple and representative perspectives, valuing collective identities and individual diversity. Learning, teaching, and assessment activities help students to understand how they can enhance outcomes both for themselves and for others. All students belong to a learning community, and during their studies we really want to hear their voices, encourage them to listen to others, and express themselves.

The programme has been devised in accordance with the University's graduate attributes of programmes of study as set out in [UPR TL03](#).

Additionally, this programme aims to:

- provide a quality education and training at postgraduate level in the discipline of mechanical engineering, including current industry trends and practices.
- help students develop advance knowledge and skills to realise their own potential, preparing them for employment in a variety of roles related to mechanical engineering or any other related industry.
- provide an educational opportunity and experience to graduates and/or those with appropriate previous experience which enhances their prospects of professional employment with industry.
- provide students with knowledge and skills to equip them for a career in mechanical engineering.

Graduate Attributes

Our graduates will be capable and professional, creative and enterprising, and will build their social and global awareness throughout. In addition to their subject expertise and proficiency, as a University of Hertfordshire graduate, they will be:

- Professionally focused
- Globally minded
- Sustainability driven
- Digitally capable and confident
- Inclusive and collaborative
- Evidence based and ethical

C. Intended Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills and other attributes in the following areas. The programme outcomes are referenced the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (2014), and relate to the typical student. Additionally, the SEEC Credit Level Descriptors for Further and Higher Education (2021) have been used as a guiding framework for curriculum design.

Knowledge and Understanding:	Teaching/learning methods & strategies	Assessment
A1-Demonstrate in-depth knowledge and understanding of advanced CAE and simulation methods employed by mechanical engineers.	Acquisition of knowledge and understanding of A1-A5 is through a combination of lectures, seminars, group discussions, tutorials, workshops, laboratory practical and written assignments.	Knowledge and understanding are assessed through a combination of exams, coursework in the form of critical analysis reports, laboratory reports, essays and class-based test or quizzes. A1-A5 can also be assessed
A2-Demonstrate in-depth knowledge and understanding of engineering sciences and	Additional math support is provided via the math drop-in centre.	

<p>mathematical approaches appropriate to mechanical engineering.</p> <p>A3-Demonstrate in-depth knowledge and understanding of methods employed in analysis of technical and commercial mechanical problems.</p> <p>A4-Demonstrate in-depth knowledge and understanding of the product/process definition and systems design process employed by the mechanical industry.</p> <p>A5-Demonstrate in-depth knowledge and understanding of roles in an engineering team and personal responsibilities.</p> <p>For students on with Advanced Project award only:</p> <p>A6–Demonstrate in-depth knowledge and understanding of skills and strategies required to deliver engineering projects.</p>	<p>Staff will also deploy a range of teaching and learning strategies in the most appropriate way for each individual module, and this varies depending on the subject nature and its associated activities.</p> <p>Throughout, the student is encouraged to undertake independent study both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject.</p>	<p>through laboratory practical, presentations and design exercises.</p>
Intellectual skills:	Teaching/learning methods & strategies	Assessment
<p>B1-Be able to analyse and solve engineering problems to reach substantiated conclusions using appropriate techniques.</p> <p>B2-Be able to design, model and analyse relevant engineering systems/subsystems and recognise the limitations of the approach employed.</p> <p>B3-Be able to critically review and select appropriate methods and techniques to solve engineering and commercial problems.</p> <p>B4-Be able to evaluate external influences on the design process including those outside of engineering.</p>	<p>Intellectual skills (B1 – B6) are developed throughout the programme by the methods and strategies outlined in section A, above. Analysis, problem solving, and modelling skills are further developed through case studies, class discussion, in-course exercises, assignments, tests, and exams.</p> <p>Analysis, problem solving, and simulation skills are further developed through tutorial work, practical sessions, and project work.</p> <p>Design and IT skills are further developed through project work.</p> <p>Throughout, the learner is encouraged to develop intellectual skills further by independent study</p>	<p>Intellectual skills (B1 – B6) are assessed through case studies, experiential work, tutorials, assignments, lab reports, report, class-based test, and examinations.</p> <p>These are supported by work centred on analysis and synthesis, problem solving, in technical contexts.</p>

