UNIVERSITY OF LEICESTER

Programme Specification (Postgraduate)

FOR ENTRY YEAR: 2024/25

Date created: 04/11/2022 **Last amended:** 05/12/2023 **Version no.** 1

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

MSc and Postgraduate Diploma in:

- Advanced Software Engineering (ASE)

MSc in:

- Advanced Software Engineering (ASE) with Industry

Postgraduate Certificate* in:

- Advanced Computer Science

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	%
100366	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

a) MSc October Intake

The normal period of registration is 12 months

The maximum period of registration is 24 months

b) MSc January Intake

The normal period of registration is 16 months

The maximum period of registration is 28 months

c) MSc with Industry October Intake

The normal period of registration is 24 months

The maximum period of registration is 36 months

d) MSc with Industry January Intake

The normal period of registration is 28 months

The maximum period of registration is 40 months

e) PG Diploma October Intake

The normal period of registration is 9 months

The maximum period of registration is 18 months

f) PG Diploma January Intake

The normal period of registration is 12 months

The maximum period of registration is 18 months

5. Typical entry requirements

The same entry requirements that apply to all MSc programmes in Computer Science apply. Specifically, candidates should have, or expect to gain, at least a good second class honours BSc degree or qualification of equivalent standard recognised by the University in a subject with a substantial element of Computing. 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 subject with a substantial element of Computing. Because applications are treated on an individual basis, alternative qualifications may be considered especially in the case of candidates with relevant work experience. Alternative qualifications are usually considered when a student holds an acceptable degree, but in a slightly different subject area and has through work experience moved into a field relevant for the programme they have applied for. In this case we would expect the experience to be significant (several years) and expect the candidate to provide details about this experience (e.g. details of the job they have been conducting in Industry) in addition to evaluating employer's statements for evaluation by the admissions team. Where English is not the first language of the candidate, the successful applicant must have IELTS 6.0.

6. Accreditation of Prior Learning

N/A

7. Programme aims

The general aims of the programme leading to a PG Cert in Advanced Computer Science are to:

- Develop a deep understanding of the nature and impact of current challenges faced by the IT industry, so that students know what is expected from them as mature professionals.
- Develop an awareness of the methodologies and technologies that are available within computer science to address these challenges, so that students can evaluate and analyse specific situations and make informed choices.
- To foster confidence, convey knowledge and develop practical skills in the use of some of these technologies, including both fundamental concepts and state-of-the-art support tools.
- Encourage students to develop their interpersonal, communication, decision-making, and problem-solving skills, and to use these in an imaginative way.

The programmes leading to an MSc have the following additional aims:

- Provide experience of both team-based and individual project work.
- Secure knowledge and research skills so that students are able to take their studies further to do a PhD, in case they complete the full MSc.

Further, ASE has more focused specific aspects:

- ASE aims to train students in development methods and processes that address key challenges that companies are facing for competing in the volatile markets of today: How to generate applications from high-level business models to reduce time-to-market and development costs? How to evolve legacy systems and promote business processes in an economy dominated by the need to offer and integrate, on demand, new services?

The 'year in industry' variant of this programme is offered in accordance with the University's standard specification for year in industry programme variants.

In addition to the aims above, the "with Industry" variant of the programme aims to:

- Enable first-hand experience of the requirements, opportunities and modes of operation of the programme related software engineering and computer industry;
- Place students on challenging and relevant industrial placements;
- Enable students to use and develop the knowledge and skills gained during the taught part of the programme;
- Develop students' career management and development skills.

8. Reference points used to inform the programme specification

- QAA Benchmark Computing
- QAA Frameworks for Higher Education Qualifications in England Wales and Northern Ireland
- QAA Master's Degree Characteristics
- PDR report (January 2010)
- University Education Strategy
- University Assessment Strategy [login required]
- University Employability Strategy
- Graduate Survey (2014)
- First Destination Survey
- External Examiner's Reports

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?
Demonstrate knowledge and mastery of a [wide (MSc)(PGDip)] range of advanced computer science subjects and the way they relate to IT practice. Integration of knowledge across subjects.	Independent research (MSc), lectures, and the seminar/discussion groups that are part of the Personal and Group Skills module.	Written examinations, oral presentations, participation in group discussions, essays/demos, project planning and dissertation (MSc).
Demonstrate understanding of the core elements of industrial practice and organisation ("with Industry").	Work placement.	Work placement report.

ii) Concepts

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Demonstrate enhanced grasp of principles of computer science methodology and technology.	Independent research, lectures, seminars, group-discussions.	Written examinations, assessed coursework, group essays, oral presentations, dissertation (MSc) and reports.

