



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

MSc and Postgraduate Diploma and Postgraduate Certificate in

- Advanced Computer Science (ACS)

MSc and Postgraduate Diploma

- Advanced Computational Methods (ACM)
- Advanced Distributed Systems (ADS)
- Agile Software Engineering Techniques (SET)
- Web Applications and Services (WAS)
- Advanced Software Engineering (ASE)

MSc in :

- Advanced Computational Methods (ACM) with Industry
- Advanced Computer Science (ACS) with Industry
- Advanced Distributed Systems (ADS) with Industry
- Agile Software Engineering Techniques (SET) with Industry
- Web Applications and Services (WAS) with Industry
- Advanced Software Engineering (ASE) with Industry

**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) 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 21 months

The maximum period of registration is 33 months

**d) MSc with Industry January Intake**

The normal period of registration is 24 months

The maximum period of registration is 36 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, each of the programmes (apart from ACS) has more focused specific aspects:

- ACM aims to train students in the design, analysis and engineering of algorithms, covering their use for modelling real-world problems in areas such as bioinformatics, networking or distributed computing.
- ADS aims to train students in new methods, architectures and design techniques for software systems able to operate, with guaranteed levels of quality of service, across heterogeneous and distributed platforms while relying on networks that cannot always be trusted.
- SET aims to train students in development methods, processes and technologies that support the development of software suitable for today's dynamic (business) environments.
- WAS aims to train students in the design, analysis and engineering of the new generation of web-based globally distributed systems.
- 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?

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 \(2011\)](#)
- QAA Frameworks for Higher Education Qualifications in England Wales and Northern Ireland
- QAA [Master's Degree Characteristics](#)
- PDR report (January 2010)
- [University Learning Strategy](#)
- University Employability Strategy
- Graduate Survey (2014)
- First Destination Survey
- External Examiner's Reports

## 9. Programme Outcomes:

Students undertaking the MSc or PG Diploma will engage with a broader range of subjects than those studying towards the PG Cert. MSc students are undertaking an individual project, which will require much deeper exploration and application of the learned skills than they would demonstrate in the PG Cert or PG Diploma. (MSc) and (PGDip) in the table below will indicate the LOs, methods and demonstration for aspects specific to the MSc or PG Diploma Programmes.

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

<b>Learning Outcomes</b>	<b>Teaching Methods</b>	<b>How Demonstrated</b>
<b>Techniques</b>		
Use problem-solving techniques, and select and apply suitable technologies in different application areas.	As above.	As above.
Apply current technologies in distributed systems engineering.	As above.	As Above.
Master research methods and project planning techniques (MSc).	Personal and Group Skills module, and individual project (MSc).	Individual project components (MSc); group discussions and essays.
Work as a Computer Scientist and Computer Engineer in an industrial or commercial setting (“with Industry”).	Work placement	Work placement report.
<b>Critical analysis</b>		
Apply understanding of concepts and techniques with independence, rigour & self-reflexivity.	Independent research, lectures, Personal and Group Skills module, and individual project (MSc).	Oral presentations, participation in group discussions, essays/demos, project plan, dissertation (MSc), and work placement report.
Critically appraise problem solutions, and project work. Demonstrate consideration of professional issues.	As above.	As above.
<b>Presentation</b>		
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).
<b>Appraisal of evidence</b>		
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).

Learning Outcomes	Teaching Methods	How Demonstrated
<b>Transferable skills</b>		
<b>Communication skills</b>		
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).
<b>Data presentation</b>		
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).
<b>Working relationships</b>		
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.
<b>Research skills</b>		
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).
<b>Managing learning</b>		
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).

## **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 WAS and SET 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. Indications of programme quality:**

QAA subject review; external examiners report.

## **12. Scheme of Assessment**

This programme follows the rules and procedures set by the University for postgraduate programmes. See: Senate Regulation 6 governing taught postgraduate programmes  
<http://www2.le.ac.uk/offices/sas2/regulations/general-regulations-for-taught-programmes>

Students on Advanced Computational Methods, Advanced Distributed Systems, Advanced Software Engineering, Agile Software Engineering Techniques or Web Applications and Service 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**

The programme will follow the standard University progression rules, as defined in the Scheme of Assessment. See: Senate Regulation 6 governing taught postgraduate programmes  
<http://www2.le.ac.uk/offices/sas2/regulations/general-regulations-for-taught-programmes>

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 three rules: (1) If students do not achieve an overall merit level or fail exams at the end of their first taught semester they will revert to the degree without industry. (2) If students fail to acquire a placement they will revert to the degree without industry. (3) Failure to satisfactorily perform (attendance, participation and completion of set tasks) in the employability programme (modules CO7260 and CO7261) will lead to being moved to the degree without industry.

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

This programme follows the rules and procedures set by the University for postgraduate programmes. See: Senate Regulation 6 governing taught postgraduate programmes  
<http://www2.le.ac.uk/offices/sas2/regulations/general-regulations-for-taught-programmes>  
noting that resits may only be taken when the exam for the module to be resat is offered again. 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.