<p>B5-Be able to develop skills in ethical operations and show insight on the commercial and social context.</p> <p>For students on with Advanced Project award only:</p> <p>B6-Be able to employ the skills and strategies required to deliver engineering projects.</p>		
Practical skills:	Teaching/learning methods & strategies	Assessment
<p>C1-Be able to apply appropriate experimental, analytical and modelling techniques to a range of mechanical engineering problems drawing appropriate conclusions.</p> <p>C2-Be able to design and perform experimental work, drawing conclusions based on critical evaluation in the absence of incomplete data.</p> <p>C3-Be able to select and use advanced computer-aided engineering tools to solve problems whilst recognising the limitations of the techniques employed.</p> <p>C4-Be able to prepare technical documentation and clearly communicate this to a range of audiences.</p> <p>C5-Be able to evaluate the design of appropriate systems, components or processes appropriate to mechanical engineering.</p> <p>C6-Be able to plan and manage project, taking into account commercial, industrial and resource constraints.</p> <p>For students on with Extended Professional Practice award only:</p> <p>C7-Be able to apply practical, technical and communication skills within an industrial environment.</p>	<p>Practical skills are developed throughout the programme through a series of case studies, experimental and simulation exercises, project reports and presentations, moving from a more didactic approach to an increasing self-directed and interactive approach depending on the nature of the module.</p> <p>Skills (C1 – C5) are developed through the programme of study and associated software simulation tools, written reports, lab exercises and submissions.</p> <p>C6 is developed throughout the programme of the study, with one-to-one supervision during the MSc individual project.</p> <p>C7 will be developed through industrial placement (where applicable)</p> <p>Feedback is provided to all students on all coursework produced.</p>	<p>Practical skills are assessed through laboratory reports, coursework assignments, design exercise submissions, case study reports, presentations, and project reports.</p>

Transferable skills:	Teaching/learning methods & strategies	Assessment
D1-Communicate information effectively, orally and/or in writing.	<p>Transferable skills are developed throughout the programme by using group discussions and report writing and require students to manage their own time for achieving targets.</p> <p>Skill D1 is developed through coursework reports, oral presentations, research methods and the project report.</p> <p>Skill D2 is developed through meeting deadlines for scheduled assignments and the individual project.</p> <p>Skills D3, D4 and D5 are developed throughout most modules, through lectures, group work, assessments, and the individual project.</p> <p>Skill D6 is encouraged and developed by the nature of the programme of study and the acquisition of transferable skills.</p> <p>Throughout, the student is encouraged to develop transferable skills by maintaining a record of evidence and completing a personal development plan.</p>	Transferable skills D1-D6 are assessed through assignment work and the project.
D2-Manage time and resources effectively.		
D3-Work effectively individually and/or within a team.		
D4-Solve problems in a logical and coherent manner.		
D5-Manipulate, sort and present data.		
D6-Learn effectively and independently, in preparation for lifelong learning.		

D. Programme Structures, Features, Levels, Modules, and Credits

The programme is offered in full-time mode only.

The duration of the programme is two years for the 'with Extended Professional Practice' and 'with Advanced Project' awards.

For the 180-credit MSc Mechanical Engineering the duration of the programme is as follows:

- 12 months for students joining in Semester A (September, Option 1). In Option 1, students study taught modules in Semesters A and B, and then undertake their project in Semester C.
- 18 months for students joining in Semester A (September, Option 2). In Option 2, students study taught modules in Semesters A and B, have a vacation in period in Semester C and undertake their project in Semester A of the following year.
- 18 months for students joining in Semester B (January).

Entry is normally at master's Level 7 with related degree qualifications.

The Programme Learning Outcomes detailed in section C are developed and assessed through the constituent modules. Table 2 (at the end of this document) identifies where each learning outcome is developed and assessed.

Professional and Statutory Regulatory Bodies

The 2023-24 intake for the MSc Mechanical Engineering is accredited by the Institution of Mechanical Engineers as meeting the further learning requirement for Chartered Engineer registration. Accreditation for the 2024-25 cohorts will be sought.

Please note that the Washington Accord recognition requires a combination of a recognised CEng bachelors-level degree course with recognised further learning to masters level.

With Extended Professional Practice Award

Industrial placement awards offer the opportunity for students to undertake a period of industrial placement, and so develop their understanding and skills within a professional environment. The industrial placement with Extended Professional Practice award is for full-time study only.

