UNIVERSITY OF LEICESTER

Programme Specification (Postgraduate)
For students entering in 2018/19
Date amended: July 2017

1. Programme Title(s):

MSc in Advanced Mechanical Engineering with Industry

2. Awarding body or institution:

University of Leicester

3. a) Mode of study

Full-time:
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 May/June 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 company concerned.

4. Registration periods:

The normal period of registration is 24 months. The maximum period of registration is 33 months.

5. Typical entry requirements: Academic:

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

Generally, a score of 6.0 in IELTS or an equivalent is required, 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 is deemed adequate. Courses at the University's English Teaching Unit are offered to candidates who fail this requirement. The course must be complete before the MSc can begin.

6. Accreditation of Prior Learning:

None

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.. The programme also aims to make student aware of the role of a mechanical engineer in industry.

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);

8. Reference points used to inform the programme specification:

- The Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (Qualifications Frameworks)
- QAA Master's Degree Characteristics
- QAA Benchmarking Statement Engineering (2015)
- PDR report (May 2008)
- University Learning Strategy
- University Employability Strategy
- Graduate Survey (2014)
- First Destination Survey
- External Examiner's Reports

9. Programme Outcomes:

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(a) Subject and Professional skills		
Knowledge		
Core knowledge of fluid dynamics, solid structures, advanced and conventional materials and of control systems. Practical experience of the application of Engineering knowledge to real world scenarios, through the industrial placement.	Lectures, Specified reading, Laboratory classes, Design exercises, Tutorials	Module examinations, Laboratory, design exercise and literature review reports, oral presentations, tutorial performance Industrial placement
Concepts		
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
Techniques		
Practical demonstration of experimental methods for fluid dynamics and structures. Competent use of standard and specialized engineering design tools. Model-based control Practical experience of the application of Engineering techniques to real world scenarios, through the	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 Industrial placement
Intended Learning Outcomes	**Teaching and Learning Methods**	**How Demonstrated?**
Critical analysis		
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
Presentation		
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
Appraisal of evidence		
Experimental methods, Project design	Lectures, Laboratory classes, Project supervision	Written examinations, laboratory and design exercise reports, Project reports

(b) Transferable skills		
Research skills		
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
Communication skills		
Report writing, Scientific Communication Learning how to work and communicate in a modern industrial environment	Project supervision meetings, laboratory and design exercise classes, Tutorials	Laboratory, design exercise and literature review reports, Individual project report Industrial placement
Data presentation		
IT, Analytical and graphical methods, CAD drawings, Statistics Practical experience of the application of Engineering software within modern industry	Project supervision meetings, course work (laboratories, module design exercises)	Seminars, Course work reports, Project reports, Module examinations Industrial placement
Working relationships		
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
Managing learning		
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
Intended Learning Outcomes	**Teaching and Learning Methods**	**How Demonstrated?**
Career management		
Knowledge of how their work fits into company and into industry sector, appreciation of the knowledge and skills required by an engineer in a commercial industrial setting	Talk from Student Support in induction, and reminder in tutorial, Industry-based experience, individual advice from project supervisor	Industry report

10. Special features:

i. After completing the eight taught modules and May/June exams in the first year of the course, students will carry out between 3 and 12 months of paid full- time work 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. Students satisfying the normal PGT criteria for passing taught modules, will aim to start their placement between June and September of the first year and finish it by the end of the May/June exam period of the second year. Companies providing placement opportunities

will be made aware of the possible need for students to return to campus briefly in September of the first year for resit exams. On their return from placements, students will carry out an in-house project in the 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 student, while she/he is on placement.

ii. During the placement, appropriate support will be provided by the Department as laid out in the Code of Practice on Student Placements published by the Quality Office. An additional member of staff will be employed as an Industrial Placement Officer to arrange the placements and to contact the students each term, answer any concerns they may have and check that they are doing work appropriate for an MSc student and are receiving the necessary support and guidance. Each student will also be assigned to a named Mentor in the industrial placement.
iii. During their placement students will undertake a programme of training and practical experience which will be agreed by the placement company and the University, and will be specific to the particular placement.
iv. Students will be expected to keep a log-book recording their training and experience which is to be presented for approval to the sponsoring company and the University. After the placement, the student will present a report detailing their work, but also explaining how their skills fit into the team in which they worked, how this team serves the overall company, and how the company fits into the industrial sector. This report is the only assessment concerned with the industrial placement, and will be assessed on a pass/fail basis, and will have no credit weighting in the MSc.
v. Students who do not satisfactorily complete their industrial placement will receive an ordinary MSc in the same subject area as the 'with Industry' MSc.
vi. Any intellectual property generated during the placement will belong to the industrial partner.
vii. The salary paid by the industrial partner to the student will be a matter to be agreed between these two parties, although the departmental representative will make a recommendation. However, students will not be allowed to take unpaid placements.
viii. This course has been accredited by IET and IMechE for 5 years from the 2014 intake.

