

## Programme Specification

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### MEng Computer Science (2018-19)

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided.

Awarding Institution	University of Southampton
Teaching Institution	University of Southampton
Mode of Study	Full-time
Duration in years	4
Accreditation details	British Computer Society (BCS) Institution of Engineering and Technology (IET)
Final award	Master of Engineering (MEng)
Name of Award	Computer Science Computer Science with Artificial Intelligence Computer Science with Cyber Security Computer Science with Distributed Systems & Networks Computer Science with Image and Multimedia Systems Computer Science with Mobile and Secure Systems
Interim Exit awards	Bachelor of Science with Honours (BSc (Hons)) Bachelor of Science (Ordinary) Certificate of Higher Education (CertHE) Diploma of Higher Education (DipHE)
FHEQ level of final award	Level 7
UCAS code	G401 – Computer Science G4GR – Computer Science with Artificial Intelligence I110 – Computer Science with Cyber Security G4G5 – Computer Science with Distributed Systems and Networks G450 – Computer Science with Image and Multimedia Systems G421 – Computer Science with Mobile and Secure Systems
Programme Code	4443 – Computer Science 4444 – Computer Science with Artificial Intelligence 7006 – Computer Science with Cyber Security 4445 – Computer Science with Distributed Systems & Networks 4446 – Computer Science with Image and Multimedia Systems 4447 – Computer Science with Mobile and Secure Systems
QAA Subject Benchmark or other external reference	Computing 2007
Programme Lead	Nicholas Gibbins (nmg)
Pathway Lead	

### Programme Overview

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#### Brief outline of the programme

Computer Science and Software Engineering drive the fundamental technologies of today's connected world. Every area of our lives, from medicine and healthcare to industrial applications, global trade, transport, communications, entertainment and security, is dependent on computing technology. As a result, computer science is now one of the fastest growing job fields in the world and skilled computer scientists are very much

in demand.

The Computer Science and Software Engineering programme at the University of Southampton is a world-leading research-led undergraduate programme that aims to give students a robust, in-depth grounding in the discipline,

while offering a broad range of optional modules that derive from the research carried out by staff in ECS (for example, the Cyber Security themed degree draws on expertise from the EPSRC/GCHQ-awarded Academic Centre of Excellence in Cyber Security Research). The programme is designed to give you experience of core technologies and techniques, while making it possible for you to work in depth and specialise in what really interests you by focussing your studies in one of six specialist areas (Software Engineering, Artificial Intelligence, Distributed Systems and Networks, Image and Multimedia Systems, Mobile and Secure Systems, and Cyber Security) through our themed degrees. Our project work will enable you to acquire valuable skills in teamwork, project planning, time management and presentation, applying your learning to design and build problems, and working to a brief, and we also offer the opportunity to spend a year in industry as part of our “with Industrial Studies” variant degrees. All of these experiences will stand you in good stead as you move into your career. Our outstanding lab facilities and research-led teaching ensure that, at the end of your programme, your skills will be highly regarded by leading employers.

Your contact hours will vary depending on your module/option choices. Full information about contact hours is provided in individual module profiles.

### **Learning and teaching**

A range of learning and teaching methods are used on this programme, including:

- Staff-led lectures, demonstrations, laboratories and seminars
- Directed reading
- Student-led seminars and presentations
- Specification, design, analysis, implementation and verification exercises
- Revision for written examinations
- Staff and post-graduate supervision of your research dissertation
- Industrial placements

### **Assessment**

A range of assessment methods are used on this programme to enable students to demonstrate their achievement of the intended learning outcomes, including:

- Written examinations
- In-class tests
- Design exercises
- Programming exercises
- Oral presentations
- Written assessments, including technical reports, literature searches and surveys
- Assessed laboratories and logbook checks
- Group work exercises, presentations and reports

## **Special Features of the programme**

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N/A

**Please note:** As a research-led University, we undertake a continuous review of our programmes to ensure quality enhancement and to manage our resources. As a result, this programme may be revised during a student's period of registration; however, any revision will be balanced against the requirement that the student should receive the educational service expected. Please read our [Disclaimer](#) to see why, when and how changes may be made to a student's programme.

Programmes and major changes to programmes are approved through the University's [programme validation process](#) which is described in the University's [Quality handbook](#).

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## Educational Aims of the Programme

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The aims of this programme are to:

- Provide you with a solid foundation and to develop the skills needed for a wide range of professional engineering careers as a high quality practitioner and leader in business, technology, research and development
- Provide a balance of theoretical, design and practical subjects which allows you to exploit your individual talents
- Provide a coherent selection of specialist subjects which allows you to focus your studies in a themed area within computer science and software engineering
- Have a flexible structure which is relevant and attractive not only to you, but also to staff, and industry and which is responsive to advances in technology and the needs of the community
- Be at the leading edge of scholarship in computer science and software engineering
- Maximise the benefit of an environment in which staff are carrying out internationally respected research
- Provide an environment which contributes towards your personal and professional development and acts as a foundation for a wide range of subsequent study and lifelong learning
- Provide a learning environment with sufficient laboratories, appropriate up-to-date software and hardware, and a first class web-site, motivating you towards the practice of engineering
- Provide a supportive pastoral environment with opportunities for you to participate in social and recreational activities.

## Programme Learning Outcomes

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### Knowledge and Understanding

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On successful completion of this programme you will have knowledge and understanding of:

- A1. *(For Artificial Intelligence, Cyber Security, Distributed Systems and Networks, Image and Multimedia Systems, Mobile and Secure Systems only)* The following topics, which are defined in the QAA Computing Benchmark:
- Architecture, Artificial Intelligence, Comparative Programming Languages, Computer Communications, Compilers and Syntax-Directed Tools, Computer Networks, Computer Vision and Image Processing, Concurrency and Parallelism, Databases, Data Structures and Algorithms, Distributed Computing Systems, Document Processing, e-Business, Graphics and Sound, Human-Computer Interaction, Information Retrieval, Information Systems, Intelligent Information Systems Technologies, Management Issues, Middleware, Multimedia, Operating Systems, Professionalism, Programming Fundamentals, Security and Privacy, Simulation and Modelling, Software Engineering, Systems Analysis and Design, Theoretical Computing, Web-based Computing
- A2. *(For Artificial Intelligence only)* The state of the art in artificial intelligence research, and the application of AI techniques to a wide range of problems.
- A3. *(For Distributed Systems and Networks only)* The state of the art in distributed or networked systems, the issues that arise in such systems, and the approaches that may be applied to mitigate those issues.
- A4. *(For Image and Multimedia Systems only)* The state of the art in multimedia research, and the application of techniques for creating and processing multimedia content.
- A5. *(For Mobile and Secure Systems only)* The state of the art in mobile and secure computer systems, the issues that arise in such systems, and the approaches that may be applied to mitigate those issues.
- A6. *(For Cyber Security only)* The state of the art in cyber security, including the concepts, principles, technologies and practices for addressing current and emerging cyber security threats and challenges.

### Teaching and Learning Methods

The topics listed in skill A1 are taught mainly through lectures and directed reading. Learning is reinforced through tutorials (in Parts I and II – the first two years of study), the supervision of individual and group projects, and other coursework assignments.

Skills A2-A7 are taught through lectures and directed reading that form part of specialist modules, and through the individual project in Part III.

Skill A8 is covered in the Year in Industry between Parts III and IV.

### **Assessment Methods**

Knowledge and understanding of the topics listed in skill A1 is assessed mainly through written examinations, with some in-class tests, coursework and project work contributing to the assessment of these areas.

Skills A2-A7 are assessed through written examinations, in-class tests and coursework, and through the individual project in Part III.

Skill A8 is assessed by written reports and oral examination.

### **Subject Specific Intellectual and Research Skills**

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On successful completion of this programme you will be able to:

- B1. Elicit, record, and analyse requirements arising from specific problems with given practical
- B2. Apply appropriate knowledge, theory, tools, methods and techniques to plan, specify, design, model, implement, test, and document computer-based solutions both individually and in teams
- B3. Describe the context and processes involved in the effective deployment of computer-based solutions, including the use of quality systems and engineering management practices
- B4. Evaluate computer-based solutions, both existing and hypothetical, in terms of general quality attributes and also possible trade-offs presented within a given problem
- B5. Critically evaluate the impact of current and emerging methods and technologies
- B6. Recognise the professional, moral and ethical issues involved in the exploitation of computer technology and be guided by the adoption of appropriate professional, ethical and legal practices
- B7. Explain the financial, social and environmental factors of significance to engineering, and the broader obligations of engineers to society
- B8. Recognise any risks or safety aspects that may be involved in the operation of computing equipment within a given context
- B9. Explain clearly the techniques that are applicable to research or advanced scholarship in the discipline, and critically evaluate this research and scholarship

### **Teaching and Learning Methods**

Skills B1-B4 are the subject of modules in each Part, taught mainly through lectures and tutorials. Practical software development skills are also taught in computer laboratories. These outcomes are further developed through coursework and project work ranging from programming exercises in Part I, to major individual (Part III) and group (Part IV) design projects.

Skills B5 and B9 are taught through the demonstration and use of up-to-date methods and technologies, Guest Lecturers from industry, and, for MEng students, industrial placements, and specialist seminars, including directed reading of research materials.

Skills B6-B8 are covered in lectures and tutorials in the first part and further developed through guest

lectures and directed reading, particularly in Parts III and IV.

### **Assessment Methods**

Skills B1-B4 are assessed through programming exercises, design exercises, design projects, logbook checks, oral presentations, and technical design reports. Skills B5 and B9 are assessed through technical reports and oral presentations. Skills B6-B8 are assessed through technical reports and logbook checks.