### **15. Additional information** [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, 8 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.

### **16. External Examiners**

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)

In line with the other MSc offerings in the Department of Informatics, 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, inadvisable to certain students. Any such pre-requisite will be explicitly stated in the corresponding

module form available in the student's handbook.

### 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.

### Employability Programme (with industry only, compulsory but non-credit bearing)

Candidates on with Industry variants of the programmes will be required to undertake study of two additional modules that equip them with skills and knowledge about the labour market and preparing them for applying for and undertaking placements. CO7260 and CO7261 are compulsory for 'with industry' students.

Table 1.

Module code	CO7002	CO7007	CO7090	CO7093	CO7095	CO7096	CO7098	CO7099	CO7105	CO7200	CO7201	CO7205	CO7206	CO7207	CO7210	CO7211	CO7212	CO7214	CO7215	CO7216	CO7217	CO7218	CO7219	
Level	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
Credits	15	15	15	15	15	15	15	15	15	15	60	15	15	15	15	15	15	15	15	15	15	15	15	
Semester offered	2	1	2	2	1	2	1	2	1	2		1	1	2	1 + 2	2	2	2	1	2	1	2	1	
Module Title	Analysis and Design of Algorithms	Communication and Concurrency	Distributed Systems and Applications.	Big Data and Predictive Analytics	Software Measurements and Quality assurance	Compression Methods for Multimedia	Web Technologies.	Cryptography and Information Security	Advanced C++ Programming	Algorithms for Bioinformatics	Individual Project	Advanced System Design	System Re-engineering	Generative Development	Personal and Group Skills	Discrete Event Systems	Game Theory in Computer Science	Service-Oriented Architectures	Advanced Web Technologies	Semantic Web	Agile Cloud Automation	Financial Services Information Systems	Internet and Cloud Computing	
ACM									C	C	✓				✓	C	C						C	
ACS											✓				✓									
ADS				C							✓	C			✓	C		C					C	
ASE					C						✓	C	C	C	✓			C						
SET											✓		C	C	✓			C			C			
WAS			R				R				✓	C			✓			C	C	C				

## Programme Regulations (Programme Structure)

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### MSc in Advanced Distributed Systems

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#### September Entry:

#### SEMESTER 1

Core Modules		Credits
CO7205	ADVANCED SYSTEM DESIGN	15
CO7219	INTERNET AND CLOUD COMPUTING	15
<b>Optional Modules</b>		
CO7210	PERSONAL AND GROUP SKILLS*	15
Plus one or two (depending on when CO7210 is taken) selected from:		
CO7095	SOFTWARE MEASUREMENT AND QUALITY ASSURANCE	15
CO7007	COMMUNICATION AND CONCURRENCY	15
CO7098	WEB TECHNOLOGIES	15
CO7105	ADVANCED C++ PROGRAMMING	15
CO7206	SYSTEM RE-ENGINEERING	15
CO7215	ADVANCED WEB TECHNOLOGIES	15
CO7217	AGILE CLOUD AUTOMATION	15
MA7071	FINANCIAL MATHEMATICS 1	15
MA7077	OPERATIONAL RESEARCH	15
		Semester Total 60

#### SEMESTER 2

Core Modules		Credits
CO7211	DISCRETE EVENT SYSTEMS	15
CO7214	SERVICE ORIENTED ARCHITECTURES	15
CO7093	BIG DATA AND PREDICTIVE ANALYTICS	15
<b>Optional Modules</b>		
15 credits selected from:		
CO7210	PERSONAL AND GROUP SKILLS (if not selected in semester 1)	15
CO7002	ANALYSIS AND THE DESIGN OF ALGORITHMS	15
CO7096	COMPRESSION METHODS FOR MULTIMEDIA	15
CO7090	DISTRIBUTED SYSTEMS AND APPLICATIONS	15
CO7099	CRYPTOGRAPHY AND INTERNET SECURITY	15
CO7200	ALGORITHMS FOR BIOINFORMATICS	15
CO7207	GENERATIVE DEVELOPMENT	15
CO7212	GAME THEORY IN COMPUTER SCIENCE	15
CO7216	SEMANTIC WEB	15
CO7218	FINANCIAL SERVICES INFORMATION SYSTEMS	15
		Semester Total 60

#### SUMMER

Core modules		Credits
CO7201	INDIVIDUAL PROJECT	60

**Total Credits** **180**

\* All students are required to study CO7210, but may select to study it in either semester 1 or semester 2