A 'With Extended Professional Practice' award requires the successful completion of at least 30 weeks full-time equivalent placement activity from a maximum of two separate approved placement, neither of which will be normally less than 12 weeks in duration as defined by [UPR AS11](#). Students are supported by Careers and Employment Services in finding a placement.

With Advanced Project Award

There is an opportunity for students to study two additional modules to develop project delivery and problem-solving skills in diverse groupwork settings. The modules aim to develop collaborative working skills, solving engineering challenges by researching topics in engineering. Graduates obtaining these awards will be equipped with essential skills for better employment prospects learned through collaborative groupwork and problem-solving scenarios to enter specialist employment in technically advanced and unpredictable working environments requiring sound judgment and the exercise of personal responsibility and initiative. This award is for full-time study only.

Programme Structure

The programme structure and progression information below (Table 1a and 1b) is provided for the award. Any interim awards are identified in Table 1b. The Programme Learning Outcomes detailed above are developed and assessed through the constituent modules. Table 2 identifies where each learning outcome is assessed.

Table 1a Outline Programme Structure

To enrol on the MSc Individual Project module, students must have studied 120 credits of taught modules from the programme and passed at least 60 credits.

MSc Mechanical Engineering

Mode of study Full-time

Entry point Semester A

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
CFD & Applications	7ENT2059	15	60	0	40	0	A
Dynamics and Performance of Mechanical Systems	7ENT2061	15	0	0	100	0	A
Renewable Energy	7ENT2092	15	40	0	60	0	A
Integrated Product Engineering	7ENT2086	15	0	0	100	0	A
Advanced Materials and Manufacturing Technology	7ENT2050	15	25	0	75	0	B
Advanced Thermodynamics and Thermal Systems	7ENT2052	15	25	0	50	25	B
FEM & Applications	7ENT2063	15	60	0	40	0	B
Data Analytics for Engineers	7ENT2085	15	0	0	100	0	B
MSc Individual Project (Mechanical)	7ENT2089	60	0	0	80	20	C, A

MSc Mechanical Engineering

Mode of study Full-time

Entry point Semester B

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Academic Session 1							
Advanced Materials and Manufacturing Technology	7ENT2050	15	25	0	75	0	B
Advanced Thermodynamics and Thermal Systems	7ENT2052	15	25	0	50	25	B
FEM & Applications	7ENT2063	15	60	0	40	0	B
Data Analytics for Engineers	7ENT2085	15	0	0	100	0	B
CFD & Applications	7ENT2059	15	60	0	40	0	A
Dynamics and Performance of Mechanical Systems	7ENT2061	15	0	0	100	0	A
Renewable Energy	7ENT2092	15	40	0	60	0	A
Integrated Product Engineering	7ENT2086	15	0	0	100	0	A
Academic Session 2							
MSc Individual Project (Mechanical)	7ENT2089	60	0	0	80	20	B

MSc Mechanical Engineering with Extended Professional Practice

Mode of study Full-time

Entry point Semester A

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Year 1							
CFD & Applications	7ENT2059	15	60	0	40	0	A
Dynamics and Performance of Mechanical Systems	7ENT2061	15	0	0	100	0	A
Renewable Energy	7ENT2092	15	40	0	60	0	A
Integrated Product Engineering	7ENT2086	15	0	0	100	0	A
Preparation for Placement	7ENT2090	0	0	0	P/F	0	A
Advanced Materials and Manufacturing Technology	7ENT2050	15	25	0	75	0	B
Advanced Thermodynamics and Thermal Systems	7ENT2052	15	25	0	50	25	B
FEM & Applications	7ENT2063	15	60	0	40	0	B
Data Analytics for Engineers	7ENT2085	15	0	0	100	0	B
Year 2							
MSc Professional Work Placement	7ENT2075	60	0	0	P/F	0	AB
MSc Individual Project (Mechanical)	7ENT2089	60	0	0	80	20	C