### **Transferable and Generic Skills**

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On successful completion of this programme you will be able to:

- C1. Manage your learning and development including time management and organisational skills
- C2. Solve problems of a non-routine nature in creative and innovative ways
- C3. Work as a member of a team, recognising the different roles within a team, different ways of organising teams, and the requirements and responsibilities of leadership
- C4. Present clearly and succinctly to a range of audiences (orally, electronically and in writing) rational and reasoned arguments that address a given information handling problem or opportunity, using either current or emerging technologies
- C5. Demonstrate numeracy and use appropriate mathematics in communicating results, concepts and ideas, and cases with a quantitative dimension; use mathematics as a tool to solve complex problems
- C6. Operate computing and other IT equipment effectively, taking into account its logical and physical properties
- C7. Retrieve information effectively, using, for example, browsers, search engines and catalogues
- C8. Explain the need for continuing professional development in recognition of lifelong learning
- C9. Explain how established techniques of research and enquiry are used to create and interpret subject knowledge

### **Teaching and Learning Methods**

Skills C1-C3 are covered in lectures in Part I, but are mainly developed through the significant practical problem-solving elements of the programme in later Parts, which contribute 50% or more to your final degree classification. Adherence to deadlines is encouraged through late submission penalties.

Skills C4-C7 are covered in lectures in Part I, and written guidelines are provided in support of specific assessed coursework and project reports. Skill C5 is also developed through in-class tests.

Skill C8 is covered in lectures in Part I, and is reinforced through the focus on current and emerging technologies, particularly in Parts III and IV.

Skill C9 is covered in lectures and seminars in Part IV.

Skill C10 is covered by the Year in Industry between Parts III and IV.

### **Assessment Methods**

Skills C1, C2, and C6 are assessed implicitly as part of all our coursework and project assessments.

Skill C3 is assessed through the use of group projects in Parts II and IV, in which students are asked to rate their own and other team member's contributions; student marks for group work therefore contain both a component based on the performance of the group as a whole, and a component based on each group's collective reflection on individual contributions.

Skills C4, C5 and C7-C10 are assessed through technical reports and presentations. Skill C8 is not

formally assessed.

## Programme Structure

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The programme structure table is below:

Information about pre and co-requisites is included in individual module profiles.

### Artificial Intelligence Pathway

#### Part I

##### Typical course content

The degrees offered within the Computer Science programme is based around a common core that spans all four years of the programme. In the first two years ('Parts') of the programme, students take compulsory modules that introduce them to the basic theory underpinning computer science, the ethical and legal framework in which computer scientists and software engineers work, the practicalities of working with computers, and key techniques and application areas. In Parts III and IV, the core topics focus on professional practice, with major individual and group projects, and taught modules covering industrial practice and engineering management. There is also a range of optional modules offered in Parts III and IV; many of these options are in the six specialist areas of Artificial Intelligence, Distributed Systems and Networks, Image and Multimedia Systems, Mobile and Secure Systems, Software Engineering, and Cyber Security.

If you successfully complete three full parts of study, you may graduate with an honours degree: BSc (hons) or BEng (hons). If you successfully complete four full parts of study, you may graduate with a MEng degree. If you obtain at least 60 ECTS credits in one of the five specialist areas across all four Parts (25% of your overall credits), you qualify for the award of MEng Computer Science with X, or MEng Software Engineering (a "themed degree"). Students may transfer between themed degree programmes (and from a themed programme to MEng Computer Science) providing that they have met the relevant requirements for specialist modules.

Students intending to graduate with MEng degrees are strongly recommended to spend 20 weeks in industry, usually as two 10-week summer placements. Alternatively, if you complete a year in industry, as part of the "with Industrial Studies" variant, you will complete a study worth 30 ECTS credits at level 6, which will qualify you for the award of the enhanced degree. Consult the ECS Industrial Liaison Tutor for advice concerning placements.

#### Programme details

#### Available Modules

The information in this programme specification is accurate at the time of writing, but may change in minor ways from year to year due to staff availability or other factors. Some of these modules are subject to pre-requisites and exclusions that, for brevity, are not given here; this information is available in the module specifications on the ECS Website.

The module requirements for each programme are shown for each Part below; modules are either core (must be taken and passed), compulsory (must be taken), optional (may be taken) or specialist (optional but contributing to the requirements of a themed degree).

It should be noted that it may not be possible to run some optional modules if the number of students registered on the module is very small. It should also be noted that optional module choice can be restricted by the University Timetable, which varies from year to year: some optional modules may clash with other optional or compulsory modules. Please be aware that many modules are shared between different cohorts; the class size depends on cohort size, which varies from year to year.

#### Part I Core

In your first year, you will take 60 ECTS at FHEQ Level 4, 30 ECTS in each semester as shown below. Note that all Part I modules are core, and must be passed in order to progress.

#### Part I Specialist Module

MEng CS with Cyber Security: COMP1203 Computer Systems I

Code	Module Title	ECTS	Type
COMP1201	Algorithmics	7.5	Core
COMP1203	Computer Systems I	7.5	Core
COMP1204	Data Management	7.5	Core
COMP1215	Foundations of Computer Science	7.5	Core
COMP1205	Professional Development	7.5	Core
COMP1206	Programming 2	7.5	Core
COMP1202	Programming I	7.5	Core
COMP1216	Software Modelling and Design	7.5	Core

#### Part II

In your second year, you will take 60 ECTS at FHEQ Level 5, 30 ECTS in each semester. Note that certain modules are marked as specialist modules, which count towards the requirements for a themed degree (that compulsory modules are also marked as specialist reflects our view that all students should have some exposure to the breadth of specialisms on offer).

#### Part II Specialist Modules

MEng CS with AI: COMP2208 Intelligent Systems

MEng CS with DSN: COMP2207 Distributed systems and Networks

MEng CS with IMS: COMP2213 Interaction Design

MEng CS with MSS: COMP2215 Computer Systems II

MEng CS with Cyber: COMP2216 Principles of Cyber Security

#### Part II Compulsory

Code	Module Title	ECTS	Type
COMP2207	Distributed Systems and Networks	7.5	Compulsory
COMP2208	Intelligent Systems	7.5	Compulsory
COMP2213	Interaction Design	7.5	Compulsory
COMP2209	Programming III	7.5	Compulsory
COMP2212	Programming Language Concepts	7.5	Compulsory
COMP2211	Software Engineering Group Project	7.5	Compulsory
COMP2210	Theory of Computing	7.5	Compulsory

#### Part II Optional

Broadening options (LANGXXXX, UOSMXXXX, etc) may be chosen from the list of modules provided by the Curriculum Innovation Project.

Code	Module Title	ECTS	Type
COMP2214	Advanced Software Modelling and Design	7.5	Optional
COMP2215	Computer Systems II	7.5	Optional
COMP2216	Principles of Cyber Security	7.5	Optional

#### Part III

The major element of Part III is the Individual Project, which runs all year. In semester 1, students intending to graduate with a MEng degree must take COMP3219 Engineering Management and Law.

You will also take 30 ECTS of optional modules from the list below, for a total load of 30 ECTS per semester. You may select at most 15 ECTS worth of options from outside the programme.

If you wish to graduate with a themed degree (MEng Computer Science with X or MEng/BEng Software Engineering), you must take at least 15 ECTS of specialist modules, and your Individual Project must be related to your theme.

#### Part III Specialist Modules

MEng CS with AI: COMP3200; COMP3204; COMP3212; COMP3222 or COMP3223, ELEC3201.

MEng CS with DSN: COMP3200; COMP3201; COMP3207; COMP3210; COMP3215.

MEng CS with IMS: COMP3200; COMP3204; COMP3214; COMP3218.

MEng CS with MSS: COMP3200; COMP3201; COMP3207; COMP3210; COMP3215; COMP3217; ELEC3219.

MEng CS with Cyber: COMP3200; COMP3201; COMP3217.

Broadening options may be chosen from the list of modules provided by the Curriculum Innovation Project.

#### Part III Compulsory

Code	Module Title	ECTS	Type
COMP3219	Engineering Management and Law	7.5	Compulsory

#### Part III Core

Code	Module Title	ECTS	Type
COMP3200	Part III Individual Project	22.5	Core

#### Part III Optional

Broadening options (LANGXXXX, UOSMXXXX, etc) may be chosen from the list of modules provided by the Curriculum Innovation Project.

Code	Module Title	ECTS	Type
ELEC3219	Advanced Computer Architecture	7.5	Optional
COMP3210	Advanced Computer Networks	7.5	Optional
COMP3211	Advanced Databases	7.5	Optional
COMP3207	Cloud Application Development	7.5	Optional
COMP3212	Computational Biology	7.5	Optional
COMP3204	Computer Vision	7.5	Optional
COMP3201	Cyber Security	7.5	Optional
COMP3218	Game Design and Development	7.5	Optional
COMP3215	Real-Time Computing and Embedded Systems	7.5	Optional
ELEC3201	Robotic Systems	7.5	Optional
COMP3217	Security of Cyber Physical Systems	7.5	Optional
COMP3208	Social Computing Techniques	7.5	Optional
COMP3220	Web Infrastructure	7.5	Optional

#### Part III Optional Machine Learning

You may only take one Machine Learning module.

Code	Module Title	ECTS	Type
COMP3223	Foundations of Machine Learning	7.5	Optional
COMP3222	Machine Learning Technologies	7.5	Optional

#### Part IV

In Part IV, all students take ELEC6200 Group Design Project, in which they work in a team that may include students from other engineering disciplines. This project spans both semesters. The Group Design Project



taken by students on MEng Computer Science with Cyber Security would be expected to be a cyber security project with an industrial partner.

In addition to the Group Design Project, you must take a further 37.5 ECTS of options (five modules) from the list below, comprising 15 ECTS of options in the first semester and 22.5 ECTS of options in the second semester (for a total load of 30 ECTS per semester). You may select at most 15 ECTS worth of options from outside the programme.

If you wish to graduate with a themed degree (MEng Computer Science with X or MEng Software Engineering), you must take at least 15 ECTS of specialist modules. It is also possible to count a relevant COMP6228 Individual Research Project as 7.5 ECTS toward your specialist area.

If you are enrolled in MEng Computer Science with Cyber Security and you wish your degree to be certified by GCHQ, you must take at least 52.5 ECTS of specialist modules.

