Programme Specification (Postgraduate)

FOR ENTRY YEAR: 2024/25

Date created: n/a **Last amended**11/04/2024 **Version no.** 1

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

MSc in Embedded Systems and Control Engineering

MSc in Embedded Systems and Control Engineering with Industry
Postgraduate Diploma in Embedded Systems and Control Engineering (exit award only) *
Postgraduate Diploma in Embedded Systems and Control Engineering with Industry (exit award only) *
Postgraduate Certificate in Embedded Systems and Control 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	%
100184	100

2. Awarding body or institution

University of Leicester

3. a) Mode of study

Full-time

b) Type of study

Campus-based

4. Registration periods

September intake

The normal period of registration for the MSc in Embedded Systems and Control Engineering is 12 Months

The maximum period of registration for the MSc in Embedded Systems and Control Engineering is 24 Months

The normal period of registration for the MSc in Embedded Systems and Control Engineering with Industry is 24 Months

The maximum period of registration for the MSc in Embedded Systems and Control Engineering with Industry is 33 Months

January intake

The normal period of registration for the MSc in Embedded Systems and Control Engineering is 16 months

The maximum period of registration the MSc in Embedded Systems and Control Engineering is 28 months

The normal period of registration for the MSc in Embedded Systems and Control Engineering with Industry is 28 months

The maximum period of registration for the MSc in Embedded Systems and Control Engineering with Industry is 40 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.
Candidates who have acquired experience through work or other means that enables staff responsible for admissions to be confident of the candidate's ability to succeed in the programme will be considered.
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

None

7. Programme aims

This is an advanced career entry programme focussed on industrial careers in the engineering / technology sector. The focus of this programme is to develop specific knowledge and understanding of topics in Embedded Systems and Control Engineering and to be able to apply this knowledge in the design and simulation of real-world systems.
It incorporates modules to teach the mathematical basis of control for all engineering systems and also to apply this knowledge to specific systems, such as power -grids and motors. The programme also includes practical work to allow students to gain hands-on practice at developing code for their own small microcontroller-based embedded systems.
The combination of advanced theory and practical skills will equip students with the skills required to understand the importance od control in engineering systems and appreciate the difference between different levels of control robustness.

The aims, learning outcomes and special features of the Year in Industry are available online.

8. Reference points used to inform the programme specification

- QAA Benchmarking Statement
- Framework for Higher Education Qualifications (FHEQ)
- UK Quality Code for Higher Education
- University Education Strategy
- University Assessment Strategy [log-in required]
- 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)
- Engineering Council Compensation and Condonement requirements November 2018

9. Programme Outcomes

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

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
(a) Subject and Professional skills		
Knowledge		
State-of-the-art knowledge in the area of control, digital signal processing and software design 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
Concepts		
Linear and nonlinear robust control paradigms, software engineering and C++ applied to real-time-systems, digital signal processing and hardware interfacing.	Lectures, Practical classes, Tutorials	Module examinations, Laboratory, design exercise and literature review reports, oral presentations, tutorial
Techniques		
State-of-the-art design and simulation software for control system design and off-line signal processing, and scheduling for real-time implementation Practical experience of the application of Engineering techniques to real world scenarios, through the industrial placement.	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

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
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
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

Career management		
1. 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. 2. Compose a Professional Development Plan considering your strengths, development areas and motivations for your next step 3. Modify your CV to include the skills and experience you have gained through your significant experience gained in the past 12 months	On placement: Students undertake a minimum of 3 months experience in the workplace. Project supervision, independent research	Completion of Monthly Reflective Journals to record skills development, major achievements, key areas of work, learning points and challenges overcome. 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. 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.

10. Special features

This programme is accredited by the Institution of Mechanical Engineers (IMechE) and The Institution of Engineering and Technology (IET) and is subject to 5 yearly re-accreditation.

11. Indicators of programme quality

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

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 a PG Diploma in Embedded Systems and Control Engineering 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.

As defined in Senate Regulation 6: Regulations governing taught postgraduate programmes of study.
The following additional progression 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 UKVI 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 criterion 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 [log-in required]

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

None

UNIVERSITY OF LEICESTER

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Date created: Click or tap here to enter text. **Last amended:** 11/04/2024 **Version no.** 1

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.

Credit breakdown

Status	Year long	Semester 1	Semester 2	Other delivery period
Core taught	n/a	60 credits	60 credits	n/a
Optional	n/a	n/a	n/a	n/a
Dissertation/project	n/a	n/a	n/a	60 credits

180 credits in total

Level 7/Year 1-September intake 2024/25

Core modules

Delivery period	Code	Title	Credits
Semester 1	EG7010	Engineering Design Case Study	15 credits
Semester 1	EG7014	High Reliability Embedded Systems	15 credits
Semester 1	EG7042	Robust Control	15 credits
Semester 1	EG7044	Nonlinear Control	15 credits
Semester 2	EG7231	Real time simulation for industry 4.0	15 credits
Semester 2	EG7324	Signal Processing	15 credits
Semester 2	EG7018	Embedded Systems for Condition Monitoring and Control	15 credits
Semester 2	EG7035	Advanced Electronically Controlled Drives	15 credits

Notes

1. The 'with industry' programme includes an industrial placement of between 3 and 12 months, following the end of the final exam period in the taught phase, Placement Students will return to the University to complete the project/dissertation after the industrial placement.

Level 7/Summer

Core modules

Delivery period	Code	Title	Credits
Summer	EG7020	Individual Project	60 credits

Level 7/Year 1- January intake 2024/25

Core modules

Notes
Please note that for January intake students Semester 2 will be first, followed by Semester 1.

The 'with industry' programme includes an industrial placement of between 3 and 12 months, following the end of the final exam period in the taught phase, Placement Students will return to the University to complete the project/dissertation after the industrial placement.

Level 7/January 2025

Core modules

Delivery period	Code	Title	Credits
Semester 2	EG7231	Real time simulation for industry 4.0	15 credits
Semester 2	EG7324	Signal Processing	15 credits
Semester 2	EG7018	Embedded Systems for Condition Monitoring and Control	15 credits
Semester 2	EG7035	Advanced Electronically Controlled Drives	15 credits
Semester 1	EG7010	Engineering Design Case Study	15 credits
Semester 1	EG7014	High Reliability Embedded Systems	15 credits
Semester 1	EG7042	Robust Control	15 credits
Semester 1	EG7044	Nonlinear Control	15 credits

Delivery period	Code	Title	Credits
January	EG7020	Individual Project	60 credits

Appendix 2: Module specifications

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