**January Entry****SEMESTER 2**

<b>Core Modules</b>		<b>Credits</b>
CO7211	DISCRETE EVENT SYSTEMS	15
CO7214	SERVICE ORIENTED ARCHITECTURES	15
CO7093	BIG DATA AND PREDICTIVE ANALYTICS	15
<b>Optional Modules</b>		
15 credits selected from:		
CO7210	PERSONAL AND GROUP SKILLS (if not selected in semester 2)	15
CO7002	ANALYSIS AND THE DESIGN OF ALGORITHMS	15
CO7096	COMPRESSION METHODS FOR MULTIMEDIA	15
CO7090	DISTRIBUTED SYSTEMS AND APPLICATIONS	15
CO7099	CRYPTOGRAPHY AND INTERNET SECURITY	15
CO7200	ALGORITHMS FOR BIOINFORMATICS	15
CO7207	GENERATIVE DEVELOPMENT	15
CO7212	GAME THEORY IN COMPUTER SCIENCE	15
CO7216	SEMANTIC WEB	15
CO7218	FINANCIAL SERVICES INFORMATION SYSTEMS	15
Semester Total		60

**SEMESTER 1**

<b>Core Modules</b>		<b>Credits</b>
CO7205	ADVANCED SYSTEM DESIGN	15
CO7219	INTERNET AND CLOUD COMPUTING	15
<b>Optional Modules</b>		
Either:		
CO7210	PERSONAL AND GROUP SKILLS*	15
Or one or two selected from:		
CO7095	SOFTWARE MEASUREMENT AND QUALITY ASSURANCE	15
CO7007	COMMUNICATION AND CONCURRENCY	15
CO7098	WEB TECHNOLOGIES	15
CO7105	ADVANCED C++ PROGRAMMING	15
CO7206	SYSTEM RE-ENGINEERING	15
CO7215	ADVANCED WEB TECHNOLOGIES	15
CO7217	AGILE CLOUD AUTOMATION	15
MA7071	FINANCIAL MATHEMATICS 1	15
MA7077	OPERATIONAL RESEARCH	15
Semester Total		60

**JANUARY TO APRIL**

<b>Core Modules</b>		<b>Credits</b>
CO7201	INDIVIDUAL PROJECT	60
Total Credits		180

\* All students are required to study CO7210, but may select to study it in either semester 1 or semester 2

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**MSc in Advanced Distributed Systems with Industry**


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The taught modules for the programme are as for those on the MSc in Advanced Distributed Systems degree programme, with the additional undertaking of:

October entry

Semester 1

CO7260	Employability – Core Skills	0 credit
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Semester 2

CO7261	Employability – Placement Preparations	0 credit
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January entry

Semester 2

CO7260      Employability – Core Skills      0 credit

Semester 1

CO7261      Employability – Placement Preparations      0 credit

All students on the 'with Industry' variant will undertake a 3, 6, 8 or 12 month placement between completion of the taught element of the programme and commencement of the project. The placement will be assessed on a pass or fail basis according to the approved and published criteria. Students who are deemed to have passed the industrial placement and subsequently pass the individual project will be eligible to be considered for the award of an MSc in Advanced Distributed Systems with Industry. Students who fail to pass the industrial placement will revert to the non- industry variant of the programme.

**SEPTEMBER ENTRY****Semester 1**

<b>Core modules</b>		<b>Credits</b>
CO7206	SYSTEM RE-ENGINEERING	15
CO7217	AGILE CLOUD AUTOMATION	15
<b>Optional Modules</b>		
30 Credits Selected From:		
CO7210	PERSONAL AND GROUP SKILLS*	15
CO7095	SOFTWARE MEASUREMENT AND QUALITY ASSURANCE	15
CO7007	COMMUNICATION AND CONCURRENCY	15
CO7098	WEB TECHNOLOGIES	15
CO7105	ADVANCED C++ PROGRAMMING	15
CO7205	ADVANCED SYSTEM DESIGN	15
CO7219	INTERNET AND CLOUD COMPUTING	15
CO7215	ADVANCED WEB TECHNOLOGIES	15
MA7071	FINANCIAL MATHEMATICS 1	15
MA7077	OPERATIONAL RESEARCH	15
<b>Semester Total</b>		<b>60</b>

**SEMESTER 2****Core Modules**

CO7207	GENERATIVE DEVELOPMENT	15
CO7214	SERVICE ORIENTED ARCHITECTURES	15

**Optional Modules**

30 Credits selected from

CO7210	PERSONAL AND GROUP SKILLS (if not selected in semester 1)	15
CO7002	ANALYSIS AND THE DESIGN OF ALGORITHMS	15
CO7096	COMPRESSION METHODS FOR MULTIMEDIA	15
CO7090	DISTRIBUTED SYSTEMS AND APPLICATIONS	15
CO7099	CRYPTOGRAPHY AND INTERNET SECURITY	15
CO7200	ALGORITHMS FOR BIOINFORMATICS	15
CO7211	DISCRETE EVENT SYSTEMS	15
CO7212	GAME THEORY IN COMPUTER SCIENCE	15
CO7216	SEMANTIC WEB	15
CO7218	FINANCIAL SERVICES INFORMATION SYSTEMS	15