MSc Mechanical Engineering with Advanced Project

Mode of study Full-time

Entry point Semester A

	Module Code	Credit Points	% Test	% Examination	% Coursework	% Practical	Semesters
Compulsory Modules							
Module Title							
Year 1							
CFD & Applications	7ENT2059	15	60	0	40	0	A
Dynamics and Performance of Mechanical Systems	7ENT2061	15	0	0	100	0	A
Renewable Energy	7ENT2092	15	40	0	60	0	A
Integrated Product Engineering	7ENT2086	15	0	0	100	0	A
Advanced Materials and Manufacturing Technology	7ENT2050	15	25	0	75	0	B
Advanced Thermodynamics and Thermal Systems	7ENT2052	15	25	0	50	25	B
FEM & Applications	7ENT2063	15	60	0	40	0	B
Data Analytics for Engineers	7ENT2085	15	0	0	100	0	B
Year 2							
Successful Project Delivery (Mechanical)	7ENT2100	30	40	0	60	0	A
Project Skills and Professional Development (Mechanical)	7ENT2099	30	0	0	P/F	0	B
MSc Individual Project (Mechanical)	7ENT2089	60	0	0	80	20	C

The award of an MSc Mechanical Engineering requires 180 credit points. The award of MSc Mechanical Engineering with Extended Professional Practice requires 240 credit points. The award of MSc Mechanical Engineering with Advanced Project requires 240 credit points.

Table 1b Final and interim awards available

The programme provides the following final and interim awards:

Final Award	Award Title	Minimum requirements	Available at end of (normally):	Programme Learning Outcomes developed (see above)
MSc	Mechanical Engineering	180 credit points.	3 Semesters	All programme learning outcomes (see Table 2), except A6, B6, C7.
MSc	Mechanical Engineering with Extended Professional Practice	240 credit points.	6 Semesters	All programme learning outcomes (see Table 2), except A6, B6.
MSc	Mechanical Engineering with Advanced Project	240 credit points.	6 Semesters	All programme learning outcomes (see Table 2), except C7.

Interim Award	Award Title	Minimum requirements	Available at end of Level	Programme Learning Outcomes developed (see above)
MSc	Engineering (Mechanical)	180 credit points including MSc Individual Project (Mechanical) 7ENT2089.	3 Semesters	All programme learning outcomes (see Table 2), except A6, B6 and C7. Unaccredited degree that does not meet PSRB compensation requirements.
MSc	Engineering Technology	180 credit points including MSc Individual Project (Mechanical) 7ENT2089.	6 Semesters	A subset of the programme learning outcomes (see Table 2) depending on the student's individual modules passed. Unaccredited degree that does not meet PSRB compensation and accreditation requirements. Only available to students on the 240-credit award.
Postgraduate Diploma	Mechanical Engineering	120 credit points, including at least 90 at level 7	2, 3 Semesters	A subset of the programme learning outcomes (see Table 2) depending on the student's individual modules passed.
Postgraduate Certificate		60 credit points, including at least 45 at level 7	1-2 Semesters	See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm

Programme-specific assessment regulations

The programme is compliant with the University's academic regulations (in particular, [UPR AS11](#), [UPR AS12](#) and [UPR AS14](#)) with the exception of those listed below, which have been specifically approved by the University:

For accredited degrees,

- A maximum of 15 credit points can be compensated for an accredited award at L7.
- MSc Individual Project (Mechanical) 7ENT2089 must be included in the calculation for the award.
- A minimum of 40% (in any allowable attempt), at level 7, must be obtained before the board of examiners will be able to consider compensation for an accredited award.

Further points of clarification and interpretation relevant to this specific programme are given below:

- The MSc Engineering (Mechanical) award is an unaccredited award that does not meet IMechE compensation and accreditation requirements. Students who do not meet the requirements for an accredited degree will be awarded an MSc Engineering (Mechanical) if they meet the University academic regulations with regards to compensation.
- The MSc Engineering Technology award is an unaccredited award that does not meet IMechE compensation and accreditation requirements. This interim award is only applicable to students registered in 240 credits, 2-year award. Students must complete their 60-credit individual project plus any 120-credit combination of modules (e.g. 60 credits of core modules, 60 credits of 'With Advanced Project' modules, and the 60-credit individual project) to be eligible for this award.
- To enrol on 7ENT2089 MSc Individual Project (Mechanical), students must have studied 120 credits of taught modules from the programme and passed at least 60 credits (UPR AS14, D5.2.3).
- To be eligible for a placement, students must pass 120 credits from their Year 1 modules and must also pass their Semester A 60 credits at first sitting. Students who do not meet the requirements for placement will be transferred from the 'with Extended Professional Practice' award to the corresponding 2-year 'with Advanced Project' award.
- Students are responsible for securing their placements. Students are required to secure a placement on or before the School's published deadline. Students who do not secure placements by the deadline will be transferred from the 'with Extended Professional Practice' award to the corresponding 2-year 'with Advanced Project' award.
- Transfer from 180-credit to 240-credit awards is not permitted.
- Students who are registered on any of the 240-credit awards may be eligible to transfer to the 180-credit award. Transfer requests will be considered on a case-by-case basis.