11. Indications of programme quality:

The 'with Industry' MSc relies on the industrial partner to provide work suitable for an MSc student. Although it will be the job of the Industrial Placement Officer to help students find suitable placements, no student will be guaranteed a placement, and the overall responsibility for securing one remains with the student.

It is intended that the Industrial Placement Officer build a database of suitable industrial partners, making them aware of the Department's requirements and the skills offered by our students. The role will also include helping students to prepare a CV and apply for placements, with the support of the Careers Service. The Industrial Placement Officer will be a suitably qualified person with some knowledge of engineering in an industrial setting, and will not be an existing staff member in the Engineering Department. There will therefore be no further stretching of current resources beyond the increased enrolment numbers expected from this, more attractive course, and the increased duties pertaining to the new PGT regulations.

Before any placement is confirmed, the Industrial Placement Officer in the Department of Engineering will have ensured that it is of a suitable level and area of expertise. To assess this, the Industrial Placement Officer will ask the industrial partner to fill in a short questionnaire. The industrial partner will be asked to provide:

- An indication of the area of the company where the student will work.
- An indication of the area of expertise that the 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 student. For example, design software, textbooks, laboratory equipment, product specimens, access to company facilities.
- 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).

This will be scrutinised by the Industrial Placement Officer to ensure that the level of work is suitable. In the unlikely case that an agreement on the placement cannot be reached between the industrial partner and Industrial Placement Officer, then the placement must be rejected by the latter.
During the second term, the placement tutor will list all available and suitable placements for each of the MSc disciplines and send the list to all students who are studying for an MSc with Industry in that discipline. The students will put themselves forward for as many placements on the list as they choose, providing contact details and a fixed-length (e.g. 200 word) summary of their skills/experience/career aims, which the placement tutor will send to the industrial partner, along with their first semester module marks. The industrial partner will then choose a placement student by whatever means they find appropriate. Rooms will be allocated within the University on a fixed date for the industrial partner to interview prospective students, but if the industrial partner instead chooses to conduct telephone interviews, interviews on their own premises, or simply choose from the students' written accounts of themselves, this will also be possible.

Industrial partners will then send the Industrial Placement Officer a ranked list of their choice of student. The placement tutor will e-mail offers to the students who have been placed first on each list. Some student will, no doubt, get several choices and some none at this stage. They shall have a fixed period (e.g. one or two days) to take up the offer, after which it will be withdrawn and sent to the next student on the list.

Apart from the allocation process described above, it will also be possible for students to apply independently to companies/sites which are not included in the database maintained by the Industrial Placement Officer. In this case, there will be no fixed procedure, such as the 200-word summary. However, any placement obtained independently by a student will still be subject to scrutiny by the Industrial Placement Officer, as described above. If a student ends up with no offers of employment at the end of this process, then they will be
transferred on to the analogous 'without Industry' MSc. This will be made clear at the start of the MSc.
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Once a student has accepted a placement offer, the industrial partner and student will be put in contact, and will arrange a start date and other details between themselves, but the placement tutor will be available to give advice. The student will be issued with a placement handbook to guide them. This will be adapted from the handbook currently given to undergraduate placement students and is to make them aware of the University's Code of Practice on Student Placements, concerning their responsibilities and those of the University and company.

Any student failing to secure a placement by these means by a fixed date (e.g. the end of the second semester) will be transferred to the analogous 'without industry' MSc. This will be made clear to all students before they take up their MSc and also written in the MSc guide.

Contact will be made with the student by the Industrial Placement Officer at least twice in the

duration of the placement. Preferably one of these events will take the form of a visit to the company. However, if this is not possible, then the student could meet the placement tutor in the department or they could talk on the telephone.