**Semester Total** **60****SUMMER****Core Modules**

CO7201	INDIVIDUAL PROJECT	60
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**Total Credits 180**

\* All students are required to study CO7210, however may select to study it in either semester 1 or semester 2

**JANUARY ENTRY****SEMESTER 2****Core Modules**

CO7207	GENERATIVE DEVELOPMENT	15
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CO7214 SERVICE ORIENTED ARCHITECTURES 15

**Optional Modules**

30 credits selected from:

CO7210	PERSONAL AND GROUP SKILLS*	15
CO7002	ANALYSIS AND THE DESIGN OF ALGORITHMS	15
CO7096	COMPRESSION METHODS FOR MULTIMEDIA	15
CO7090	DISTRIBUTED SYSTEMS AND APPLICATIONS	15
CO7099	CRYPTOGRAPHY AND INTERNET SECURITY	15
CO7200	ALGORITHMS FOR BIOINFORMATICS	15
CO7211	DISCRETE EVENT SYSTEMS	15
CO7212	GAME THEORY IN COMPUTER SCIENCE	15
CO7216	SEMANTIC WEB	15
CO7218	FINANCIAL SERVICES INFORMATION SYSTEMS	15

**Semester Total 60**

**SEMESTER 1**

**Core Modules**

CO7206	SYSTEM RE-ENGINEERING	15
CO7217	AGILE CLOUD AUTOMATION	15

**Optional Modules**

30 credits selected from:

CO7210	PERSONAL AND GROUP SKILLS* (if not selected in semester 2)	15
CO7095	SOFTWARE MEASUREMENT AND QUALITY ASSURANCE	15
CO7007	COMMUNICATION AND CONCURRENCY	15
CO7098	WEB TECHNOLOGIES	15
CO7105	ADVANCED C++ PROGRAMMING	15
CO7205	ADVANCED SYSTEM DESIGN	15
CO7219	INTERNET AND CLOUD COMPUTING	15
CO7215	ADVANCED WEB TECHNOLOGIES	15
MA7071	FINANCIAL MATHEMATICS 1	15
MA7077	OPERATIONAL RESEARCH	15

**Semester Total 60**

**JANUARY TO APRIL**

**Core Modules**

CO7201	INDIVIDUAL PROJECT	60
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**Credits**

**Total Credits 180**

\* All students are required to study CO7210, however may select to study it in either semester 1 or semester 2

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**MSc in Agile Software Engineering Techniques with Industry**

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The taught modules for the programme are as for those on the MSc in Agile Software Engineering Techniques degree programme with the additional undertaking of:

October entry

Semester 1

CO7260	Employability – Core Skills	0
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Semester 2

CO7261	Employability – Placement Preparations	0
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January entry

Semester 2

CO7260	Employability – Core Skills	0
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Semester 1

CO7261	Employability – Placement Preparations	0
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All students on the 'with Industry' variant will undertake a 3, 6, 8 or 12 month placement between completion of the taught element of the programme and commencement of the project. The placement will be assessed on a pass or fail basis according to the approved and published criteria. Students who are deemed to have passed the industrial placement and subsequently pass the individual project will be eligible to be considered for the award of an MSc in Agile Software Engineering Techniques with Industry. Students who fail to pass the industrial placement will revert to the non-industry variant of the programme.

**SEPTEMBER ENTRY**
**SEMESTER 1**
**Core Modules**

CO7105	ADVANCED C++ PROGRAMMING	15
CO7219	INTERNET AND CLOUD COMPUTING	15

**Optional Modules**

30 credits selected from:

CO7210	PERSONAL AND GROUP SKILLS*	15
CO7095	SOFTWARE MEASUREMENT AND QUALITY ASSURANCE	15
CO7007	COMMUNICATION AND CONCURRENCY	15
CO7098	WEB TECHNOLOGIES	15
CO7205	ADVANCED SYSTEM DESIGN	15
CO7206	SYSTEM RE-ENGINEERING	15
CO7215	ADVANCED WEB TECHNOLOGIES	15
CO7217	AGILE CLOUD AUTOMATION	15
MA7071	FINANCIAL MATHEMATICS 1	15
MA7077	OPERATIONAL RESEARCH	15

**Semester Total 60**
**SEMESTER 2**
**Core Modules**

CO7200	ALGORITHMS FOR BIOINFORMATICS	15
CO7212	GAME THEORY IN COMPUTER SCIENCE	15
CO7211	DISCRETE EVENT SYSTEMS	15

**Optional Modules**

Either

CO7210	PERSONAL AND GROUP SKILLS* (if not selected in semester 1)	15
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Or 15 credits selected from:

