

**1. Programme title(s) and code(s)**

MSc in Advanced Mechanical Engineering

MSc Advanced Mechanical Engineering with Industry

Postgraduate Diploma (PGDip) in Advanced Mechanical Engineering (exit award only)

Postgraduate Diploma (PGDip) in Advanced Mechanical Engineering with Industry (exit award only)

Postgraduate Certificate (PGCert) in Advanced Mechanical Engineering (exit award only)

**Notes**

\* An award marked with an asterisk is only available as an exit award and is not available for students to register onto.

**HECOS Code**

HECOS Code	%
100190	100

**2. Awarding body or institution**

University of Leicester

**3. a) Mode of study**

MSc in Advanced Mechanical Engineering: Full time

MSc in Advanced Mechanical Engineering with Industry: Full time.

With Industry: The taught modules would all be taken in the first two semesters. This is followed by the industrial placement, which is between 3 and 12 months long, and would be taken following the end of the first year Jan exam period. This is followed by the in-house project, taking 10 weeks.

**b) Type of study**

The taught modules and project are campus based. The Industrial placement is off campus, on the site of the Placement Provider.

**4. Registration periods**

MSc in Advanced Mechanical Engineering (September start, Full-time)

The normal period of registration is 12 months.

The maximum period of registration is 24 months.

MSc in Advanced Mechanical Engineering with Industry (September start):

The normal period of registration is 24 months.

The maximum period of registration is 36 months.

## 5. Typical entry requirements

Candidates should normally have at least a good second class honours degree in a relevant subject from a British university; or a qualification recognized by the University as equivalent. Applicants for the “with Industry” variant should have or expect to gain at least a very good second class honours BSc degree or qualification of equivalent standard recognised by the University in a relevant subject.

### English language

Candidates whose first language is not English will be required to provide evidence of appropriate language skills. A score of 6.5 in IELTS or an equivalent is required, with no less than a score of 6.0 in any element, but if candidates have been instructed in their u/g courses in English in certain countries for a period of at least two years, this may be deemed adequate. Courses at the University’s English Teaching Unit are offered to candidates who fail this requirement. The course must be completed before the MSc can begin.

## 6. Accreditation of Prior Learning

n/a

## 7. Programme aims

The course aims to introduce and develop state-of-the-art methodologies and techniques relevant to current and future strategies for the design of mechanical systems and components. Particular attention will be given to the development of investigative, modelling and computational strategies. The course covers fluid dynamics, solid structures, advanced and conventional materials and control systems.

Students should be able to:

- Demonstrate specific knowledge and understanding of advanced topics in Mechanical Engineering and to be able to apply this knowledge in the design and simulation of real-world systems;
- Describe their role in their company and the company’s role in relation to customers and the industrial sector in which it sits;
- Continue to develop their professional engineering education through CPD programmes of related areas;
- Work effectively as part of both multi- and single-disciplinary teams;
- Demonstrate clear communication skills and be competent users of IT communication techniques (e.g. oral presentation and report writing);
- Pursue research (MSc graduates only);

For this ‘with industry’ variant, these additional programme aims apply:

- Prepare students for career and training opportunities which relates to their degree – in both the private and public sectors, and voluntary organisations.
- Construct effective applications for placement opportunities

## 8. Provide students the opportunity to recognise suitable plans for transitioning into the workplace Reference points used to inform the programme specification

- QAA Benchmarking Statement
- Framework for Higher Education Qualifications (FHEQ)
- UK Quality Code for Higher Education
- [University Learning Strategy](#)
- [University Assessment Strategy](#)
- University of Leicester Periodic Developmental Review Report

- External Examiners' reports (annual)
- United Nations Education for Sustainable Development Goals
- Student Destinations Data
- Engineering Accreditation Board (EAB) Masters Degree other than Integrated Masters, and EngD Learning Outcomes (AHEP 3rd Edition)
- UK-SPEC (UK Standard for Professional Engineering Competence)

## 9. Programme Outcomes

Unless otherwise stated, programme outcomes apply to all awards specified in 1. Programme title(s).