Course Code	Award Title	Modules (child instance codes & title)	Must be included in classification algorithm?
PEMEM PEMEME	MSc Mechanical Engineering MSc Mechanical Engineering with Extended Professional Practice MSc Mechanical Engineering with Advanced Project MSc Engineering (Mechanical)	7ENT2089 MSc Individual Project (Mechanical)	Yes

E. Management of Programme & Support for student learning

Management

- The programme is managed and administered through:
- The Programme Leader, who is responsible for advising students on the programme as a whole and chairing the programme committee;

- Student representatives on programme committees;
- Module Leaders;
- A designated administrative team to deal with day-to-day administration associated with the modules within the programme.

Support

Students are supported by:

- An induction week at the beginning of each new academic session.
- Overseas Orientation.
- A nominated member of academic staff who will be an important point of contact, able to help you gain a good understanding of the School and programme you are studying.
- The SPECS Academic Support Hub (SASH), which provides one-to-one academic skills support.
- A substantial Student Centre that provides advice on issues such as finance, University regulations, legal matters, accommodation, international student support, etc.
- Office of Dean of Students, Student Wellbeing (incorporating Counselling, Mental Health and Disability Support), Chaplaincy, and Day Nursery.
- A versatile on-line inter-active intranet and learning environment.
- Guided student-centred learning on Canvas module sites.
- Access to extensive digital and print collections of information resources.
- Attractive modern study environments in 3 Learning Resources Centres.
- Student Success Hubs, which include a Mathematics Drop-in Centre.
- Medical Centre.
- University Disability Advisors.
- Careers and Employment.
- Hertfordshire Student's Union.
- Dedicated programme site.

F. Other sources of information

In addition to this Programme Specification, the University publishes guidance to registered students on the programme and its constituent modules:

- A dedicated programme site
- A Definitive Module Document (DMD) for each constituent module;

The [Ask Herts](#) website provides information on a wide range of resources and services available at the University of Hertfordshire including academic support, accommodation, fees, funding, visas, wellbeing services and student societies.

As a condition of registration, all students at the University of Hertfordshire are required to comply with the University's rules, regulations and procedures. These are published in a series of documents called 'University Policies and Regulations' (UPRs). The University requires that all students consult these documents which are available on-line, on the [UPR web site](#), in particular, [UPR AS14](#) provides information on the UPRs that contain the academic regulations of particular relevance for undergraduate and taught postgraduate students.

In accordance with section 4(5) of the Higher Education and Research Act 2017 (HERA), the UK Office for Students (OfS) has registered the University of Hertfordshire in the register of English higher education providers. The Register can be viewed at: <https://www.officeforstudents.org.uk/advice-and-guidance/the-register/the-ofs-register/>.

G. Entry requirements

The normal entry requirements for the programme are:

Either:

- a good (2:2 or above) Honours Degree in mechanical engineering.

Or:

- a good (2:2 or above) Honours Degree (or equivalent) in a related discipline (such as automotive or aerospace engineering) may be considered.

An IELTS score of 6.5 (or equivalent) (with no less than 5.5 in any band) would typically be required from candidates whose first language is not English.

For current entry tariff point requirements, please refer to the relevant page for the Course on the University website or on the online prospectus.

The programme is subject to the University's Principles, Policies and Regulations for the Admission of Students to Undergraduate and Taught Postgraduate Programmes (in [UPR SA03](#)), along with associated procedures. These will take account of University policy and guidelines for assessing accredited prior certificated learning (APCL) and accredited prior experiential learning (APEL).