CO7002	ANALYSIS AND THE DESIGN OF ALGORITHMS	15
CO7096	COMPRESSION METHODS FOR MULTIMEDIA	15
CO7090	DISTRIBUTED SYSTEMS AND APPLICATIONS	15
CO7099	CRYPTOGRAPHY AND INTERNET SECURITY	15
CO7207	GENERATIVE DEVELOPMENT	15
CO7214	SERVICE ORIENTED ARCHITECTURES	15
CO7216	SEMANTIC WEB	15
CO7218	FINANCIAL SERVICES INFORMATION SYSTEMS	15

**Semester Total 60**
**SUMMER**
**Core Modules**

CO7201	INDIVIDUAL PROJECT	60
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**Total Credits 180**

\* All students are required to study CO7210, however may select to study it in either semester 1 or semester 2

**JANUARY ENTRY****SEMESTER 2****Core Modules**

CO7200	ALGORITHMS FOR BIOINFORMATICS	15
CO7212	GAME THEORY IN COMPUTER SCIENCE	15
CO7211	DISCRETE EVENT SYSTEMS	15

**Optional Modules**

Either

CO7210	PERSONAL AND GROUP SKILLS*	15
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Or 15 credits selected from:

CO7002	ANALYSIS AND THE DESIGN OF ALGORITHMS	15
CO7096	COMPRESSION METHODS FOR MULTIMEDIA	15
CO7090	DISTRIBUTED SYSTEMS AND APPLICATIONS	15
CO7099	CRYPTOGRAPHY AND INTERNET SECURITY	15
CO7207	GENERATIVE DEVELOPMENT	15
CO7216	SEMANTIC WEB	15
CO7218	FINANCIAL SERVICES INFORMATION SYSTEMS	15

**Semester Total 60****SEMESTER 1****Core Modules**

CO7105	ADVANCED C++ PROGRAMMING	15
CO7219	INTERNET AND CLOUD COMPUTING	15

**Optional Modules**

30 credits selected from:

CO7210	PERSONAL AND GROUP SKILLS* (if not selected in semester 2)	15
CO7095	SOFTWARE MEASUREMENT AND QUALITY ASSURANCE	15
CO7007	COMMUNICATION AND CONCURRENCY	15
CO7098	WEB TECHNOLOGIES	15
CO7205	ADVANCED SYSTEM DESIGN	15
CO7206	SYSTEM RE-ENGINEERING	15
CO7215	ADVANCED WEB TECHNOLOGIES	15
CO7217	AGILE CLOUD AUTOMATION	15
MA7071	FINANCIAL MATHEMATICS 1	15
MA7077	OPERATIONAL RESEARCH	15

**Semester Total 60****JANUARY TO APRIL****Core Modules**

CO7201	INDIVIDUAL PROJECT	60
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**Total Credits 180**

\* All students are required to study CO7210, however may select to study it in either semester 1 or semester 2

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**MSc in Advanced Computational Methods with Industry**

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The taught modules for the programme are as for those on the MSc in Advanced Computation Methods degree programme, with the additional undertaking of:

October entry

Semester 1

CO7260	Employability – Core Skills	0
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Semester 2

CO7261	Employability – Placement Preparations	0
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January entry

Semester 2

CO7260	Employability – Core Skills	0
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Semester 1

CO7261	Employability – Placement Preparations	0
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All students on the 'with Industry' variant will undertake a 3, 6,8 or 12 month placement between completion of the taught element of the programme and commencement of the project. The placement will be assessed on a pass or fail basis according to the approved and published criteria. Students who are deemed to have passed the industrial placement and subsequently pass the individual project will be eligible to be considered for the award of an MSc in Advanced Computational Methods with Industry. Students who fail to pass the industrial placement will revert to the non-industry variant of the programme.

**September Entry:**

**SEMESTER 1**

<b>Core Modules</b>		<b>Credits</b>
CO7095	SOFTWARE MEASUREMENT AND QUALITY ASSURANCE	15
CO7205	ADVANCED SYSTEM DESIGN	15
CO7206	SYSTEM RE-ENGINEERING	15

**Optional Modules**

Either:

CO7210	PERSONAL AND GROUP SKILLS*	15
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Or one selected from:

CO7007	COMMUNICATION AND CONCURRENCY	15
CO7098	WEB TECHNOLOGIES	15
CO7105	ADVANCED C++ PROGRAMMING	15
CO7219	INTERNET AND CLOUD COMPUTING	15
CO7215	ADVANCED WEB TECHNOLOGIES	15
CO7217	AGILE CLOUD AUTOMATION	15
MA7071	FINANCIAL MATHEMATICS 1	15
MA7077	OPERATIONAL RESEARCH	15

**Semester Total 60**

**SEMESTER 2**

<b>Core Modules</b>		<b>Credits</b>
CO7207	GENERATIVE DEVELOPMENT	15
CO7214	SERVICE ORIENTED ARCHITECTURES	15

**Optional Modules**

30 credits selected from:

CO7210	PERSONAL AND GROUP SKILLS* (if not selected in semester 1)	15
CO7002	ANALYSIS AND THE DESIGN OF ALGORITHMS	15
CO7096	COMPRESSION METHODS FOR MULTIMEDIA	15
CO7090	DISTRIBUTED SYSTEMS AND APPLICATIONS	15
CO7099	CRYPTOGRAPHY AND INTERNET SECURITY	15
CO7200	ALGORITHMS FOR BIOINFORMATICS	15
CO7211	DISCRETE EVENT SYSTEMS	15
CO7212	GAME THEORY IN COMPUTER SCIENCE	15
CO7216	SEMANTIC WEB	15
CO7218	FINANCIAL SERVICES INFORMATION SYSTEMS	15

**Semester Total 60**

**SUMMER**

<b>Core Modules</b>		<b>Credits</b>
CO7201	INDIVIDUAL PROJECT	60

**Total Credits 180**

\* All students are required to study CO7210, however may select to study it in either semester 1 or semester 2

**JANUARY ENTRY****SEMESTER 2****Core Modules**

CO7207	GENERATIVE DEVELOPMENT	15
CO7214	SERVICE ORIENTED ARCHITECTURES	15

**Optional Modules**

30 credits selected from:

CO7210	PERSONAL AND GROUP SKILLS*	15
CO7002	ANALYSIS AND THE DESIGN OF ALGORITHMS	15
CO7096	COMPRESSION METHODS FOR MULTIMEDIA	15
CO7090	DISTRIBUTED SYSTEMS AND APPLICATIONS	15
CO7099	CRYPTOGRAPHY AND INTERNET SECURITY	15
CO7200	ALGORITHMS FOR BIOINFORMATICS	15
CO7211	DISCRETE EVENT SYSTEMS	15
CO7212	GAME THEORY IN COMPUTER SCIENCE	15
CO7216	SEMANTIC WEB	15
CO7218	FINANCIAL SERVICES INFORMATION SYSTEMS	15

**Semester Total 60****SEMESTER 1****Core Modules**

CO7095	SOFTWARE MEASUREMENT AND QUALITY ASSURANCE	15
CO7205	ADVANCED SYSTEM DESIGN	15
CO7206	SYSTEM RE-ENGINEERING	15

**Optional Modules**

Either:

CO7210	PERSONAL AND GROUP SKILLS* (if note selected in semester 2)	15
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Or one selected from:

CO7007	COMMUNICATION AND CONCURRENCY	15
CO7098	WEB TECHNOLOGIES	15
CO7105	ADVANCED C++ PROGRAMMING	15
CO7219	INTERNET AND CLOUD COMPUTING	15
CO7215	ADVANCED WEB TECHNOLOGIES	15
CO7217	AGILE CLOUD AUTOMATION	15
MA7077	OPERATIONAL RESEARCH	15
MA7071	FINANCIAL MATHEMATICS 1	15

**Semester Total 60****JANUARY TO APRIL****Core Modules**

CO7201	INDIVIDUAL PROJECT	60
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**Total Credits 180**

\* All students are required to study CO7210, however may select to study it in either semester 1 or semester 2

**MSc in Advanced Software Engineering with Industry**

The taught modules for the programme are as for those on the MSc in Advanced Software Engineering degree programme, with the additional undertaking of:

October entry

Semester 1

CO7260	Employability – Core Skills	0
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Semester 2

	CO7261	Employability – Placement Preparations	0
January entry			
Semester 2			
	CO7260	Employability – Core Skills	0
Semester 1			
	CO7261	Employability – Placement Preparations	0

All students on the 'with Industry' variant will undertake a 3, 6, 8 or 12 month placement between completion of the taught element of the programme and commencement of the project. The placement will be assessed on a pass or fail basis according to the approved and published criteria. Students who are deemed to have passed the industrial placement and subsequently pass the individual project will be eligible to be considered for the award of an MSc in Advanced Software Engineering with Industry. Students who fail to pass the industrial placement will revert to the non- industry variant of the programme.

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**MSc in Web Applications and Services**

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**September Entry:****SEMESTER 1**

<b>Core Modules</b>		<b>Credits</b>
CO7205	ADVANCED SYSTEM DESIGN	15
CO7215	ADVANCED WEB TECHNOLOGIES	15

**Optional Modules**

30 credits selected from:

CO7210	PERSONAL AND GROUP SKILLS*	15
CO7095	SOFTWARE MEASUREMENT AND QUALITY ASSURANCE	15
CO7007	COMMUNICATION AND CONCURRENCY	15
CO7098	WEB TECHNOLOGIES	15
CO7105	ADVANCED C++ PROGRAMMING	15
CO7206	SYSTEM RE-ENGINEERING	15
CO7219	INTERNET AND CLOUD COMPUTING	15
CO7217	AGILE CLOUD AUTOMATION	15
MA7071	FINANCIAL MATHEMATICS 1	15
MA7077	OPERATIONAL RESEARCH	15