#### Part IV Specialist Modules

MEng CS with AI: COMP6202; COMP6203; COMP6207; COMP6208; COMP6211; COMP6212; COMP6215; COMP6216; COMP6228; COMP6237; ELEC6212; ELEC6213.

MEng CS with DSN: COMP6205; COMP6218; COMP6228; ELEC6242; ELEC6245.

MEng CS with IMS: COMP6219; COMP6228; COMP6234; ELEC6213.

MEng CS with MSS: COMP6205; COMP6214; COMP6218; COMP6228; ELEC6242; ELEC6245.

MEng CS with Cyber: COMP6211; COMP6230; COMP6236; ELEC6200; ELEC6242; CRIM6008.

Alternatively, Semester 2 of Part IV may be taken at a partner institution overseas, which has been approved by the Erasmus coordinator. In this case, the Group Report, Group Presentations and Individual Reflection parts of ELEC6200 should be submitted as usual, some at the beginning of semester II. However, the Individual Report and Poster on Business Case Study parts of ELEC6200 will be set aside. ELEC6200 will therefore count for 15 ECTS credits. The modules selected at the overseas institution must be approved by the programme leader. The module selection must include at least 30 ECTS (or equivalent) at masters level, that is relevant to the degree title. In 'with X' programmes, the requirement to take 15 ECTS credits specific to the specialisation must be met across the two semesters. The marks awarded by the overseas institution will be converted to equivalent UK marks by the Erasmus coordinator.

#### Part IV Core

Code	Module Title	ECTS	Type
ELEC6200	Group Design Project	22.5	Core

#### Part IV Optional

Code	Module Title	ECTS	Type
COMP6248	Deep Learning	7.5	Optional
COMP6247	Reinforcement and Online Learning	7.5	Optional
COMP6207	Advanced Intelligent Agents	7.5	Optional
COMP6208	Advanced Machine Learning	7.5	Optional
COMP6241	Advanced Topics in Human-Systems Interaction	7.5	Optional
COMP6209	Automated Code Generation	7.5	Optional
ELEC6212	Biologically Inspired Robotics	7.5	Optional
COMP6211	Biometrics	7.5	Optional
COMP6212	Computational Finance	7.5	Optional
ELEC6242	Cryptography	7.5	Optional
COMP6237	Data Mining	7.5	Optional
COMP6234	Data Visualisation	7.5	Optional
COMP6219	Designing Usable and Accessible Technologies	7.5	Optional
COMP6201	E-Business Strategy	7.5	Optional
COMP6202	Evolution of Complexity	7.5	Optional

WEBS6201	Foundations of Web Science	7.5	Optional
ELEC6213	Image Processing	7.5	Optional
COMP6228	Individual Research Project	7.5	Optional
COMP6203	Intelligent Agents	7.5	Optional
COMP6214	Open Data Innovation	7.5	Optional
COMP6215	Semantic Web Technologies	7.5	Optional
COMP6216	Simulation Modelling for Computer Science	7.5	Optional
COMP6204	Software Project Management and Development	7.5	Optional
COMP6217	The Science of Online Social Networks	7.5	Optional
COMP6218	Web Architecture	7.5	Optional
COMP6205	Web Development	7.5	Optional
ELEC6245	Wireless Networks	7.5	Optional

The programme structure table is below:

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## Computer Science Pathway

### Part I

#### Typical course content

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If you successfully complete three full parts of study, you may graduate with an honours degree: BSc (hons) or BEng (hons). If you successfully complete four full parts of study, you may graduate with a MEng degree. If you obtain at least 60 ECTS credits in one of the five specialist areas across all four Parts (25% of your overall credits), you qualify for the award of MEng Computer Science with X, or MEng Software Engineering (a "themed degree"). Students may transfer between themed degree programmes (and from a themed programme to MEng Computer Science) providing that they have met the relevant requirements for specialist modules.

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#### Available Modules

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#### Part I Core

In your first year, you will take 60 ECTS at FHEQ Level 4, 30 ECTS in each semester as shown below. Note that all Part I modules are core, and must be passed in order to progress.

#### Part I Specialist Module

MEng CS with Cyber Security: COMP1203 Computer Systems I

Code	Module Title	ECTS	Type
COMP1201	Algorithmics	7.5	Core
COMP1203	Computer Systems I	7.5	Core
COMP1204	Data Management	7.5	Core
COMP1215	Foundations of Computer Science	7.5	Core
COMP1205	Professional Development	7.5	Core
COMP1206	Programming 2	7.5	Core
COMP1202	Programming I	7.5	Core
COMP1216	Software Modelling and Design	7.5	Core

#### Part II

In your second year, you will take 60 ECTS at FHEQ Level 5, 30 ECTS in each semester. Note that certain modules are marked as specialist modules, which count towards the requirements for a themed degree (that compulsory modules are also marked as specialist reflects our view that all students should have some exposure to the breadth of specialisms on offer).

#### Part II Specialist Modules

MEng CS with AI: COMP2208 Intelligent Systems

MEng CS with DSN: COMP2207 Distributed systems and Networks

MEng CS with IMS: COMP2213 Interaction Design

MEng CS with MSS: COMP2215 Computer Systems II

MEng CS with Cyber: COMP2216 Principles of Cyber Security

#### Part II Compulsory

Code	Module Title	ECTS	Type
COMP2207	Distributed Systems and Networks	7.5	Compulsory
COMP2208	Intelligent Systems	7.5	Compulsory
COMP2213	Interaction Design	7.5	Compulsory
COMP2209	Programming III	7.5	Compulsory
COMP2212	Programming Language Concepts	7.5	Compulsory
COMP2211	Software Engineering Group Project	7.5	Compulsory
COMP2210	Theory of Computing	7.5	Compulsory

#### Part II Optional

Broadening options (LANGXXXX, UOSMXXXX, etc) may be chosen from the list of modules provided by the Curriculum Innovation Project.

Code	Module Title	ECTS	Type
COMP2214	Advanced Software Modelling and Design	7.5	Optional
COMP2215	Computer Systems II	7.5	Optional
COMP2216	Principles of Cyber Security	7.5	Optional

### Part III

The major element of Part III is the Individual Project, which runs all year. In semester 1, students intending to graduate with a MEng degree must take COMP3219 Engineering Management and Law.

You will also take 30 ECTS of optional modules from the list below, for a total load of 30 ECTS per semester. You may select at most 15 ECTS worth of options from outside the programme.

If you wish to graduate with a themed degree (MEng Computer Science with X or MEng/BEng Software Engineering), you must take at least 15 ECTS of specialist modules, and your Individual Project must be related to your theme.

### Part III Specialist Modules

MEng CS with AI: COMP3200; COMP3204; COMP3212; COMP3222 or COMP3223, ELEC3201.

MEng CS with DSN: COMP3200; COMP3201; COMP3207; COMP3210; COMP3215.

MEng CS with IMS: COMP3200; COMP3204; COMP3214; COMP3218.

MEng CS with MSS: COMP3200; COMP3201; COMP3207; COMP3210; COMP3215; COMP3217; ELEC3219.

MEng CS with Cyber: COMP3200; COMP3201; COMP3217.

Broadening options may be chosen from the list of modules provided by the Curriculum Innovation Project.

### Part III Compulsory

Code	Module Title	ECTS	Type
COMP3219	Engineering Management and Law	7.5	Compulsory

### Part III Core

Code	Module Title	ECTS	Type
COMP3200	Part III Individual Project	22.5	Core

### Part III Optional

Broadening options (LANGXXXX, UOSMXXXX, etc) may be chosen from the list of modules provided by the Curriculum Innovation Project.

Code	Module Title	ECTS	Type
ELEC3219	Advanced Computer Architecture	7.5	Optional
COMP3210	Advanced Computer Networks	7.5	Optional
COMP3211	Advanced Databases	7.5	Optional
COMP3207	Cloud Application Development	7.5	Optional
COMP3212	Computational Biology	7.5	Optional
COMP3204	Computer Vision	7.5	Optional
COMP3201	Cyber Security	7.5	Optional
COMP3218	Game Design and Development	7.5	Optional
COMP3215	Real-Time Computing and Embedded Systems	7.5	Optional
ELEC3201	Robotic Systems	7.5	Optional
COMP3217	Security of Cyber Physical Systems	7.5	Optional
COMP3208	Social Computing Techniques	7.5	Optional
COMP3220	Web Infrastructure	7.5	Optional

### Part III Optional Machine Learning

You may only take one Machine Learning module.

Code	Module Title	ECTS	Type
COMP3223	Foundations of Machine Learning	7.5	Optional
COMP3222	Machine Learning Technologies	7.5	Optional

### Part IV

In Part IV, all students take ELEC6200 Group Design Project, in which they work in a team that may include students from other engineering disciplines. This project spans both semesters. The Group Design Project taken by students on MEng Computer Science with Cyber Security would be expected to be a cyber security project with an industrial partner.

In addition to the Group Design Project, you must take a further 37.5 ECTS of options (five modules) from the list below, comprising 15 ECTS of options in the first semester and 22.5 ECTS of options in the second semester (for a total load of 30 ECTS per semester). You may select at most 15 ECTS worth of options from outside the programme.

If you wish to graduate with a themed degree (MEng Computer Science with X or MEng Software Engineering), you must take at least 15 ECTS of specialist modules. It is also possible to count a relevant COMP6228 Individual Research Project as 7.5 ECTS toward your specialist area.

If you are enrolled in MEng Computer Science with Cyber Security and you wish your degree to be certified by GCHQ, you must take at least 52.5 ECTS of specialist modules.

#### Part IV Specialist Modules

MEng CS with AI: COMP6202; COMP6203; COMP6207; COMP6208; COMP6211; COMP6212; COMP6215; COMP6216; COMP6228; COMP6237; ELEC6212; ELEC6213.

MEng CS with DSN: COMP6205; COMP6218; COMP6228; ELEC6242; ELEC6245.

MEng CS with IMS: COMP6219; COMP6228; COMP6234; ELEC6213.

