UNIVERSITY OF LEICESTER

Programme Specification (Postgraduate)

For students entering in 2018/19

Date amended: 05 Dec 2017

1. **Programme Title(s):**

MSc/PGDip in Advanced Mechanical Engineering with Management

MSc in Advanced Mechanical Engineering with Management and Industry

Postgraduate Certificate (PGCert) in Advanced Engineering with Management (exit award only)

Postgraduate Certificate (PGCert) in Engineering with Management (exit award only)

Postgraduate Certificate (PGCert) in Management (exit award only)

2. **Awarding body or institution:**

University of Leicester

3. **a) Mode of study**

MSc/PGDip in Advanced Mechanical Engineering with Management: Full-time or Part-time.

MSc in Advanced Mechanical Engineering with Management and Industry: Full-time.

With Industry only: 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 ('with Industry' programme only) is off campus, on the site of the company concerned.

4. **Registration periods:**

MSc/PGDip in Advanced Mechanical Engineering with Management:

The normal period of registration is 12 months.
The maximum period of registration is 24 months.

MSc in Advanced Mechanical Engineering with Management and Industry:

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

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, 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:

None

7. Programme aims:

This is an advanced career entry programme focussed on industrial careers in the engineering sector. The technical focus of this programme is state-of-the-art methodologies and techniques relevant to 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 in combination with a rigorous introduction to those management theories, models, frameworks and techniques that are likely to be important to a professional Engineer. The combination of advanced technical Engineering skills and knowledge of Management theory and practice equips students with the knowledge and skills required to secure leadership roles in global engineering industries. At the end of the programme students should:

- Demonstrate specific knowledge of advanced topics in engineering, specifically in mechanical fields, and to be able to apply this knowledge in the design and simulation of real-world systems;
- Demonstrate clear communication skills and be competent users of IT communication techniques (e.g. oral presentation and report writing);
- Work effectively as part of both multi- and single-disciplinary teams;
- Have knowledge of core management subjects, be able to explain them, critique them, select, apply them to engineering management situations
- Pursue research (MSc graduates only);
- Describe their role in their company and the company's role in relation to customers and the industrial sector in which it sits (MSc 'with Industry' graduates only);
- Continue to develop their professional engineering education through CPD programmes of related areas (MSc 'with Industry' graduates only);

8. Reference points used to inform the programme specification:

- QAA Subject benchmark statement for masters degrees, available at: http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/MastersDegreeCharacteristics.pdf
- The Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (Qualifications Frameworks)
- QAA subject benchmark statement for engineering (2010 edition) http://www.qaa.ac.uk/en/Publications/Documents/Subject-benchmark-statement-Engineering-.pdf
- Engineering Council UK Standard for Professional Engineering Competence 3rd Edition (UK-SPEC).http://www.engc.org.uk/engcdocuments/internet/Website/Accreditation%20of%20Higher%20 Education%20Programmes%20third%20edition%20(1).pdf

- QAA Benchmarking Statement for Business and Management: http://www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Subject-benchmark-statement- Masters-degrees-in-business-and-management.aspx University of Leicester Senate Regulations
- University of Leicester Code of Practice on Examining: http://www2.le.ac.uk/offices/sas2/quality/codes/examining
- University of Leicester Learning & Teaching Strategy: http://www2.le.ac.uk/offices/sas2/quality/learnteach

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, surfaces, MATLAB / CAD and control systems. A core knowledge of management subjects including the business environment, accountability, representation and control. Knowledge of the quantitative and qualitative methods used in management research and what constitutes a methodology. Students should be able to synthesise and apply knowledge to engineering management issues.	Lectures, Specified reading, Laboratory classes, Design exercises, Tutorials, Group discussion, directed reading and exercises, private study, assignment feedback: formative and summative. Dissertation research process, research methods training.	Module examinations, Laboratory, design exercises, literature review reports, oral presentations and tutorial performance. Essays (individual), group discussions, computer based exercises, case study exercises. Research proposal, ethics approval and dissertation.
Concepts		
Design, selection and testing of materials, mechanisms in structures, design of flows, robust control. Graduates should be able to explain the core concepts of management as they relate to engineering activities.	Lectures, Practical classes, Tutorials, Group discussion, Directed reading, assignment feedback, private-study. Dissertation supervision process, independent research.	Module examinations, Laboratory, design exercise and literature review reports, oral presentations, tutorial. Essays (individual), group discussions, case study exercises, research proposal and dissertation.
Techniques		
Practical demonstration of experimental methods for fluid dynamics and structures. Competent use of standard and specialized engineering design tools. Model-based control Competent use of a variety of engineering design tools, conventions of academic writing and qualitative and quantitative evaluation to solve management problems relevant to engineering.	Laboratory classes, Individual independent project and research, module design exercise supervision, Practical demonstrations, Lectures. Self- directed private-study. Assignment feedback, formative and summative. Dissertation research process and methods training.	Laboratory and design exercise reports, module design exercise assessment, essays (individual), group discussions, case study exercises, and the dissertation. Module examinations.