**Semester Total**      **60****SEMESTER 2**

<b>Core Modules</b>		<b>Credits</b>
CO7214	SERVICE ORIENTED ARCHITECTURES	15
CO7216	SEMANTIC WEB	15

**Optional Modules**

30 credits selected from:

CO7210	PERSONAL AND GROUP SKILLS* (if not selected in semester 1)	15
CO7002	ANALYSIS AND THE DESIGN OF ALGORITHMS	15
CO7096	COMPRESSION METHODS FOR MULTIMEDIA	15
CO7090	DISTRIBUTED SYSTEMS AND APPLICATIONS	15
CO7099	CRYPTOGRAPHY AND INTERNET SECURITY	15
CO7200	ALGORITHMS FOR BIOINFORMATICS	15
CO7207	GENERATIVE DEVELOPMENT	15
CO7211	DISCRETE EVENT SYSTEMS	15
CO7212	GAME THEORY IN COMPUTER SCIENCE	15
CO7218	FINANCIAL SERVICES INFORMATION SYSTEMS	15

**Semester Total**      **60****SUMMER**

<b>Core Modules</b>		<b>Credits</b>
CO7201	INDIVIDUAL PROJECT	60

**Total Credits**      **180**

\* All students are required to study CO7210, however may select to study it in either semester 1 or semester 2

**January Entry:****SEMESTER 2**

<b>Core Modules</b>		<b>Credits</b>
CO7214	SERVICE ORIENTED ARCHITECTURES	15
CO7216	SEMANTIC WEB	15
<b>Optional Modules</b>		
30 credits selected from:		
CO7210	PERSONAL AND GROUP SKILLS*	15
CO7002	ANALYSIS AND THE DESIGN OF ALGORITHMS	15
CO7096	COMPRESSION METHODS FOR MULTIMEDIA	15
CO7090	DISTRIBUTED SYSTEMS AND APPLICATIONS	15
CO7099	CRYPTOGRAPHY AND INTERNET SECURITY	15
CO7200	ALGORITHMS FOR BIOINFORMATICS	15
CO7207	GENERATIVE DEVELOPMENT	15
CO7211	DISCRETE EVENT SYSTEMS	15
CO7212	GAME THEORY IN COMPUTER SCIENCE	15
CO7218	FINANCIAL SERVICES INFORMATION SYSTEMS	15
<b>Semester Total</b>		<b>60</b>

**SEMESTER 1**

<b>Core Modules</b>		<b>Credits</b>
CO7205	ADVANCED SYSTEM DESIGN	15
CO7215	ADVANCED WEB TECHNOLOGIES	15
<b>Optional Modules</b>		
30 credits selected from:		
CO7210	PERSONAL AND GROUP SKILLS* (if not selected in semester 2)	15
CO7095	SOFTWARE MEASUREMENT AND QUALITY ASSURANCE	15
CO7007	COMMUNICATION AND CONCURRENCY	15
CO7098	WEB TECHNOLOGIES	15
CO7105	ADVANCED C++ PROGRAMMING	15
CO7206	SYSTEM RE-ENGINEERING	15
CO7219	INTERNET AND CLOUD COMPUTING	15
CO7217	AGILE CLOUD AUTOMATION	15
MA7071	FINANCIAL MATHEMATICS 1	15
MA7077	OPERATIONAL RESEARCH	15
<b>Semester Total</b>		<b>60</b>

**JANUARY TO APRIL**

<b>Core Modules</b>		<b>Credits</b>
CO7201	INDIVIDUAL PROJECT	60
<b>Total Credits</b>		<b>180</b>

\* All students are required to study CO7210, however may select to study it in either semester 1 or semester 2

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**MSc in Web Applications and Services with Industry**


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The taught modules for the programme are as for those on the MSc in Web Applications and Services degree programme, with the additional undertaking of:

October entry

Semester 1

CO7260	Employability – Core Skills	0
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Semester 2

CO7261	Employability – Placement Preparations	0
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January entry

Semester 2

CO7260	Employability – Core Skills	0
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Semester 1

CO7261	Employability – Placement Preparations	0
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All students on the 'with Industry' variant will undertake a 3, 6, 8 or 12 month placement between completion of the taught element of the programme and commencement of the project. The placement will be assessed on a pass or fail basis according to the approved and published criteria. Students who are deemed to have passed the industrial placement and subsequently pass the individual project will be eligible to be considered for the award of an MSc in Web Applications and Services with Industry. Students who fail to pass the industrial placement will revert to the non-industry variant of the programme.