iii) Techniques

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Master advanced modelling and design techniques for the development of distributed, software intensive, and web-based systems. Engineer and follow software development processes, make use of model-based techniques, target service-oriented architectures.	Independent research, lectures, seminars, group-discussions, along with laboratory work and individual project (MSc). As above.	Written examinations, assessed coursework, group essays, oral presentations, dissertation (MSc) and reports. As above.

iv) Critical analysis

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Apply understanding of concepts and techniques with independence, rigour & self- reflexivity. Critically appraise problem solutions, and project work. Demonstrate consideration of professional issues.	Independent research, lectures, Personal and Group Skills module, and individual project (MSc). As above.	Oral presentations, participation in group discussions, essays/demos, project plan, dissertation (MSc), and work placement report. As above.

v) Presentation

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Organise research material and/or technology demonstration; distinguish between relevant and non-relevant material; write-up and deliver oral reports on findings to a professional standard; engage in scientific discussion with peers. These aspects are explored in more depth and with greater rigour by students studying for the MSc or PGDip.	Lectures, seminars, group discussions. Personal and Group Skills module. Work placement.	Oral presentations, participation in group discussions, essays/demos, project plan, and dissertation (MSc).

vi) Appraisal of evidence

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Analyse and assess a variety of requirements for system development and/or engineering. Assess the relevance and quality of proposed methods, techniques and technologies. Mount (PGDip, MSc) and sustain (MSc) an independent level of inquiry at an advanced level.	Independent research, lectures, seminars, group-discussion, and the Personal and Group Skills module.	Oral presentations, participation in group discussions, essays/demos, project plan, and dissertation (MSc).

b) Transferable skills

i) Research skills

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Conduct [significant (MSc, PGDip)] background research and literature surveys, organise and marshal evidence, report on findings, analyse complex ideas and construct [sophisticated (MSc)] critical arguments.	Project supervision (MSc). Seminars, group discussions, collective essay, and specific workshops delivered by the Student Learning Centre.	Collective essay, group discussions, and individual project reports and dissertation (MSc).

ii) Communication skills

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Respond to scientific questions with accurate and concise answers. Demonstrate fluent and sustained scientific and technical communication.	Lectures, seminars, moderated group discussions, and individual project supervision (MSc). Workshops delivered by the Student Learning Centre. Work placement.	Group discussions and individual project presentations, individual project oral examinations (MSc), work placement presentation.
Write concise and accurate summaries of scientific knowledge, and solutions to problems, in a variety of different formats.	Lectures. Detailed solutions provided in problem classes. Workshops delivered by the Student Learning Centre. Individual project supervision (MSc).	Written examinations, assessed coursework, group essay, intermediate individual project reports (MSc) and dissertation (MSc).
Produce properly structured, clear, advanced technical reports or dissertations (MSc).	As above.	Group essay. Intermediate individual project reports and dissertation (MSc).

iii) Data presentation

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Organise and present information gathered through research clearly and effectively using appropriate IT resources.	Independent research. Lectures. Workshops delivered by the Student Learning Centre. Work placement.	Oral presentations, essays/demos, work placement report, and dissertation (MSc).

iv) Information technology

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Use of software development tools across different languages and environments, including the ability to set up and configure them as required.	Lab based instruction and independent research. Work placement.	Coursework and lab-based demos. Dissertation. Work placement.
Ability to use online tools for independent research and collaboration.	Workshops delivered by the Student Learning Centre.	Coursework and dissertations.

v) Problem solving

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Discovering, querying and resolving ambiguities in requirements.	Lab based instruction and independent research. Work placement.	Coursework and lab-based demos. Dissertation. Work placement.

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Testing, debugging and correcting code. Troubleshooting technical problems.	Lab based instruction and independent research. Work placement.	Coursework and lab-based demos. Dissertation. Work placement.

vi) Working relationships

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Know how and when to draw on the knowledge & expertise of others; contribute and comment on ideas in syndicate groups.	Lectures. Group discussions and collective essay. Work placement.	Oral presentations, participation in group discussions, work placement report.

vii) Managing learning

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Demonstrate independence and time management skills.	Tutor system. Career development workshop delivered by the Student Learning Centre.	Meeting coursework deadlines. Collective essay.
Identifying a credible research project, drawing up a realistic research time-table, reflecting on and 'writing up' results. Design a long-term personal career plan (MSc).	Project supervision (MSc).	Individual project topic choice and plan, intermediate reports and dissertation (MSc).

viii) Career management

Intended Learning Outcomes	Teaching and Learning Methods	How Demonstrated?
Plan personal professional development, understand how to prepare for job market and how to apply for employment.	Career development workshop.	Personal Tutor meetings. Obtaining placement ("with Industry")

10. Special features

Each course shares the compulsory Personal and Group Skills which combines attendance of seminars especially commissioned from speakers selected for their presentation skills and state-of-the-art research, group discussions and collective essay writing on topics selected for the seminars, as well as a series of workshops on transferable skills and career planning run by the Student Learning Centre of the university. This module forms a highly praised (by previous referees and the external examiners) component of the existing MSc offering in the department and is well liked by the students.