If the placement is terminated before the agreed time, then the placement tutor will endeavour to discover the events that caused the termination and report to the MSc exam board. If the termination is due to the student's behaviour or negligence, then the Department reserves the right to withdraw the MSc with Industry, and award the student the analogous ordinary MSc. If the
circumstances are outside the student's control, then the Industrial Placement Officer will endeavour
to find an alternative placement. In this case, whether an alternative placement can be found or not, the student will be awarded an MSc with Industry.

The University's Code of Practice on Student Placements shall be adhered to.

12. Scheme of Assessment

This programme follows the same scheme as the non-industry-based MSc, namely the Senate Regulation 6 for Taught Postgraduate Programmes. See http://www2.le.ac.uk/offices/sas2/regulations/general-regulations-for-taught-programmes.
120 credits are allocated to the taught modules, 60 to the project and none to the industrial placement.

13. Progression points

See: Senate Regulation 6 governing taught postgraduate programmes http://www2.le.ac.uk/offices/sas2/regulations/general-regulations-for-taught-programmes

In order to progress onto the industrial placement students must: 1) have passed **at least one module at Merit level** and have **failed maximum one module** at the end of **Semester 1**; any student failing to satisfy this requirement at the end of Semester 1 will be removed from the MSc with Industry programme, and revert back to the standard campus-based MSc; 2) have passed **at least two modules at Merit level** and have **failed maximum two modules** at the end of **Semester 2**; any student failing to satisfy this requirement at the end of Semester 2 will be removed from the MSc with Industry programme, and revert back to the standard campus-based MSc. In the event that the student is moved to the standard campus-based MSc, the company where the placement was to be held will be notified immediately. For overseas students, the UKBA will also be informed immediately. This may happen in June of the first year. Companies offering placements will be warned of this eventuality at the outset, and any contract of employment shall be made subject to satisfactory completion of the taught part of the MSc.

14. Rules relating to re-sits or re-submissions:

Re-assessment rules for taught postgraduate programmes apply. See: Senate Regulation 6 governing taught postgraduate programmes
http://www2.le.ac.uk/offices/sas2/regulations/general-regulations-for-taught-programmes

The written examinations in the taught elements of the programme can be resat. Generally, coursework cannot be resat. In practice all but the weakest students failing a module will be able to pass it by resitting the examination. In the case that a module has no components that

can be resat, this must be stated explicitly in the module description given in the MSc handbook. The project would not be able to be resat. Before failing the project, the student would undergo a viva, in which the original mark given to the project could be raised to no more than the pass mark (50%). Any student failing the project would not receive an MSc, but may be considered for a Postgraduate Diploma or Postgraduate Certificate.

15. Additional information [e.g. timetable for admissions] Admissions will only take place in October each year.

16. External Examiner

The details of the External Examiner(s) for this programme and the most recent External Examiners' reports can be found here.

Appendix 1: Programme structure (programme regulations)

YEAR 1

SEMESTER 1

Induction		0	Week 1/Semester 1
EG7012	MATLAB and CAD	15	Semester 1

Select 3 modules:
Select **at least one** module from:

EG7026	Advanced Fluid Dynamics	15	Semester 1
EG7037	Advanced Solid Mechanics	15	Semester 1
EG7028	Understanding Surfaces in Engineering	15	Semester 1

Select maximum two modules from:

EG7013	Modelling and Classification of Data	15	Semester 1
EG7015	Robust Control	15	Semester 1
EG7412	Systems Engineering and Spacecraft Systems	15	Semester 1
EG7411	Current Trends in Aerospace	15	Semester 1

Semester 2

Select four modules from:

EG7016	Design of Discrete Systems	15	Semester 2
EG7017	Real-Time Signal Processing	15	Semester 2
EG7029	Computational Fluid Dynamics	15	Semester 2
EG7031	Advanced Materials Modelling	15	Semester 2
EG7040	Nonlinear Control	15	Semester 2
EG7060	Dynamics of Mechanical Systems	15	Semester 2
EG7038	Aerospace Materials	15	Semester 2

YEAR 2

Industrial placement		0	Semester 1&2
EG7020	Individual project	60	Semester 2/Summer

*'with industry' programme includes an industrial placement of 3-12 months, following the end of the first year May/June exam period, with students returning to UoL to complete the project/dissertation after their placement.

Appendix 2: Module Specifications

See module specification database http://www.le.ac.uk/sas/courses/documentation