MEng CS with MSS: COMP6205; COMP6214; COMP6218; COMP6228; ELEC6242; ELEC6245.

MEng CS with Cyber: COMP6211; COMP6230; COMP6236; ELEC6200; ELEC6242; CRIM6008.

Alternatively, Semester 2 of Part IV may be taken at a partner institution overseas, which has been approved by the Erasmus coordinator. In this case, the Group Report, Group Presentations and Individual Reflection parts of ELEC6200 should be submitted as usual, some at the beginning of semester II. However, the Individual Report and Poster on Business Case Study parts of ELEC6200 will be set aside. ELEC6200 will therefore count for 15 ECTS credits. The modules selected at the overseas institution must be approved by the programme leader. The module selection must include at least 30 ECTS (or equivalent) at masters level, that is relevant to the degree title. In 'with X' programmes, the requirement to take 15 ECTS credits specific to the specialisation must be met across the two semesters. The marks awarded by the overseas institution will be converted to equivalent UK marks by the Erasmus coordinator.

#### Part IV Core

Code	Module Title	ECTS	Type
ELEC6200	Group Design Project	22.5	Core

#### Part IV Optional

Code	Module Title	ECTS	Type
COMP6248	Deep Learning	7.5	Optional
COMP6224	Foundations of Cyber Security	7.5	Optional
COMP6247	Reinforcement and Online Learning	7.5	Optional
COMP6236	Software Security	7.5	Optional
COMP6207	Advanced Intelligent Agents	7.5	Optional
COMP6208	Advanced Machine Learning	7.5	Optional
COMP6241	Advanced Topics in Human-Systems Interaction	7.5	Optional
COMP6209	Automated Code Generation	7.5	Optional
ELEC6212	Biologically Inspired Robotics	7.5	Optional
COMP6211	Biometrics	7.5	Optional
COMP6212	Computational Finance	7.5	Optional
ELEC6242	Cryptography	7.5	Optional
COMP6237	Data Mining	7.5	Optional
COMP6234	Data Visualisation	7.5	Optional

COMP6219	Designing Usable and Accessible Technologies	7.5	Optional
COMP6201	E-Business Strategy	7.5	Optional
COMP6202	Evolution of Complexity	7.5	Optional
WEBS6201	Foundations of Web Science	7.5	Optional
ELEC6213	Image Processing	7.5	Optional
COMP6228	Individual Research Project	7.5	Optional
COMP6203	Intelligent Agents	7.5	Optional
COMP6214	Open Data Innovation	7.5	Optional
COMP6215	Semantic Web Technologies	7.5	Optional
COMP6216	Simulation Modelling for Computer Science	7.5	Optional
COMP6204	Software Project Management and Development	7.5	Optional
COMP6217	The Science of Online Social Networks	7.5	Optional
COMP6218	Web Architecture	7.5	Optional
COMP6205	Web Development	7.5	Optional
ELEC6245	Wireless Networks	7.5	Optional

The programme structure table is below:

Information about pre and co-requisites is included in individual module profiles.

## Cyber Security Pathway

### Part I

#### Typical course content

The degrees offered within the Computer Science programme is based around a common core that spans all four years of the programme. In the first two years ('Parts') of the programme, students take compulsory modules that introduce them to the basic theory underpinning computer science, the ethical and legal framework in which computer scientists and software engineers work, the practicalities of working with computers, and key techniques and application areas. In Parts III and IV, the core topics focus on professional practice, with major individual and group projects, and taught modules covering industrial practice and engineering management. There is also a range of optional modules offered in Parts III and IV; many of these options are in the six specialist areas of Artificial Intelligence, Distributed Systems and Networks, Image and Multimedia Systems, Mobile and Secure Systems, Software Engineering, and Cyber Security.

If you successfully complete three full parts of study, you may graduate with an honours degree: BSc (hons) or BEng (hons). If you successfully complete four full parts of study, you may graduate with a MEng degree. If you obtain at least 60 ECTS credits in one of the five specialist areas across all four Parts (25% of your overall credits), you qualify for the award of MEng Computer Science with X, or MEng Software Engineering (a "themed degree"). Students may transfer between themed degree programmes (and from a themed programme to MEng Computer Science) providing that they have met the relevant requirements for specialist modules.

Students intending to graduate with MEng degrees are strongly recommended to spend 20 weeks in industry, usually as two 10-week summer placements. Alternatively, if you complete a year in industry, as part of the "with Industrial Studies" variant, you will complete a study worth 30 ECTS credits at level 6, which will qualify you for the award of the enhanced degree. Consult the ECS Industrial Liaison Tutor for advice concerning placements.

#### Programme details

#### Available Modules

The information in this programme specification is accurate at the time of writing, but may change in minor ways from year to year due to staff availability or other factors. Some of these modules are subject to pre-requisites and exclusions that, for brevity, are not given here; this information is available in the module

specifications on the ECS Website.

The module requirements for each programme are shown for each Part below; modules are either core (must be taken and passed), compulsory (must be taken), optional (may be taken) or specialist (optional but contributing to the requirements of a themed degree).

It should be noted that it may not be possible to run some optional modules if the number of students registered on the module is very small. It should also be noted that optional module choice can be restricted by the University Timetable, which varies from year to year: some optional modules may clash with other optional or compulsory modules. Please be aware that many modules are shared between different cohorts; the class size depends on cohort size, which varies from year to year.

#### Part I Core

In your first year, you will take 60 ECTS at FHEQ Level 4, 30 ECTS in each semester as shown below. Note that all Part I modules are core, and must be passed in order to progress.

#### Part I Specialist Module

MEng CS with Cyber Security: COMP1203 Computer Systems I

<b>Code</b>	<b>Module Title</b>	<b>ECTS</b>	<b>Type</b>
COMP1201	Algorithmics	7.5	Core
COMP1203	Computer Systems I	7.5	Core
COMP1204	Data Management	7.5	Core
COMP1215	Foundations of Computer Science	7.5	Core
COMP1205	Professional Development	7.5	Core
COMP1206	Programming 2	7.5	Core
COMP1202	Programming I	7.5	Core
COMP1216	Software Modelling and Design	7.5	Core

#### Part II

In your second year, you will take 60 ECTS at FHEQ Level 5, 30 ECTS in each semester. Note that certain modules are marked as specialist modules, which count towards the requirements for a themed degree (that compulsory modules are also marked as specialist reflects our view that all students should have some exposure to the breadth of specialisms on offer).

#### Part II Specialist Modules

MEng CS with AI: COMP2208 Intelligent Systems

MEng CS with DSN: COMP2207 Distributed systems and Networks

MEng CS with IMS: COMP2213 Interaction Design

MEng CS with MSS: COMP2215 Computer Systems II

MEng CS with Cyber: COMP2216 Principles of Cyber Security

#### Part II Compulsory

<b>Code</b>	<b>Module Title</b>	<b>ECTS</b>	<b>Type</b>
COMP2215	Computer Systems II	7.5	Compulsory
COMP2207	Distributed Systems and Networks	7.5	Compulsory
COMP2208	Intelligent Systems	7.5	Compulsory
COMP2213	Interaction Design	7.5	Compulsory
COMP2216	Principles of Cyber Security	7.5	Compulsory
COMP2209	Programming III	7.5	Compulsory
COMP2211	Software Engineering Group Project	7.5	Compulsory
COMP2210	Theory of Computing	7.5	Compulsory

#### Part III

The major element of Part III is the Individual Project, which runs all year. In semester 1, students intending to graduate with a MEng degree must take COMP3219 Engineering Management and Law.

You will also take 30 ECTS of optional modules from the list below, for a total load of 30 ECTS per semester. You may select at most 15 ECTS worth of options from outside the programme.

If you wish to graduate with a themed degree (MEng Computer Science with X or MEng/BEng Software Engineering), you must take at least 15 ECTS of specialist modules, and your Individual Project must be related to your theme.

### Part III Specialist Modules

MEng CS with AI: COMP3200; COMP3204; COMP3212; COMP3222 or COMP3223, ELEC3201.

MEng CS with DSN: COMP3200; COMP3201; COMP3207; COMP3210; COMP3215.

MEng CS with IMS: COMP3200; COMP3204; COMP3214; COMP3218.

MEng CS with MSS: COMP3200; COMP3201; COMP3207; COMP3210; COMP3215; COMP3217; ELEC3219.

MEng CS with Cyber: COMP3200; COMP3201; COMP3217.

Broadening options may be chosen from the list of modules provided by the Curriculum Innovation Project.

### Part III Compulsory

Code	Module Title	ECTS	Type
COMP3219	Engineering Management and Law	7.5	Compulsory
COMP3217	Security of Cyber Physical Systems	7.5	Compulsory

### Part III Core

Code	Module Title	ECTS	Type
COMP3200	Part III Individual Project	22.5	Core

### Part III Optional

Broadening options (LANGXXXX, UOSMXXXX, etc) may be chosen from the list of modules provided by the Curriculum Innovation Project.

Code	Module Title	ECTS	Type
ELEC3219	Advanced Computer Architecture	7.5	Optional
COMP3210	Advanced Computer Networks	7.5	Optional
COMP3211	Advanced Databases	7.5	Optional
COMP3207	Cloud Application Development	7.5	Optional
COMP3212	Computational Biology	7.5	Optional
COMP3204	Computer Vision	7.5	Optional
COMP3201	Cyber Security	7.5	Optional
COMP3218	Game Design and Development	7.5	Optional
COMP3215	Real-Time Computing and Embedded Systems	7.5	Optional
ELEC3201	Robotic Systems	7.5	Optional
COMP3208	Social Computing Techniques	7.5	Optional

### Part III Optional Machine Learning

You may only take one Machine Learning module.

Code	Module Title	ECTS	Type
COMP3223	Foundations of Machine Learning	7.5	Optional
COMP3222	Machine Learning Technologies	7.5	Optional

### Part IV

In Part IV, all students take ELEC6200 Group Design Project, in which they work in a team that may include students from other engineering disciplines. This project spans both semesters. The Group Design Project taken by students on MEng Computer Science with Cyber Security would be expected to be a cyber security project with an industrial partner.