The department is research active in all areas covered by the programmes, which means that students will be able to benefit from the projects that are going on through special lectures, tutorials

and discussions with national and international collaborators, as well as being able to conduct their projects in topics that are at the cutting edge of science and technology. The areas covered by the programmes are directly related to the specific research strength in the department, in the areas of Service Oriented Computing (Sensoria and in Context) and Agile Methods (Leg2Net, Segravis) where the department has a significant international recognition.

11. Indicators of programme quality

QAA subject review; external examiners report.

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.

Students on Advanced Software Engineering, who only achieve sufficient credits for the award of a postgraduate certificate will not have met the Learning Outcomes for a PG Cert in their named degree specialism and hence are only eligible for a PG Cert in Advanced Computer Science as an exit award.

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.

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 award where appropriate.

Additionally, students on the "with Industry" programme are subject to the following two rules: (1) If students do not achieve an overall merit level, or fails exams at the end of their first taught semester, they will revert to the degree without industry. A Progression Board of Examiners will be held after the students' first semester, which will determine if students remain on the "with industry" variant of their programme. (2) If students fail to acquire a placement they will revert to the degree without industry.

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.

Resit examinations for modules examined in January are offered in the Midsummer exam period, and resit examinations for modules examined in the Midsummer exam period are offered in September.

14. 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]

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

Admissions are in September and January.

- Students admitted in September undertake their individual project during the summer of the following year and submit their dissertation in September (12 months in total).
- Students admitted in January start by following semester 2 modules and break during the summer; in September they follow semester 1 modules and start their project in the second half of February of the following year, submitting their dissertation at the end of May. Although this implies 16 months in total, only 12 are actually spent in the course.

Examinations are taken in January for first semester modules and in May/June for second semester ones. Additionally, "With Industry" programmes will be longer as the placement, which can be of 3, 6, 9 or 12 months length depending on the interest of the student and the placement that can be secured, is an integral part of the programme and hence adds the respective time to the programme length. Students will automatically be registered as if they were to take a 12 month placement and the length of study will be corrected when the placement is secured and the actual length of the placement is decided upon.

Students may transfer from this programme to other MSc programmes offered by the Department of Informatics, with the permission of the programme director and under advice from their personal tutor until week 2 of each semester. Transfers should normally only take place when a student wishes to study modules that are not compatible with the specialization chosen at registration or when the student wishes to take an individual project outside their specialization chosen at registration.

Appendix 1: Programme structure (programme regulations)

In line with the other MSc offerings in the School, there are three kinds of modules in the programmes. Details of the modules, including the semesters when they are delivered are shown in Table 1.

Personal and Group Skills (PGS) (15 credits)

This module is offered in both semesters and provides students with skills that are way up the value chain of any IT employer. Students attend a series of seminars given by researchers from universities or companies followed by group discussions moderated by a member of staff. Each group prepares a joint essay based on the seminar and the discussions. Students also attend workshops organised by the Student Learning Centre on topics like project planning, writing and presentation skills, as well as career management.

Taught Modules (105 credits)

Taught modules are taken to a total of 105 credits in a mixture of core and optional modules as indicated in Table 1.

Optional modules are chosen, with the approval of the personal tutor, before the end of the second teaching week of each semester. Some optional modules may have pre-requisites (e.g. experience in certain programming languages or mathematical maturity) and, therefore, unadvisable to certain students. Any such pre-requisite will be explicitly stated in the module specification.

Individual Project (60 credits)

Candidates entitled to proceed to a full MSc degree undertake, after examinations, an individual project on an approved topic according to the profile of each course, leading to the submission of a 15,000 word dissertation. The project is expected to contain some element of original work, and may involve informal collaboration with other organisations, subject to the previous approval of the project supervisor.

UNIVERSITY OF LEICESTER

Programme Specification (Postgraduate) FOR ENTRY YEAR: 2024/25

Date created: n/a **Last amended:** 25/04/2024 **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.