**September Entry:**
**SEMESTER 1**

<b>Optional Modules</b>		<b>Credits</b>
60 credits selected from:		
CO7210	PERSONAL AND GROUP SKILLS*	15
CO7095	SOFTWARE MEASUREMENT AND QUALITY ASSURANCE	15
CO7007	COMMUNICATION AND CONCURRENCY	15
CO7098	WEB TECHNOLOGIES	15
CO7105	ADVANCED C++ PROGRAMMING	15
CO7205	ADVANCED SYSTEM DESIGN	15
CO7206	SYSTEM RE-ENGINEERING	15
CO7219	INTERNET AND CLOUD COMPUTING	15
CO7215	ADVANCED WEB TECHNOLOGIES	15
CO7217	AGILE CLOUD AUTOMATION	15
MA7071	FINANCIAL MATHEMATICS 1	15
MA7077	OPERATIONAL RESEARCH	15
<b>Semester Total</b>		<b>60</b>

**SEMESTER 2**

<b>Optional Modules</b>		<b>Credits</b>
60 credits selected from:		
CO7210	PERSONAL AND GROUP SKILLS* (if not selected in semester 1)	15
CO7002	ANALYSIS AND THE DESIGN OF ALGORITHMS	15
CO7096	COMPRESSION METHODS FOR MULTIMEDIA	15
CO7090	DISTRIBUTED SYSTEMS AND APPLICATIONS	15
CO7099	CRYPTOGRAPHY AND INTERNET SECURITY	15
CO7200	ALGORITHMS FOR BIOINFORMATICS	15
CO7207	GENERATIVE DEVELOPMENT	15
CO7211	DISCRETE EVENT SYSTEMS	15
CO7212	GAME THEORY IN COMPUTER SCIENCE	15
CO7214	SERVICE ORIENTED ARCHITECTURES	15
CO7216	SEMANTIC WEB	15
CO7218	FINANCIAL SERVICES INFORMATION SYSTEMS	15
<b>Semester Total</b>		<b>60</b>

**SUMMER**

<b>Core Modules</b>		<b>Credits</b>
CO7201	INDIVIDUAL PROJECT	60
<b>Total Credits</b>		<b>180</b>

\* All students are required to study CO7210, however may select to study it in either semester 1 or semester 2

**January Entry:****SEMESTER 2****Optional Modules** **Credits****Optional Modules** **Credits**

60 credits selected from:

CO7210	PERSONAL AND GROUP SKILLS*	15
CO7002	ANALYSIS AND THE DESIGN OF ALGORITHMS	15
CO7096	COMPRESSION METHODS FOR MULTIMEDIA	15
CO7090	DISTRIBUTED SYSTEMS AND APPLICATIONS	15
CO7099	CRYPTOGRAPHY AND INTERNET SECURITY	15
CO7200	ALGORITHMS FOR BIOINFORMATICS	15
CO7207	GENERATIVE DEVELOPMENT	15
CO7211	DISCRETE EVENT SYSTEMS	15
CO7212	GAME THEORY IN COMPUTER SCIENCE	15
CO7214	SERVICE ORIENTED ARCHITECTURES	15
CO7216	SEMANTIC WEB	15
CO7218	FINANCIAL SERVICES INFORMATION SYSTEMS	15

**Semester Total** **60****SEMESTER 1****Optional Modules** **Credits**

60 credits selected from:

CO7210	PERSONAL AND GROUP SKILLS* (if not selected in semester 2)	15
CO7095	SOFTWARE MEASUREMENT AND QUALITY ASSURANCE	15
CO7007	COMMUNICATION AND CONCURRENCY	15
CO7098	WEB TECHNOLOGIES	15
CO7105	ADVANCED C++ PROGRAMMING	15
CO7205	ADVANCED SYSTEM DESIGN	15
CO7206	SYSTEM RE-ENGINEERING	15
CO7219	INTERNET AND CLOUD COMPUTING	15
CO7215	ADVANCED WEB TECHNOLOGIES	15
CO7217	AGILE CLOUD AUTOMATION	15
MA7071	FINANCIAL MATHEMATICS 1	15
MA7077	OPERATIONAL RESEARCH	15

**Semester Total** **60****JANUARY TO APRIL****Core Modules** **Credits**

CO7201	INDIVIDUAL PROJECT	60
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**Total Credits** **180**

\* All students are required to study CO7210, however may select to study it in either semester 1 or semester 2

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**MSc in Advanced Computer Science with Industry**

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The taught modules for the programme are as for those on the MSc in Advanced Computer Science degree programme, with the additional undertaking of:

October entry

Semester 1

CO7260	Employability – Core Skills	0
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Semester 2

CO7261	Employability – Placement Preparations	0
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January entry

Semester 2			
CO7260	Employability – Core Skills		0
Semester 1			
CO7261	Employability – Placement Preparations		0

All students on the 'with Industry' variant will undertake a 3, 6,8 or 12 month placement between completion of the taught element of the programme and commencement of the project. The placement will be assessed on a pass or fail basis according to the approved and published criteria. Students who are deemed to have passed the industrial placement and subsequently pass the individual project will be eligible to be considered for the award of an MSc in Advanced Computer Science with Industry. Students who fail to pass the industrial placement will revert to the non-industry variant of the programme.

### **Appendix 2: Module Specifications**

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