In addition to the Group Design Project, you must take a further 37.5 ECTS of options (five modules) from the



list below, comprising 15 ECTS of options in the first semester and 22.5 ECTS of options in the second semester (for a total load of 30 ECTS per semester). You may select at most 15 ECTS worth of options from outside the programme.

If you wish to graduate with a themed degree (MEng Computer Science with X or MEng Software Engineering), you must take at least 15 ECTS of specialist modules. It is also possible to count a relevant COMP6228 Individual Research Project as 7.5 ECTS toward your specialist area.

If you are enrolled in MEng Computer Science with Cyber Security and you wish your degree to be certified by GCHQ, you must take at least 52.5 ECTS of specialist modules.

#### Part IV Specialist Modules

MEng CS with AI: COMP6202; COMP6203; COMP6207; COMP6208; COMP6211; COMP6212; COMP6215; COMP6216; COMP6228; COMP6237; ELEC6212; ELEC6213.

MEng CS with DSN: COMP6205; COMP6218; COMP6228; ELEC6242; ELEC6245.

MEng CS with IMS: COMP6219; COMP6228; COMP6234; ELEC6213.

MEng CS with MSS: COMP6205; COMP6214; COMP6218; COMP6228; ELEC6242; ELEC6245.

MEng CS with Cyber: COMP6211; COMP6230; COMP6236; ELEC6200; ELEC6242; CRIM6008.

Alternatively, Semester 2 of Part IV may be taken at a partner institution overseas, which has been approved by the Erasmus coordinator. In this case, the Group Report, Group Presentations and Individual Reflection parts of ELEC6200 should be submitted as usual, some at the beginning of semester II. However, the Individual Report and Poster on Business Case Study parts of ELEC6200 will be set aside. ELEC6200 will therefore count for 15 ECTS credits. The modules selected at the overseas institution must be approved by the programme leader. The module selection must include at least 30 ECTS (or equivalent) at masters level, that is relevant to the degree title. In 'with X' programmes, the requirement to take 15 ECTS credits specific to the specialisation must be met across the two semesters. The marks awarded by the overseas institution will be converted to equivalent UK marks by the Erasmus coordinator.

#### Part IV Compulsory

Code	Module Title	ECTS	Type
COMP6230	Network and Web Based Security	7.5	Compulsory
COMP6236	Software Security	7.5	Compulsory

#### Part IV Core

Code	Module Title	ECTS	Type
ELEC6200	Group Design Project	22.5	Core

#### Part IV Optional

Code	Module Title	ECTS	Type
COMP6248	Deep Learning	7.5	Optional
COMP6247	Reinforcement and Online Learning	7.5	Optional
COMP6207	Advanced Intelligent Agents	7.5	Optional
COMP6208	Advanced Machine Learning	7.5	Optional
COMP6209	Automated Code Generation	7.5	Optional
ELEC6212	Biologically Inspired Robotics	7.5	Optional
COMP6211	Biometrics	7.5	Optional
COMP6212	Computational Finance	7.5	Optional
ELEC6242	Cryptography	7.5	Optional
CRIM6008	Cyber Crime, Insecurity and the Dark Web (Cyber Security)	7.5	Optional
COMP6237	Data Mining	7.5	Optional
COMP6234	Data Visualisation	7.5	Optional
COMP6219	Designing Usable and Accessible Technologies	7.5	Optional

COMP6201	E-Business Strategy	7.5	Optional
COMP6202	Evolution of Complexity	7.5	Optional
WEBS6201	Foundations of Web Science	7.5	Optional
ELEC6213	Image Processing	7.5	Optional
COMP6228	Individual Research Project	7.5	Optional
COMP6203	Intelligent Agents	7.5	Optional
COMP6214	Open Data Innovation	7.5	Optional
COMP6215	Semantic Web Technologies	7.5	Optional
COMP6216	Simulation Modelling for Computer Science	7.5	Optional
COMP6204	Software Project Management and Development	7.5	Optional
COMP6217	The Science of Online Social Networks	7.5	Optional
COMP6218	Web Architecture	7.5	Optional
COMP6205	Web Development	7.5	Optional
ELEC6245	Wireless Networks	7.5	Optional

The programme structure table is below:

Information about pre and co-requisites is included in individual module profiles.

## Distributed Systems and Networks Pathway

### Part I

#### Typical course content

The degrees offered within the Computer Science programme is based around a common core that spans all four years of the programme. In the first two years ('Parts') of the programme, students take compulsory modules that introduce them to the basic theory underpinning computer science, the ethical and legal framework in which computer scientists and software engineers work, the practicalities of working with computers, and key techniques and application areas. In Parts III and IV, the core topics focus on professional practice, with major individual and group projects, and taught modules covering industrial practice and engineering management. There is also a range of optional modules offered in Parts III and IV; many of these options are in the six specialist areas of Artificial Intelligence, Distributed Systems and Networks, Image and Multimedia Systems, Mobile and Secure Systems, Software Engineering, and Cyber Security.

If you successfully complete three full parts of study, you may graduate with an honours degree: BSc (hons) or BEng (hons). If you successfully complete four full parts of study, you may graduate with a MEng degree. If you obtain at least 60 ECTS credits in one of the five specialist areas across all four Parts (25% of your overall credits), you qualify for the award of MEng Computer Science with X, or MEng Software Engineering (a "themed degree"). Students may transfer between themed degree programmes (and from a themed programme to MEng Computer Science) providing that they have met the relevant requirements for specialist modules.

Students intending to graduate with MEng degrees are strongly recommended to spend 20 weeks in industry, usually as two 10-week summer placements. Alternatively, if you complete a year in industry, as part of the "with Industrial Studies" variant, you will complete a study worth 30 ECTS credits at level 6, which will qualify you for the award of the enhanced degree. Consult the ECS Industrial Liaison Tutor for advice concerning placements.

#### Programme details

#### Available Modules

The information in this programme specification is accurate at the time of writing, but may change in minor ways from year to year due to staff availability or other factors. Some of these modules are subject to pre-requisites and exclusions that, for brevity, are not given here; this information is available in the module specifications on the ECS Website.

The module requirements for each programme are shown for each Part below; modules are either core (must be taken and passed), compulsory (must be taken), optional (may be taken) or specialist (optional but contributing to the requirements of a themed degree).

It should be noted that it may not be possible to run some optional modules if the number of students registered on the module is very small. It should also be noted that optional module choice can be restricted by the University Timetable, which varies from year to year: some optional modules may clash with other optional or compulsory modules. Please be aware that many modules are shared between different cohorts; the class size depends on cohort size, which varies from year to year.

#### Part I Core

In your first year, you will take 60 ECTS at FHEQ Level 4, 30 ECTS in each semester as shown below. Note that all Part I modules are core, and must be passed in order to progress.

#### Part I Specialist Module

MEng CS with Cyber Security: COMP1203 Computer Systems I

Code	Module Title	ECTS	Type
COMP1201	Algorithmics	7.5	Core
COMP1203	Computer Systems I	7.5	Core
COMP1204	Data Management	7.5	Core
COMP1215	Foundations of Computer Science	7.5	Core
COMP1205	Professional Development	7.5	Core
COMP1206	Programming 2	7.5	Core
COMP1202	Programming I	7.5	Core
COMP1216	Software Modelling and Design	7.5	Core

#### Part II

In your second year, you will take 60 ECTS at FHEQ Level 5, 30 ECTS in each semester. Note that certain modules are marked as specialist modules, which count towards the requirements for a themed degree (that compulsory modules are also marked as specialist reflects our view that all students should have some exposure to the breadth of specialisms on offer).

#### Part II Specialist Modules

MEng CS with AI: COMP2208 Intelligent Systems

MEng CS with DSN: COMP2207 Distributed systems and Networks

MEng CS with IMS: COMP2213 Interaction Design

MEng CS with MSS: COMP2215 Computer Systems II

MEng CS with Cyber: COMP2216 Principles of Cyber Security

#### Part II Compulsory

Code	Module Title	ECTS	Type
COMP2207	Distributed Systems and Networks	7.5	Compulsory
COMP2208	Intelligent Systems	7.5	Compulsory
COMP2213	Interaction Design	7.5	Compulsory
COMP2209	Programming III	7.5	Compulsory
COMP2212	Programming Language Concepts	7.5	Compulsory
COMP2211	Software Engineering Group Project	7.5	Compulsory
COMP2210	Theory of Computing	7.5	Compulsory

#### Part II Optional

Broadening options (LANGXXXX, UOSMXXXX, etc) may be chosen from the list of modules provided by the Curriculum Innovation Project.

Code	Module Title	ECTS	Type
COMP2214	Advanced Software Modelling and Design	7.5	Optional

COMP2215	Computer Systems II	7.5	Optional
COMP2216	Principles of Cyber Security	7.5	Optional

### Part III

The major element of Part III is the Individual Project, which runs all year. In semester 1, students intending to graduate with a MEng degree must take COMP3219 Engineering Management and Law.

You will also take 30 ECTS of optional modules from the list below, for a total load of 30 ECTS per semester. You may select at most 15 ECTS worth of options from outside the programme.

If you wish to graduate with a themed degree (MEng Computer Science with X or MEng/BEng Software Engineering), you must take at least 15 ECTS of specialist modules, and your Individual Project must be related to your theme.

### Part III Specialist Modules

MEng CS with AI: COMP3200; COMP3204; COMP3212; COMP3222 or COMP3223, ELEC3201.

MEng CS with DSN: COMP3200; COMP3201; COMP3207; COMP3210; COMP3215.

MEng CS with IMS: COMP3200; COMP3204; COMP3214; COMP3218.

MEng CS with MSS: COMP3200; COMP3201; COMP3207; COMP3210; COMP3215; COMP3217; ELEC3219.

MEng CS with Cyber: COMP3200; COMP3201; COMP3217.

Broadening options may be chosen from the list of modules provided by the Curriculum Innovation Project.