MSc Advanced Software Engineering – September Intake

Updates to the programme

Academic year affected	Module Code(s)	Update
2024/25	CO7215 Advanced Web Technologies	Removal of optional module
2024/25	CO7103 Technology and Innovation Management	Addition of optional module

Credit breakdown

Status	Year long	Semester 1	Semester 2	Other delivery period
Core taught	n/a	15 credits	30 credits	n/a
Optional	n/a	45 credits	30 credits	n/a
Dissertation/project	n/a	n/a	n/a	60 credits

180 credits in total

Level 7/Year 1 2024/25

Core modules

Delivery period	Code	Title	Credits
Semester 1	CO7095	Software Measurement and Quality Assurance	15 credits
Semester 2	CO7207	Generative Development	15 credits
Semester 2	CO7214	Service Oriented Architectures	15 credits

Option modules

Delivery period	Code	Title	Credits
Semester 1	CO7210	Personal and Group Skills*	15 credits
Semester 2	CO7210	Personal and Group Skills*	15 credits
Semester 1	CO7091	Computational Intelligence and Software Engineering	15 credits
Semester 1	CO7102	Mobile and Web Applications	15 credits
Semester 1	CO7103	Technology and Innovation Management	15 credits
Semester 1	CO7105	Advanced C++ Programming	15 credits
Semester 1	CO7217	Agile Cloud Automation	15 credits
Semester 1	CO7219	Internet and Cloud Computing	15 credits
Semester 1	CO7223	User Experience and Interaction Design**	15 credits
Semester 1	CO7224	Mobile and Ubiquitous Computing**	15 credits
Semester 1	MA7077	Operational Research	15 credits
Semester 2	CO7002	Analysis and Design of Algorithms	15 credits
Semester 2	CO7093	Big Data and Predictive Analytics	15 credits

Delivery period	Code	Title	Credits
Semester 2	CO7099	Foundations of Cybersecurity	15 credits
Semester 2	CO7113	AI for Space	15 credits
Semester 2	CO7200	Algorithms for Bioinformatics	15 credits
Semester 2	CO7225	Service Design	15 credits

Core modules

Delivery period	Code	Title	Credits
Term 3	CO7201	Individual Project	60 credits

Notes

* Students must take CO7210, but can take it in either semester 1 or 2.

** Students can only choose one of CO7223 and CO7224, they cannot choose both.

Students on a 'with industry' degree will take CO7201 Individual Project after their industry placement is complete at the nearest available start time (Feb, June, or Oct).

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.

MSc Advanced Software Engineering – January Intake

Credit breakdown

Status	Year long	Semester 1	Semester 2	Other delivery period
Core taught	n/a	15 credits	30 credits	n/a
Optional	n/a	45 credits	30 credits	n/a

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

180 credits in total

Level 7/Year 1 2024/25

Core modules

Delivery period	Code	Title	Credits
Semester 2	CO7207	Generative Development	15 credits
Semester 2	CO7214	Service Oriented Architectures	15 credits
Semester 1	CO7095	Software Measurement and Quality Assurance	15 credits

Option modules

Delivery period	Code	Title	Credits
Semester 2	CO7210	Personal and Group Skills*	15 credits
Semester 1	CO7210	Personal and Group Skills*	15 credits
Semester 2	CO7002	Analysis and Design of Algorithms	15 credits
Semester 2	CO7093	Big Data and Predictive Analysis	15 credits
Semester 2	CO7099	Foundations of Cybersecurity	15 credits
Semester 2	CO7113	AI for Space	15 credits
Semester 2	CO7200	Algorithms for Bioinformatics	15 credits
Semester 2	CO7225	Service Design	15 credits
2025/6			
Semester 1	CO7091	Computational Intelligence and Software Engineering	15 credits

Delivery period	Code	Title	Credits
Semester 1	CO7102	Mobile and Web Applications	15 credits
Semester 1	CO7103	Technology and Innovation Management	15 credits
Semester 1	CO7105	Advanced C++ Programming	15 credits
Semester 1	CO7217	Agile Cloud Automation	15 credits
Semester 1	CO7219	Internet and Cloud Computing	15 credits
Semester 1	CO7223	User Experience and Interaction Design**	15 credits
Semester 1	CO7224	Mobile and Ubiquitous Computing**	15 credits
Semester 1	MA7077	Operational Research	15 credits

Core modules (2025/6)

Delivery period	Code	Title	Credits
Semester 2	CO7201	Individual Project	60 credits

Notes

* Students must take CO7210, but can take it in either semester 1 or 2.

** Students can only choose one of CO7223 and CO7224, they cannot choose both.

Students on a 'with industry' degree will take CO7201 Individual Project after their industry placement is complete at the nearest available start time (Feb, June, or Oct).

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.

Appendix 2: Module specifications

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