### a) Discipline specific knowledge and competencies

#### i) Knowledge

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Core knowledge of fluid dynamics, solid structures, advanced and conventional materials and of control systems.	Lectures, Specified reading, Laboratory classes, Design exercises, Tutorials	Module examinations, Laboratory, design exercise and literature review reports, oral presentations, tutorial performance
Practical experience of the application of Engineering knowledge to real world scenarios, through the industrial placement.	With Industry: Placement preparation and supervision.	Industrial placement

#### ii) Concepts

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Design, selection and testing of materials, mechanisms in structures, design of flows, robust control	Lectures, Practical classes, Tutorials	Module examinations, Laboratory, design exercise and literature review reports, oral presentations, tutorial

#### iii) Techniques

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Practical demonstration of experimental methods for fluid dynamics and structures. Competent use of standard and specialized engineering design tools. Model-based control	Laboratory classes, Individual Project and module design exercise supervision, Practical demonstrations, Lectures	Laboratory and design exercise reports, module design exercise assessment, Individual Project progress and report, Module examinations
Practical experience of the application of Engineering techniques to real world scenarios	With Industry: Placement preparation and supervision.	Industrial placement

iv) Critical analysis

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Critical appraisal of results. Critical review of literature	Laboratory, design exercise and project supervision	Laboratory, module design exercise and literature review reports, Project progress and report

v) Presentation

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Presentation of scientific results, Participation in scientific discussion	Tutorials, Module seminars, Laboratory classes, module design exercise supervision, Project supervision	Module presentations, Laboratory, module design exercise and Individual project report
With Industry: report key responsibilities and achievements from their placement.	With Industry: Placement preparation and supervision.	With Industry: Placement assessment and reports.

vi) Appraisal of evidence

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Experimental methods, Project design	Lectures, Laboratory classes, Project supervision	Written examinations, laboratory and design exercise reports, Project reports
With Industry: evaluate critically their impact and results achieved in the workplace environment.	With Industry: Placement preparation and supervision.	With Industry: Placement assessment and reports.

**b) Transferable skills**

i) Research skills

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Literature review, Experimental design, Laboratory skills, Data analysis	Tutorials, lectures, Laboratory classes, module design exercise work, Project supervision meetings	Module design exercise reports and oral presentations, Course work, Individual project report

ii) Communication skills

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Report writing, Scientific Communication	Project supervision meetings, laboratory and design exercise classes, Tutorials	Laboratory, design exercise and literature review reports, Individual project report
Learning how to work and communicate in a modern industrial environment	With Industry: Placement preparation and supervision.	Industrial placement

iii) Data presentation

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
IT, Analytical and graphical methods, CAD drawings, Statistics	Project supervision meetings, course work (laboratories, module design exercises)	Seminars, Course work reports, Project reports, Module examinations
Practical experience of the application of Engineering software within modern industry	With Industry: Placement preparation and supervision.	Industrial placement, Placement assessment and reports.

iv)

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?

v)

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?

vi) Working relationships

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Project management, Organization skills, Time management, Working in groups	Project supervision meetings, Group working in modules (laboratories and design exercises)	Module design exercise assessment, Seminar performance
With Industry: communicate professionally through selection processes and networking opportunities.	With Industry: Placement preparation and supervision	With Industry: Placement assessment and reports

vii) Managing learning

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Study skills, Information management, Developing specialization and interests, Project management	Tutorials and seminars, Library and IT skills sessions, project supervision meetings	Course work, module design exercise assessment, project assessment

viii) Career management

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
<ol style="list-style-type: none"> <li>1. Select appropriate resources for researching/securing placement opportunities</li> <li>2. Explain the process for applying for and securing a relevant placement</li> <li>3. Construct effective applications for placement opportunities</li> <li>4. Recognise suitable plans for transitioning into a placement</li> <li>5. Apply the theoretical and practical aspects of the material studied at the University and demonstrate the personal and professional skills necessary for your role within the organisation.</li> <li>6. Compose a Professional Development Plan considering your strengths, development areas and motivations for your next step</li> <li>7. Modify your CV to include the skills and experience you have gained through your significant experience gained in the past 12 months</li> </ol>	<p>Placement preparation 1 &amp; 2:</p> <p>Students are provided with dedicated and timetabled sessions to prepare to search and secure an industrial placement.</p> <p>Problem solving classes, Masterclasses, Career development programmes, Independent research.</p> <p>On placement:</p> <p>Students undertake a minimum of 3 months experience in the workplace.</p> <p>Project supervision, independent research</p>	<p>Formative module feedback through session tasks and exercises</p> <p>Completion of Monthly Reflective Journals to record skills development, major achievements, key areas of work, learning points and challenges overcome.</p> <p>Assessed by a Placement Portfolio, comprising of a Reflective Summary, Professional Development Plan, and Updated CV (excluded from word count) to formally assess on a pass or fail basis.</p> <p>Formative feedback during a Placement Visit (in person or via Skype) from Placement Provider and Placement Tutor regarding reflection on skills development, areas of strength and weakness and contribution to the workplace.</p>

**10. Special features**

The course is accredited by IMechE and IET subject to 5 yearly re-accreditation.