### Part III Compulsory

Code	Module Title	ECTS	Type
COMP3219	Engineering Management and Law	7.5	Compulsory

### Part III Core

Code	Module Title	ECTS	Type
COMP3200	Part III Individual Project	22.5	Core

### Part III Optional

Broadening options (LANGXXXX, UOSMXXXX, etc) may be chosen from the list of modules provided by the Curriculum Innovation Project.

Code	Module Title	ECTS	Type
ELEC3219	Advanced Computer Architecture	7.5	Optional
COMP3210	Advanced Computer Networks	7.5	Optional
COMP3211	Advanced Databases	7.5	Optional
COMP3207	Cloud Application Development	7.5	Optional
COMP3212	Computational Biology	7.5	Optional
COMP3204	Computer Vision	7.5	Optional
COMP3201	Cyber Security	7.5	Optional
COMP3218	Game Design and Development	7.5	Optional
COMP3215	Real-Time Computing and Embedded Systems	7.5	Optional
ELEC3201	Robotic Systems	7.5	Optional
COMP3217	Security of Cyber Physical Systems	7.5	Optional
COMP3208	Social Computing Techniques	7.5	Optional
COMP3220	Web Infrastructure	7.5	Optional

### Part III Optional Machine Learning

You may only take one Machine Learning module.

Code	Module Title	ECTS	Type
COMP3223	Foundations of Machine Learning	7.5	Optional
COMP3222	Machine Learning Technologies	7.5	Optional

#### Part IV

In Part IV, all students take ELEC6200 Group Design Project, in which they work in a team that may include students from other engineering disciplines. This project spans both semesters. The Group Design Project taken by students on MEng Computer Science with Cyber Security would be expected to be a cyber security project with an industrial partner.

In addition to the Group Design Project, you must take a further 37.5 ECTS of options (five modules) from the list below, comprising 15 ECTS of options in the first semester and 22.5 ECTS of options in the second semester (for a total load of 30 ECTS per semester). You may select at most 15 ECTS worth of options from outside the programme.

If you wish to graduate with a themed degree (MEng Computer Science with X or MEng Software Engineering), you must take at least 15 ECTS of specialist modules. It is also possible to count a relevant COMP6228 Individual Research Project as 7.5 ECTS toward your specialist area.

If you are enrolled in MEng Computer Science with Cyber Security and you wish your degree to be certified by GCHQ, you must take at least 52.5 ECTS of specialist modules.

#### Part IV Specialist Modules

MEng CS with AI: COMP6202; COMP6203; COMP6207; COMP6208; COMP6211; COMP6212; COMP6215; COMP6216; COMP6228; COMP6237; ELEC6212; ELEC6213.

MEng CS with DSN: COMP6205; COMP6218; COMP6228; ELEC6242; ELEC6245.

MEng CS with IMS: COMP6219; COMP6228; COMP6234; ELEC6213.

MEng CS with MSS: COMP6205; COMP6214; COMP6218; COMP6228; ELEC6242; ELEC6245.

MEng CS with Cyber: COMP6211; COMP6230; COMP6236; ELEC6200; ELEC6242; CRIM6008.

Alternatively, Semester 2 of Part IV may be taken at a partner institution overseas, which has been approved by the Erasmus coordinator. In this case, the Group Report, Group Presentations and Individual Reflection parts of ELEC6200 should be submitted as usual, some at the beginning of semester II. However, the Individual Report and Poster on Business Case Study parts of ELEC6200 will be set aside. ELEC6200 will therefore count for 15 ECTS credits. The modules selected at the overseas institution must be approved by the programme leader. The module selection must include at least 30 ECTS (or equivalent) at masters level, that is relevant to the degree title. In 'with X' programmes, the requirement to take 15 ECTS credits specific to the specialisation must be met across the two semesters. The marks awarded by the overseas institution will be converted to equivalent UK marks by the Erasmus coordinator.

#### Part IV Core

Code	Module Title	ECTS	Type
ELEC6200	Group Design Project	22.5	Core

#### Part IV Optional

Code	Module Title	ECTS	Type
COMP6248	Deep Learning	7.5	Optional
COMP6247	Reinforcement and Online Learning	7.5	Optional
COMP6207	Advanced Intelligent Agents	7.5	Optional
COMP6208	Advanced Machine Learning	7.5	Optional
COMP6241	Advanced Topics in Human-Systems Interaction	7.5	Optional
COMP6209	Automated Code Generation	7.5	Optional
ELEC6212	Biologically Inspired Robotics	7.5	Optional
COMP6211	Biometrics	7.5	Optional
COMP6212	Computational Finance	7.5	Optional
ELEC6242	Cryptography	7.5	Optional
COMP6237	Data Mining	7.5	Optional
COMP6234	Data Visualisation	7.5	Optional
COMP6219	Designing Usable and Accessible	7.5	Optional

Technologies			
COMP6201	E-Business Strategy	7.5	Optional
COMP6202	Evolution of Complexity	7.5	Optional
WEBS6201	Foundations of Web Science	7.5	Optional
ELEC6213	Image Processing	7.5	Optional
COMP6228	Individual Research Project	7.5	Optional
COMP6203	Intelligent Agents	7.5	Optional
COMP6214	Open Data Innovation	7.5	Optional
COMP6215	Semantic Web Technologies	7.5	Optional
COMP6216	Simulation Modelling for Computer Science	7.5	Optional
COMP6204	Software Project Management and Development	7.5	Optional
COMP6217	The Science of Online Social Networks	7.5	Optional
COMP6218	Web Architecture	7.5	Optional
COMP6205	Web Development	7.5	Optional
ELEC6245	Wireless Networks	7.5	Optional

The programme structure table is below:

Information about pre and co-requisites is included in individual module profiles.

## Image and Multimedia Systems Pathway

### Part I

#### Typical course content

The degrees offered within the Computer Science programme is based around a common core that spans all four years of the programme. In the first two years ('Parts') of the programme, students take compulsory modules that introduce them to the basic theory underpinning computer science, the ethical and legal framework in which computer scientists and software engineers work, the practicalities of working with computers, and key techniques and application areas. In Parts III and IV, the core topics focus on professional practice, with major individual and group projects, and taught modules covering industrial practice and engineering management. There is also a range of optional modules offered in Parts III and IV; many of these options are in the six specialist areas of Artificial Intelligence, Distributed Systems and Networks, Image and Multimedia Systems, Mobile and Secure Systems, Software Engineering, and Cyber Security.

If you successfully complete three full parts of study, you may graduate with an honours degree: BSc (hons) or BEng (hons). If you successfully complete four full parts of study, you may graduate with a MEng degree. If you obtain at least 60 ECTS credits in one of the five specialist areas across all four Parts (25% of your overall credits), you qualify for the award of MEng Computer Science with X, or MEng Software Engineering (a "themed degree"). Students may transfer between themed degree programmes (and from a themed programme to MEng Computer Science) providing that they have met the relevant requirements for specialist modules.

Students intending to graduate with MEng degrees are strongly recommended to spend 20 weeks in industry, usually as two 10-week summer placements. Alternatively, if you complete a year in industry, as part of the "with Industrial Studies" variant, you will complete a study worth 30 ECTS credits at level 6, which will qualify you for the award of the enhanced degree. Consult the ECS Industrial Liaison Tutor for advice concerning placements.

#### Programme details

#### Available Modules

The information in this programme specification is accurate at the time of writing, but may change in minor ways from year to year due to staff availability or other factors. Some of these modules are subject to pre-requisites and exclusions that, for brevity, are not given here; this information is available in the module specifications on the ECS Website.

The module requirements for each programme are shown for each Part below; modules are either core (must be taken and passed), compulsory (must be taken), optional (may be taken) or specialist (optional but contributing to the requirements of a themed degree).

It should be noted that it may not be possible to run some optional modules if the number of students registered on the module is very small. It should also be noted that optional module choice can be restricted by the University Timetable, which varies from year to year: some optional modules may clash with other optional or compulsory modules. Please be aware that many modules are shared between different cohorts; the class size depends on cohort size, which varies from year to year.

#### Part I Core

In your first year, you will take 60 ECTS at FHEQ Level 4, 30 ECTS in each semester as shown below. Note that all Part I modules are core, and must be passed in order to progress.

#### Part I Specialist Module

MEng CS with Cyber Security: COMP1203 Computer Systems I

Code	Module Title	ECTS	Type
COMP1201	Algorithmics	7.5	Core
COMP1203	Computer Systems I	7.5	Core
COMP1204	Data Management	7.5	Core
COMP1215	Foundations of Computer Science	7.5	Core
COMP1205	Professional Development	7.5	Core
COMP1206	Programming 2	7.5	Core
COMP1202	Programming I	7.5	Core
COMP1216	Software Modelling and Design	7.5	Core

#### Part II

In your second year, you will take 60 ECTS at FHEQ Level 5, 30 ECTS in each semester. Note that certain modules are marked as specialist modules, which count towards the requirements for a themed degree (that compulsory modules are also marked as specialist reflects our view that all students should have some exposure to the breadth of specialisms on offer).

#### Part II Specialist Modules

MEng CS with AI: COMP2208 Intelligent Systems

MEng CS with DSN: COMP2207 Distributed systems and Networks

MEng CS with IMS: COMP2213 Interaction Design

MEng CS with MSS: COMP2215 Computer Systems II

MEng CS with Cyber: COMP2216 Principles of Cyber Security

#### Part II Compulsory

Code	Module Title	ECTS	Type
COMP2207	Distributed Systems and Networks	7.5	Compulsory
COMP2208	Intelligent Systems	7.5	Compulsory
COMP2213	Interaction Design	7.5	Compulsory
COMP2209	Programming III	7.5	Compulsory
COMP2212	Programming Language Concepts	7.5	Compulsory
COMP2211	Software Engineering Group Project	7.5	Compulsory
COMP2210	Theory of Computing	7.5	Compulsory

#### Part II Optional

Broadening options (LANGXXXX, UOSMXXXX, etc) may be chosen from the list of modules provided by the Curriculum Innovation Project.