If you would like this information in an alternative format, please contact:
hhaq@herts.ac.uk

If you wish to receive a copy of the latest External Examiner's Report for the programme, please email a request to aqo@herts.ac.uk

Table 2: Development of Intended Programme Learning Outcomes in the Constituent Modules

This map identifies where the programme learning outcomes are assessed in the constituent modules. It provides (i) an aid to academic staff in understanding how individual modules contribute to the programme aims (ii) a checklist for quality control purposes and (iii) a means to help students monitor their own learning, personal and professional development as the programme progresses.

MSc Mechanical Engineering

Programme Learning Outcomes (as identified in section 1 and the following page)																											
		Knowledge & Understanding						Intellectual Skills						Practical Skills							Transferable Skills						
Module Title	Module Code	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4	D5	D6	
CFD & Applications	7ENT2059	x	x	x	x	x		x	x	x				x	x		x							x	x	x	
Dynamics and Performance of Mechanical Systems	7ENT2061	x	x					x	x					x	x	x	x							x	x		
Renewable Energy	7ENT2092		x	x				x			x	x			x			x			x			x		x	
Integrated Product Engineering	7ENT2086		x			x				x		x			x	x					x			x		x	
Advanced Materials and Manufacturing Technology	7ENT2050	x			x			x		x				x	x		x							x	x		
Advanced Thermodynamics and Thermal Systems	7ENT2052		x			x				x		x			x	x					x			x		x	
FEM & Applications	7ENT2063	x	x	x	x	x		x	x	x				x	x		x							x	x	x	
Data Analytics for Engineers	7ENT2085	x	x							x	x			x			x						x		x		
MSc Individual Project (Mechanical)	7ENT2089			x	x			x	x	x	x						x	x	x		x	x		x		x	

MSc Mechanical Engineering with Extended Professional Practice

Programme Learning Outcomes (as identified in section 1 and the following page)																										
		Knowledge & Understanding						Intellectual Skills						Practical Skills							Transferable Skills					
Module Title	Module Code	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4	D5	D6
CFD & Applications	7ENT2059	x	x	x	x	x		x	x	x				x	x		x							x	x	x
Dynamics and Performance of Mechanical Systems	7ENT2061	x	x					x	x					x	x	x	x							x	x	
Renewable Energy	7ENT2092		x	x				x			x	x			x			x			x			x		x
Integrated Product Engineering	7ENT2086		x			x				x		x			x	x					x			x		x
Advanced Materials and Manufacturing Technology	7ENT2050	x			x			x		x				x	x		x							x	x	
Advanced Thermodynamics and Thermal Systems	7ENT2052		x			x				x		x			x	x					x			x		x
FEM & Applications	7ENT2063	x	x	x	x	x		x	x	x				x	x		x							x	x	x
Data Analytics for Engineers	7ENT2085	x	x							x	x			x			x						x		x	
MSc Individual Project (Mechanical)	7ENT2089			x	x			x	x	x	x						x	x	x		x	x		x		x
MSc Professional Work Placement	7ENT2075																		x	x	x	x	x	x	x	x

MSc Mechanical Engineering with Advanced Project

Programme Learning Outcomes (as identified in section 1 and the following page)																										
		Knowledge & Understanding						Intellectual Skills						Practical Skills							Transferable Skills					
Module Title	Module Code	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4	D5	D6
CFD & Applications	7ENT2059	x	x	x	x	x		x	x	x				x	x		x							x	x	x
Dynamics and Performance of Mechanical Systems	7ENT2061	x	x					x	x					x	x	x	x							x	x	
Renewable Energy	7ENT2092		x	x				x			x	x			x			x			x			x		x
Integrated Product Engineering	7ENT2086		x			x				x		x			x	x					x			x		x
Advanced Materials and Manufacturing Technology	7ENT2050	x			x			x		x				x	x		x							x	x	
Advanced Thermodynamics and Thermal Systems	7ENT2052		x			x				x		x			x	x					x			x		x
FEM & Applications	7ENT2063	x	x	x	x	x		x	x	x				x	x		x							x	x	x
Data Analytics for Engineers	7ENT2085	x	x							x	x			x			x						x		x	
MSc Individual Project (Mechanical)	7ENT2089			x	x			x	x	x	x						x	x	x		x	x		x		x
Successful Project Delivery (Mechanical)	7ENT2100						x					x	x				x		x		x	x	x	x	x	
Project Skills and Professional Development (Mechanical)	7ENT2099					x	x					x	x				x		x		x	x	x	x	x	