With Industry;

- i. After completing the eight taught modules and exams in the first year of the course, students will carry out between 3 and 12 months employment in an industrial placement. Students will be encouraged to undertake the maximum period of employment possible, to gain the full benefit of experience in industry.
- ii. On the return from an industrial placement, the Placement Student will carry out an in-

house project in the School or Department, as per the normal non-Industry MSc The project will be supervised and assessed within the Department. The project title will be decided, in conjunction with the Placement Student, while they are on placement.

- iii. During the industrial placement, appropriate support will be provided by the School or Department as defined in the Code of Practice.
- iv. Placement Students will be expected to complete a Monthly Reflective Journal to record their training. This will support the Placement Student to complete the Placement Portfolio which is assessed on a pass/fail basis, and will have no credit weighting in the MSc.
- v. Placement Students who do not pass the assessment or meet the minimum duration of an industrial placement will receive the standard MSc degree.

## 11. Indicators of programme quality

The programme is subject to all normal departmental, college and institutional academic quality assurance processes.

It is the student's responsibility to secure an industrial placement. Students are invited to attend Placement Preparation modules, additional support workshops and 1-2-1 appointments with the Career Development Service. Employer led activities provide a platform for students to engage with organisations who are recruiting students for year in industry roles.

The 'with Industry' MSc relies on the Placement Provider to provide work suitable for an MSc student. To ensure the role is relevant, the School or Department assesses the industrial placement through the University's Placement Approval Process. The Placement Provider will be asked to provide:

- An indication of the area of the organisation where the Placement Student will work.
- An indication of the area of expertise that the Placement Student should have or will gain.
- Whether the work is suitable only for a UK national, for and EU national or for an overseas student.
- The resources available to the Placement Student. For example, design software, textbooks, laboratory equipment, product specimens, access to facilities in the organisation.
- Identification of a suitable industrial mentor (i.e. a graduate with knowledge of the area and at least a couple of years of experience in the field).

When a Placement Student starts an industrial placement, they will be required to complete health and safety documents and confirm they have completed a formal induction process no later than the 2nd week of placement.

Placement Students will be provided with a Study Guide for their industrial placement and support them to complete the assessment. The School or Department will undertake a placement start check, regular communications, visits to the workplace (physical and/or virtual) and evaluation. Communication and contact between the Placement Student, Placement Provider and University provides support should issues arise.

## 12. Criteria for award and classification

This programme follows the standard scheme of taught postgraduate award and classification set out in [Senate Regulations](#) – see the version of *Senate Regulation 6 governing taught postgraduate programmes of study* relevant to year of entry.

The following additional award requirements for this programme have been approved:

- This programme follows the Scheme of Assessment for Master degree programmes with a structure of 120 credits of taught modules and a project of 60 credits, with the variation (required by the Engineering Council for accreditation purposes) that a maximum of 15 credits may be failed at grade D (40-49%) and no credits failed at grade F (0-39%). Students who fail to meet this criterion will be considered for an interim award based on the taught component of the programme.
- A student who successfully completes an industry placement but does not meet the award requirements for an MSc may be considered for the exit award of PGDip with industry.

### 13. Progression points

As defined in [Senate Regulations](#) - refer to the version of *Senate Regulation 6 governing taught postgraduate programmes of study* relevant to year of entry.

The following additional award requirements for this programme have been approved:

A Placement Student will revert back to the degree without Year in Industry if:

1. At the semester 1 exam board, they have less than one module at merit level and any failed modules at <50%. No progression rule is applied at the semester 2 exam board. In the case of failed modules with mitigating circumstances, the semester 1 board will use its discretion.
2. They fail to secure an industrial placement role.
3. They fail to pass the assessment related to the industrial placement.
4. The industrial placement ends early due to the behaviour of the Placement Student not being in accordance with the University's Regulations for Students, Student Responsibilities. The Placement Student will need to return to the University and carry out an in-house project in the School or Department, as per the normal non-Industry MSc. To prevent such an incident from happening, processes are in place to identify any possible issues or concerns early in the industrial placement role. This includes a start check, regular communications, visits to the workplace (physical and/or virtual) and evaluation. Communication and contact between the Placement Student, Placement Provider and University provides support should issues arise.
5. They discontinue their industrial placement and carry out an in-house project in the School or Department, as per the normal non-Industry MSc.

In the event that a Placement Student is moved to the standard campus-based MSc, the Placement Provider will be notified immediately. For overseas students, the UKBA will also be informed immediately. Placement Provider's will be made that any contract of employment shall be made subject to satisfactory completion of the taught part of the MSc.