Critical analysis		
Critical appraisal of results and literature, the discipline of management and its application in engineering, including in different cultural, environmental and organisational contexts.	Laboratory, design exercise and project supervision	Laboratory, module design exercise and literature review reports. Essays (individual), group discussion, case study exercises. Project progress and dissertation.
Presentation		
Presentation of scientific results, management analysis and conclusions in an organized and appropriate medium to a professional standard with clarity, fluency and coherency. Participation in scientific discussion.	Tutorials, Module seminars, Laboratory classes, module design exercise supervision, Project supervision, group discussion, directed reading and exercises. Dissertation.	Module presentations, Laboratory, module design exercise and dissertation. Essays, examinations and case study exercises.
Appraisal of evidence		
Experimental methods, Project design. Ability to locate, organise and assess data, analyse complex ideas and understand and criticise different arguments with independent inquiry at an advanced level.	Lectures, Laboratory classes, Project supervision. Independent research, group discussion, directed reading and exercises.	Written examinations, laboratory and design exercise reports, dissertation, individual essays.
Industrial application		
With industry students only: Practical experience of the application of knowledge, concepts and techniques of engineering and management.	Industry placement.	Industry placement and report.
(b) Transferable skills		
Research skills		
Literature review, Experimental design, Laboratory skills, Data analysis. Demonstration of intellectual independence through identifying and delivering a credible and substantial research project at an advanced level.	Tutorials, lectures, Laboratory classes, module design exercise work. Research methodology module, dissertation supervision meetings.	Module design exercise reports and oral presentations, Course work, dissertation.
Communication skills		
Report writing, Scientific Communication. Ability to work collaboratively and responsibility in teams.	Dissertation supervision meetings, laboratory and design exercise classes, Tutorials/dissertation supervision process.	Laboratory, design and group exercise reports. Research proposal and dissertation.

Data presentation		
IT, Analytical and graphical methods, CAD drawings, Statistics. Ability to locate, organise and marshal evidence and select and apply appropriate software packages for quantitative analysis.	Dissertation supervision meetings, course work (laboratories, module design exercises, case studies and self- directed private study)	Seminars, Course work/case- study reports, Research proposal and dissertation, Module examinations
Working relationships		
Project management, Organization skills, Time management, Collaborative and responsible working in teams.	Dissertation supervision meetings (incl. the establishment of a working relationship with supervisor), Group working in modules (laboratories and design exercises).	Formative assessment based on informal qualitative feedback on content and performance from teacher and peers. Module design exercise assessment, Seminar performance. Dissertation.
Managing learning		
Study skills, Information management, Developing specialization and interests, Project management. Ability to reflect upon behaviour and skills with a view to personal and professional development. Identifying and delivering a credible and substantial research project at an advanced level.	Tutorials and seminars, Library and IT skills sessions, dissertation supervision meetings and process.	Course work, module design exercise assessment, Research proposal and dissertation.
Career management		
Ability to reflect on motivation, strengths, interests and skills with a view to personal and professional development. Research an area which may be relevant to the student's career preferences.	Tutorials, independent self- directed research into career opportunities using CDS. Dissertation research.	Discussion within forums/tutorials, Development Plan. Dissertation.
With industry students only: 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 management dissertation, as per the non-Industry 'with Management' MSc. 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 has been 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.

11. Indications of programme quality:

Programme external examiners in engineering will consider the programme as a whole (all modules) and the engineering modules in particular. The management modules are also taken by other cohorts of students and are therefore subject to a second independent review. Experience with other programmes where MSc students take modules from a second department has recently shown this to be a very positive way of maintaining academic standards and industrial relevance.