KEY TO PROGRAMME LEARNING OUTCOMES

Knowledge and Understanding

- A1. Demonstrate in-depth knowledge and understanding of advanced CAE and simulation methods employed by mechanical engineers.
- A2. Demonstrate in-depth knowledge and understanding of engineering sciences and mathematical approaches appropriate to mechanical engineering
- A3. Demonstrate in-depth knowledge and understanding of methods employed in analysis of technical and commercial mechanical problems.
- A4. Demonstrate in-depth knowledge and understanding of the product/process definition and systems design process employed by the mechanical industry.
- A5. Demonstrate in-depth knowledge and understanding of roles in an engineering team and personal responsibilities.
- A6. Demonstrate in-depth knowledge and understanding of skills and strategies required to deliver engineering projects.

Intellectual Skills

- B1. Analyse and solve engineering problems to reach substantiated conclusions using appropriate techniques.
- B2. Design/model/analyse relevant engineering systems/subsystems and recognise the limitations of the approached employed.
- B3. Critically review and select appropriate methods and techniques to solve engineering and commercial problems.
- B4. Evaluate external influences on the design process including those outside of engineering.
- B5. Develop skills in ethical operations and show insight on the commercial and social context.
- B6. Develop relevant skills and techniques to deliver engineering projects.

Practical Skills

- C1. Apply appropriate experimental, analytical and modelling techniques to a range of mechanical engineering problems drawing appropriate conclusions.
- C2. Design and perform experimental work, drawing conclusions based on critical evaluation in the absence of incomplete data.
- C3. Select and use advanced computer-aided engineering tools to solve problems whilst recognising the limitation of the techniques employed
- C4. Prepare technical documentation and clearly communicate this to a range of audiences
- C5. Evaluate the design of appropriate systems, components or processes appropriate to mechanical engineering.
- C6. Apply relevant skills and techniques to deliver engineering projects, taking into account commercial, industrial and resource constraints.
- C7. Develop practical, technical and communication skills within an industrial environment.

Transferable Skills

- D1. Communicate information effectively, orally and/or in writing.
- D2. Manage time and resources effectively.
- D3. Work effectively individually and/or within a team.
- D4. Solve problems in a logical and coherent manner.
- D5. Learn effectively and independently, in preparation for lifelong learning.
- D6. Manipulate, sort and present data.

Table 3: Development of Graduate Attributes in the Constituent Modules

This map identifies where the Graduate Attributes are delivered in the constituent modules. It provides (i) an aid to academic staff in understanding how individual modules contribute to the development of the Graduate Attributes (ii) a checklist for quality control purposes and (iii) a means to help students monitor their own personal and professional development as the programme progresses. [Note that there is no requirement for the Graduate Attributes to be assessed through these modules]

D = Delivered

Module Title	Module Code	Professionally Focused	Globally Minded	Sustainability Driven	Digitally capable & confident	Inclusive and collaborative	Evidenced based and Ethical
CFD & Applications	7ENT2059				D	D	
Dynamics and Performance of Mechanical Systems	7ENT2061				D		
Renewable Energy	7ENT2092		D	D			D
Integrated Product Engineering	7ENT2086		D			D	
Advanced Materials and Manufacturing Technology	7ENT2050			D			
Advanced Thermodynamics and Thermal Systems	7ENT2052				D		
FEM & Applications	7ENT2063				D	D	
Data Analytics for Engineers	7ENT2085				D		D
MSc Individual Project (Mechanical)	7ENT2089				D		D
MSc Professional Work Placement	7ENT2075	D	D	D	D		D
Successful Project Delivery (Mechanical)	7ENT2100	D				D	D
Project Skills and Professional Development (Mechanical)	7ENT2099	D				D	D

Section 2

Programme management

Relevant QAA subject benchmarking statements	Engineering
Type of programme	Taught Postgraduate
Date of validation/last periodic review	January 24
Date of production/ last revision of PS	March 2024
Relevant to level/cohort	Level 7 entering September 2024
Administrative School	School of Physics, Engineering & Computer Science
Language of Delivery	English

Table 4 Course structure

Course details			
Course Code	Course Description	HECOS	UCAS
PEMEM	MSc Mechanical Engineering (Revised 2024)	100190	N/A
PEMEME	MSc Mechanical Engineering - Extended	100190	N/A