Three months is the minimum time required for an industrial placement to be formally recognised. If the industrial placement is terminated earlier than 3 months as a result of event outside of the Placement Students control (for example redundancy, or company liquidation), the following process will be adopted:

1. If the Placement Student has completed less than 2 months, they will be supported to search for another placement to take them up to the required minimum of 3 months for the industrial placement to be formally recognised. If the Placement Student does not find a placement to meet this criteria they will be required to suspend and transferred onto the degree without industry.
2. If the Placement Student has completed 2 months, they will be supported to search for another placement to take them up to the 3 months required for the industrial placement to be formally recognised. If the Placement Student cannot source an additional placement to take them to 3 months, assessments related to the industrial placement will be set for



the student to make it possible for the individual learning objectives for the industrial placement to be met. This will allow with industry to be recognised in the degree certificate.

3. The duration of time between the two Placement Providers to meet the minimum 3 months of an industrial placement must not exceed the period of time required to comply with visa requirements.
4. A Placement Student is permitted to undertake an industrial placement which runs across two academic years.

In cases where a student has failed to meet a requirement to progress he or she will be required to withdraw from the course and a recommendation will be made to the Board of Examiners for an intermediate/exit award where appropriate.

#### **14. Rules relating to re-sits or re-submissions**

As defined in [Senate Regulations](#) - refer to the version of *Senate Regulation 6 governing taught postgraduate programmes of study* relevant to year of entry.

#### **15. External Examiners reports**

The details of the External Examiner(s) for this programme and the most recent External Examiners' reports for this programme can be found at [exampapers@Leicester](mailto:exampapers@Leicester) [log-in required]

#### **16. Additional features** (e.g. timetable for admissions)

## Programme Specification (Postgraduate) **FOR ENTRY YEAR:** Choose an item.

**Date created:** Click or tap here to enter text.

**Last amended:** Click or tap to enter a date. **Version no.** Choose an item.

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### Appendix 1: Programme structure (programme regulations)

The University regularly reviews its programmes and modules to ensure that they reflect the current status of the discipline and offer the best learning experience to students. On occasion, it may be necessary to alter particular aspects of a course or module.

#### Updates to the programme

Academic year affected	Module Code(s)	Update

### MSc Advanced Mechanical Engineering with Industry

#### Credit breakdown

Status	Year long	Semester 1	Semester 2	Other delivery period
Core taught	Choose an item.	45 credits	n/a	Choose an item.
Optional	Choose an item.	15 credits	60 credits	Choose an item.
Dissertation/project	Choose an item.	Choose an item.	Choose an item.	60 credits

180 credits in total

**Level 7/Year 1      Choose an item.**

Core modules

Delivery period	Code	Title	Credits
Semester 1	EG7010	Engineering Design Case Study	15 credits
Semester 1	EG7115	Fluid Stability, Transition and Turbulence	15 credits
Semester 1	EG7116	Advanced Solid Mechanics	15 credits
Semester 1	ADEG7221	Placement Preparation 1*	n/a
Semester 2	ADEG7222	Placement Preparation 2*	n/a

**Notes**

(\*) are only in the “with Industry” programme

*Please note January starters will do Semester 2 modules then Semester 1 modules.*

Option modules

Delivery period	Code	Title	Credits
Semester 1	EG7015	Rotorcraft Mechanics and Control	15 credits
Semester 1	EG7413	Spacecraft Systems Engineering	15 credits
Semester 2	EG7324	Signal Processing	15 credits
Semester 2	EG7126	Advanced Composite Materials	15 credits
Semester 2	EG7040	Robust and Nonlinear Control	15 credits
Semester 2	EG7422	Advanced Gas Turbines	15 credits
Semester 2	EG7125	Computational Fluid Dynamics	15 credits

## Notes

This is an indicative list of option modules and not definitive of what will be available. Option module choice is also subject to availability, timetabling, student number restrictions and, where appropriate, students having taken appropriate pre-requisite modules. *Please note January starters will do Semester 2 modules then Semester 1 modules.*

## Level 7/Year 2      2022/23

### Core modules

Delivery period	Code	Title	Credits
Choose an item.	ADEG7223	On Placement*	n/a
Choose an item.	EG7020	Individual Project	60 credits

## Notes

(\*) are only in the “with Industry” programme

The “with industry” programme includes an industrial placement of 3-12 months, following the end of the final exam period of the taught phase of the programme, with students returning to UoL to complete the project/dissertation after their placement.

## Appendix 2: Module specifications

See taught postgraduate [module specification database](#) (Note - modules are organized by year of delivery).