Code	Module Title	ECTS	Type
COMP2214	Advanced Software Modelling and	7.5	Optional

	Design		
COMP2215	Computer Systems II	7.5	Optional
COMP2216	Principles of Cyber Security	7.5	Optional

### Part III

The major element of Part III is the Individual Project, which runs all year. In semester 1, students intending to graduate with a MEng degree must take COMP3219 Engineering Management and Law.

You will also take 30 ECTS of optional modules from the list below, for a total load of 30 ECTS per semester. You may select at most 15 ECTS worth of options from outside the programme.

If you wish to graduate with a themed degree (MEng Computer Science with X or MEng/BEng Software Engineering), you must take at least 15 ECTS of specialist modules, and your Individual Project must be related to your theme.

### Part III Specialist Modules

MEng CS with AI: COMP3200; COMP3204; COMP3212; COMP3222 or COMP3223, ELEC3201.

MEng CS with DSN: COMP3200; COMP3201; COMP3207; COMP3210; COMP3215.

MEng CS with IMS: COMP3200; COMP3204; COMP3214; COMP3218.

MEng CS with MSS: COMP3200; COMP3201; COMP3207; COMP3210; COMP3215; COMP3217; ELEC3219.

MEng CS with Cyber: COMP3200; COMP3201; COMP3217.

Broadening options may be chosen from the list of modules provided by the Curriculum Innovation Project.

### Part III Compulsory

Code	Module Title	ECTS	Type
COMP3219	Engineering Management and Law	7.5	Compulsory

### Part III Core

Code	Module Title	ECTS	Type
COMP3200	Part III Individual Project	22.5	Core

### Part III Optional

Broadening options (LANGXXXX, UOSMXXXX, etc) may be chosen from the list of modules provided by the Curriculum Innovation Project.

Code	Module Title	ECTS	Type
ELEC3219	Advanced Computer Architecture	7.5	Optional
COMP3210	Advanced Computer Networks	7.5	Optional
COMP3211	Advanced Databases	7.5	Optional
COMP3207	Cloud Application Development	7.5	Optional
COMP3212	Computational Biology	7.5	Optional
COMP3204	Computer Vision	7.5	Optional
COMP3201	Cyber Security	7.5	Optional
COMP3218	Game Design and Development	7.5	Optional
COMP3215	Real-Time Computing and Embedded Systems	7.5	Optional
ELEC3201	Robotic Systems	7.5	Optional
COMP3217	Security of Cyber Physical Systems	7.5	Optional
COMP3208	Social Computing Techniques	7.5	Optional
COMP3220	Web Infrastructure	7.5	Optional

### Part III Optional Machine Learning

You may only take one Machine Learning module.

Code	Module Title	ECTS	Type
COMP3223	Foundations of Machine Learning	7.5	Optional



COMP3222	Machine Learning Technologies	7.5	Optional
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#### Part IV

In Part IV, all students take ELEC6200 Group Design Project, in which they work in a team that may include students from other engineering disciplines. This project spans both semesters. The Group Design Project taken by students on MEng Computer Science with Cyber Security would be expected to be a cyber security project with an industrial partner.

In addition to the Group Design Project, you must take a further 37.5 ECTS of options (five modules) from the list below, comprising 15 ECTS of options in the first semester and 22.5 ECTS of options in the second semester (for a total load of 30 ECTS per semester). You may select at most 15 ECTS worth of options from outside the programme.

If you wish to graduate with a themed degree (MEng Computer Science with X or MEng Software Engineering), you must take at least 15 ECTS of specialist modules. It is also possible to count a relevant COMP6228 Individual Research Project as 7.5 ECTS toward your specialist area.

If you are enrolled in MEng Computer Science with Cyber Security and you wish your degree to be certified by GCHQ, you must take at least 52.5 ECTS of specialist modules.

#### Part IV Specialist Modules

MEng CS with AI: COMP6202; COMP6203; COMP6207; COMP6208; COMP6211; COMP6212; COMP6215; COMP6216; COMP6228; COMP6237; ELEC6212; ELEC6213.

MEng CS with DSN: COMP6205; COMP6218; COMP6228; ELEC6242; ELEC6245.

MEng CS with IMS: COMP6219; COMP6228; COMP6234; ELEC6213.

MEng CS with MSS: COMP6205; COMP6214; COMP6218; COMP6228; ELEC6242; ELEC6245.

MEng CS with Cyber: COMP6211; COMP6230; COMP6236; ELEC6200; ELEC6242; CRIM6008.

Alternatively, Semester 2 of Part IV may be taken at a partner institution overseas, which has been approved by the Erasmus coordinator. In this case, the Group Report, Group Presentations and Individual Reflection parts of ELEC6200 should be submitted as usual, some at the beginning of semester II. However, the Individual Report and Poster on Business Case Study parts of ELEC6200 will be set aside. ELEC6200 will therefore count for 15 ECTS credits. The modules selected at the overseas institution must be approved by the programme leader. The module selection must include at least 30 ECTS (or equivalent) at masters level, that is relevant to the degree title. In 'with X' programmes, the requirement to take 15 ECTS credits specific to the specialisation must be met across the two semesters. The marks awarded by the overseas institution will be converted to equivalent UK marks by the Erasmus coordinator.

#### Part IV Core

Code	Module Title	ECTS	Type
ELEC6200	Group Design Project	22.5	Core

#### Part IV Optional

Code	Module Title	ECTS	Type
COMP6248	Deep Learning	7.5	Optional
COMP6247	Reinforcement and Online Learning	7.5	Optional
COMP6207	Advanced Intelligent Agents	7.5	Optional
COMP6208	Advanced Machine Learning	7.5	Optional
COMP6241	Advanced Topics in Human-Systems Interaction	7.5	Optional
COMP6209	Automated Code Generation	7.5	Optional
ELEC6212	Biologically Inspired Robotics	7.5	Optional
COMP6212	Computational Finance	7.5	Optional
ELEC6242	Cryptography	7.5	Optional
COMP6237	Data Mining	7.5	Optional
COMP6234	Data Visualisation	7.5	Optional

COMP6219	Designing Usable and Accessible Technologies	7.5	Optional
COMP6201	E-Business Strategy	7.5	Optional
COMP6202	Evolution of Complexity	7.5	Optional
WEBS6201	Foundations of Web Science	7.5	Optional
ELEC6213	Image Processing	7.5	Optional
COMP6228	Individual Research Project	7.5	Optional
COMP6203	Intelligent Agents	7.5	Optional
COMP6214	Open Data Innovation	7.5	Optional
COMP6215	Semantic Web Technologies	7.5	Optional
COMP6216	Simulation Modelling for Computer Science	7.5	Optional
COMP6204	Software Project Management and Development	7.5	Optional
COMP6217	The Science of Online Social Networks	7.5	Optional
COMP6218	Web Architecture	7.5	Optional
COMP6205	Web Development	7.5	Optional
ELEC6245	Wireless Networks	7.5	Optional

The programme structure table is below:

Information about pre and co-requisites is included in individual module profiles.

## Mobile and Secure Systems Pathway

### Part I

#### Typical course content

The degrees offered within the Computer Science programme is based around a common core that spans all four years of the programme. In the first two years ('Parts') of the programme, students take compulsory modules that introduce them to the basic theory underpinning computer science, the ethical and legal framework in which computer scientists and software engineers work, the practicalities of working with computers, and key techniques and application areas. In Parts III and IV, the core topics focus on professional practice, with major individual and group projects, and taught modules covering industrial practice and engineering management. There is also a range of optional modules offered in Parts III and IV; many of these options are in the six specialist areas of Artificial Intelligence, Distributed Systems and Networks, Image and Multimedia Systems, Mobile and Secure Systems, Software Engineering, and Cyber Security.

If you successfully complete three full parts of study, you may graduate with an honours degree: BSc (hons) or BEng (hons). If you successfully complete four full parts of study, you may graduate with a MEng degree. If you obtain at least 60 ECTS credits in one of the five specialist areas across all four Parts (25% of your overall credits), you qualify for the award of MEng Computer Science with X, or MEng Software Engineering (a "themed degree"). Students may transfer between themed degree programmes (and from a themed programme to MEng Computer Science) providing that they have met the relevant requirements for specialist modules.

Students intending to graduate with MEng degrees are strongly recommended to spend 20 weeks in industry, usually as two 10-week summer placements. Alternatively, if you complete a year in industry, as part of the "with Industrial Studies" variant, you will complete a study worth 30 ECTS credits at level 6, which will qualify you for the award of the enhanced degree. Consult the ECS Industrial Liaison Tutor for advice concerning placements.

#### Programme details

#### Available Modules

The information in this programme specification is accurate at the time of writing, but may change in minor ways from year to year due to staff availability or other factors. Some of these modules are subject to pre-requisites and exclusions that, for brevity, are not given here; this information is available in the module

specifications on the ECS Website.

The module requirements for each programme are shown for each Part below; modules are either core (must be taken and passed), compulsory (must be taken), optional (may be taken) or specialist (optional but contributing to the requirements of a themed degree).

It should be noted that it may not be possible to run some optional modules if the number of students registered on the module is very small. It should also be noted that optional module choice can be restricted by the University Timetable, which varies from year to year: some optional modules may clash with other optional or compulsory modules. Please be aware that many modules are shared between different cohorts; the class size depends on cohort size, which varies from year to year.

#### Part I Core

In your first year, you will take 60 ECTS at FHEQ Level 4, 30 ECTS in each semester as shown below. Note that all Part I modules are core, and must be passed in order to progress.