Engineering modules were subject to review as part of the successful accreditation by the professional engineering institutions in 2014.

Industrial placement quality will be managed in the same way as for existing 'with industry' programmes. Full details were considered when the MSc with Industry programmes were put through full programme approval for first entry in 2013/14. These are supported by the Industrial Placement Officer and follow the University's Code of Practice on Student Placements shall be adhered to.

12. Scheme of Assessment

Normal schemes of assessment (Senate Regulation 6: Regulations governing taught postgraduate programmes of study) will apply with special conditions for the PGCert exit route to ensure minimum engineering learning outcomes are achieved given modules are drawn from two departments.

The intermediate awards of PGCert in Advanced Engineering and PGCert in Management are already available as intermediate exit routes where students fail to meet the requirements for a PGDip in Advanced Mechanical Engineering with Management per senate PGT regulation 6.35. Where students have passed a combination of Engineering and Management modules, two additional exit routes (PGCert in Engineering with Management and PGCert in Advanced Engineering with Management) have been created (detailed in a separate programme specification). The title of award offered, a function of the number of modules passed in each discipline and therefore the balance of ILOs achieved, is detailed in the Table below:

AWARD MATRIX FOR TAUGHT MODULES (NUMBER IN BRACKETS IS CREDITS PASSED)		NUMBER OF 15-CREDIT MN7xxx MODULES PASSED			
		0	1	2	3
NUMBER OF 15- CREDIT EG7xxx MODULES PASSED	0	FAIL (0)	FAIL (15)	FAIL (30)	PGCert IN MANAGEMENT (45)
	1	FAIL (15)	FAIL (30)	PGCert IN ENGINEERING WITH MANAGEMENT (45)	PGCert IN ENGINEERING WITH MANAGEMENT (60)
	2	FAIL (30)	PGCert in ENGINEERING WITH MANAGEMENT (45)	PGCert IN ENGINEERING WITH MANAGEMENT (60)	PGCert IN ENGINEERING WITH MANAGEMENT (75)
	3	PGCert in ADVANCED ENGINEERING (45)	PGCert in ADVANCED ENGINEERING WITH MANAGEMENT (60)	PGCert IN ADVANCED ENGINEERING WITH MANAGEMENT (75)	MSc/PGDip IN (respective discipline) ENGINEERING WITH MANAGEMENT (90)
	4	PGCert in ADVANCED ENGINEERING (60)	PGCert in ADVANCED ENGINEERING WITH MANAGEMENT (75)	MSc/PGDip IN (respective discipline) ENGINEERING WITH MANAGEMENT (90)	MSc/PGDip IN (respective discipline) ENGINEERING WITH MANAGEMENT (105)
	5	PGCert in ADVANCED ENGINEERING (75)	MSc/PGDip IN (respective discipline) ENGINEERING WITH MANAGEMENT (90)	MSc/PGDip IN (respective discipline) ENGINEERING WITH MANAGEMENT (105)	MSc/PGDip IN (respective discipline) ENGINEERING WITH MANAGEMENT (120)

13. Progression points

Any student failing to satisfy the requirements for an MSc (i.e. failing more than four taught modules in May/June of the first year or with more than two failed modules after the resit exams in September of the first year) will be removed from the MSc with Industry programme and considered for a Postgraduate Diploma or Postgraduate Certificate as appropriate. This will necessarily disqualify him/her from the placement (as there is no Postgraduate Diploma or Certificate with Industry). In this event, 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, although it could happen as late as September 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:

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 dissertation 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)

Semester 1

Compulsory modules:

Dept. of Engineering Induction	0	Week 1 / Sem 1
EG7012 MATLAB and CAD	15	Sem 1
MN7403 Accounting and Finance for Managers	15	Sem 1
MN7402 Business Economics	15	Sem 1

Select at least one module from:

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

Select maximum one module from:

EG7013 Modelling and Classification of Data	15	Sem 1
EG7015 Robust Control	15	Sem 1

Semester 2

Compulsory modules:

MN7406 International Business	15	Sem 2
EG7302 Engineering Management Project	60	Sem 2/Summer

Select two modules from:

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

'with Management & 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