#### Part I Specialist Module

MEng CS with Cyber Security: COMP1203 Computer Systems I

<b>Code</b>	<b>Module Title</b>	<b>ECTS</b>	<b>Type</b>
COMP1201	Algorithmics	7.5	Core
COMP1203	Computer Systems I	7.5	Core
COMP1204	Data Management	7.5	Core
COMP1215	Foundations of Computer Science	7.5	Core
COMP1205	Professional Development	7.5	Core
COMP1206	Programming 2	7.5	Core
COMP1202	Programming I	7.5	Core
COMP1216	Software Modelling and Design	7.5	Core

#### Part II

In your second year, you will take 60 ECTS at FHEQ Level 5, 30 ECTS in each semester. Note that certain modules are marked as specialist modules, which count towards the requirements for a themed degree (that compulsory modules are also marked as specialist reflects our view that all students should have some exposure to the breadth of specialisms on offer).

#### Part II Specialist Modules

MEng CS with AI: COMP2208 Intelligent Systems

MEng CS with DSN: COMP2207 Distributed systems and Networks

MEng CS with IMS: COMP2213 Interaction Design

MEng CS with MSS: COMP2215 Computer Systems II

MEng CS with Cyber: COMP2216 Principles of Cyber Security

#### Part II Compulsory

<b>Code</b>	<b>Module Title</b>	<b>ECTS</b>	<b>Type</b>
COMP2215	Computer Systems II	7.5	Compulsory
COMP2207	Distributed Systems and Networks	7.5	Compulsory
COMP2208	Intelligent Systems	7.5	Compulsory
COMP2213	Interaction Design	7.5	Compulsory
COMP2209	Programming III	7.5	Compulsory
COMP2212	Programming Language Concepts	7.5	Compulsory
COMP2211	Software Engineering Group Project	7.5	Compulsory
COMP2210	Theory of Computing	7.5	Compulsory

#### Part III

The major element of Part III is the Individual Project, which runs all year. In semester 1, students intending to graduate with a MEng degree must take COMP3219 Engineering Management and Law.

You will also take 30 ECTS of optional modules from the list below, for a total load of 30 ECTS per semester. You may select at most 15 ECTS worth of options from outside the programme.

If you wish to graduate with a themed degree (MEng Computer Science with X or MEng/BEng Software Engineering), you must take at least 15 ECTS of specialist modules, and your Individual Project must be related to your theme.

### Part III Specialist Modules

MEng CS with AI: COMP3200; COMP3204; COMP3212; COMP3222 or COMP3223, ELEC3201.

MEng CS with DSN: COMP3200; COMP3201; COMP3207; COMP3210; COMP3215.

MEng CS with IMS: COMP3200; COMP3204; COMP3214; COMP3218.

MEng CS with MSS: COMP3200; COMP3201; COMP3207; COMP3210; COMP3215; COMP3217; ELEC3219.

MEng CS with Cyber: COMP3200; COMP3201; COMP3217.

Broadening options may be chosen from the list of modules provided by the Curriculum Innovation Project.

### Part III Compulsory

Code	Module Title	ECTS	Type
COMP3219	Engineering Management and Law	7.5	Compulsory

### Part III Core

Code	Module Title	ECTS	Type
COMP3200	Part III Individual Project	22.5	Core

### Part III Optional

Broadening options (LANGXXXX, UOSMXXXX, etc) may be chosen from the list of modules provided by the Curriculum Innovation Project.

Code	Module Title	ECTS	Type
ELEC3219	Advanced Computer Architecture	7.5	Optional
COMP3210	Advanced Computer Networks	7.5	Optional
COMP3211	Advanced Databases	7.5	Optional
COMP3207	Cloud Application Development	7.5	Optional
COMP3212	Computational Biology	7.5	Optional
COMP3204	Computer Vision	7.5	Optional
COMP3201	Cyber Security	7.5	Optional
COMP3218	Game Design and Development	7.5	Optional
COMP3215	Real-Time Computing and Embedded Systems	7.5	Optional
ELEC3201	Robotic Systems	7.5	Optional
COMP3217	Security of Cyber Physical Systems	7.5	Optional
COMP3208	Social Computing Techniques	7.5	Optional
COMP3220	Web Infrastructure	7.5	Optional

### Part III Optional Machine Learning

You may only take one Machine Learning module.

Code	Module Title	ECTS	Type
COMP3223	Foundations of Machine Learning	7.5	Optional
COMP3222	Machine Learning Technologies	7.5	Optional

### Part IV

In Part IV, all students take ELEC6200 Group Design Project, in which they work in a team that may include students from other engineering disciplines. This project spans both semesters. The Group Design Project taken by students on MEng Computer Science with Cyber Security would be expected to be a cyber security project with an industrial partner.

In addition to the Group Design Project, you must take a further 37.5 ECTS of options (five modules) from the list below, comprising 15 ECTS of options in the first semester and 22.5 ECTS of options in the second semester (for a total load of 30 ECTS per semester). You may select at most 15 ECTS worth of options from outside the programme.

If you wish to graduate with a themed degree (MEng Computer Science with X or MEng Software Engineering), you must take at least 15 ECTS of specialist modules. It is also possible to count a relevant COMP6228 Individual Research Project as 7.5 ECTS toward your specialist area.

If you are enrolled in MEng Computer Science with Cyber Security and you wish your degree to be certified by GCHQ, you must take at least 52.5 ECTS of specialist modules.

#### Part IV Specialist Modules

MEng CS with AI: COMP6202; COMP6203; COMP6207; COMP6208; COMP6211; COMP6212; COMP6215; COMP6216; COMP6228; COMP6237; ELEC6212; ELEC6213.

MEng CS with DSN: COMP6205; COMP6218; COMP6228; ELEC6242; ELEC6245.

MEng CS with IMS: COMP6219; COMP6228; COMP6234; ELEC6213.

MEng CS with MSS: COMP6205; COMP6214; COMP6218; COMP6228; ELEC6242; ELEC6245.

MEng CS with Cyber: COMP6211; COMP6230; COMP6236; ELEC6200; ELEC6242; CRIM6008.

Alternatively, Semester 2 of Part IV may be taken at a partner institution overseas, which has been approved by the Erasmus coordinator. In this case, the Group Report, Group Presentations and Individual Reflection parts of ELEC6200 should be submitted as usual, some at the beginning of semester II. However, the Individual Report and Poster on Business Case Study parts of ELEC6200 will be set aside. ELEC6200 will therefore count for 15 ECTS credits. The modules selected at the overseas institution must be approved by the programme leader. The module selection must include at least 30 ECTS (or equivalent) at masters level, that is relevant to the degree title. In 'with X' programmes, the requirement to take 15 ECTS credits specific to the specialisation must be met across the two semesters. The marks awarded by the overseas institution will be converted to equivalent UK marks by the Erasmus coordinator.

#### Part IV Core

Code	Module Title	ECTS	Type
ELEC6200	Group Design Project	22.5	Core

#### Part IV Optional

Code	Module Title	ECTS	Type
COMP6248	Deep Learning	7.5	Optional
COMP6247	Reinforcement and Online Learning	7.5	Optional
COMP6207	Advanced Intelligent Agents	7.5	Optional
COMP6208	Advanced Machine Learning	7.5	Optional
COMP6241	Advanced Topics in Human-Systems Interaction	7.5	Optional
COMP6209	Automated Code Generation	7.5	Optional
ELEC6212	Biologically Inspired Robotics	7.5	Optional
COMP6211	Biometrics	7.5	Optional
COMP6212	Computational Finance	7.5	Optional
ELEC6242	Cryptography	7.5	Optional
COMP6237	Data Mining	7.5	Optional
COMP6234	Data Visualisation	7.5	Optional
COMP6219	Designing Usable and Accessible Technologies	7.5	Optional
COMP6201	E-Business Strategy	7.5	Optional
COMP6202	Evolution of Complexity	7.5	Optional
WEBS6201	Foundations of Web Science	7.5	Optional
ELEC6213	Image Processing	7.5	Optional
COMP6228	Individual Research Project	7.5	Optional

COMP6203	Intelligent Agents	7.5	Optional
COMP6214	Open Data Innovation	7.5	Optional
COMP6215	Semantic Web Technologies	7.5	Optional
COMP6216	Simulation Modelling for Computer Science	7.5	Optional
COMP6204	Software Project Management and Development	7.5	Optional
COMP6217	The Science of Online Social Networks	7.5	Optional
COMP6218	Web Architecture	7.5	Optional
COMP6205	Web Development	7.5	Optional
ELEC6245	Wireless Networks	7.5	Optional

## Progression Requirements

The programme will follow the University's regulations for *Progression, Determination and Classification of Results: Undergraduate and Integrated Masters Programmes* or the University's regulations for *Progression, Determination and Classification of Results: Standalone Masters Programmes* as set out in the General Academic Regulations in the University Calendar: <http://www.calendar.soton.ac.uk/sectionIV/sectIV-index.html>

## Support for student learning

There are facilities and services to support your learning some of which are accessible to students across the University and some of which will be geared more particularly to students in your particular Faculty or discipline area.

The University provides:

- library resources, including e-books, on-line journals and databases, which are comprehensive and up-to-date; together with assistance from Library staff to enable you to make the best use of these resources
- high speed access to online electronic learning resources on the Internet from dedicated PC Workstations onsite and from your own devices; laptops, smartphones and tablet PCs via the Eduroam wireless network. There is a wide range of application software available from the Student Public Workstations.
- computer accounts which will connect you to a number of learning technologies for example, the Blackboard virtual learning environment (which facilitates online learning and access to specific learning resources)
- standard ICT tools such as Email, secure filestore and calendars.
- access to key information through the MySouthampton Student Mobile Portal which delivers timetables, Module information, Locations, Tutor details, Library account, bus timetables etc. while you are on the move.
- IT support through a comprehensive website, telephone and online ticketed support and a dedicated helpdesk in the Hartley Library.
- Enabling Services offering support services and resources via a triage model to access crisis management, mental health support and counselling. Support includes daily Drop In at Highfield campus at 13.00 – 15.00 (Monday, Wednesday and Friday out of term-time) or via on-line chat on weekdays from 14.00 – 16.00. Arrangements can also be made for meetings via Skype.
- assessment and support (including specialist IT support) facilities if you have a disability, long term health problem or Specific Learning Difficulty (e.g. dyslexia)
- the Student Services Centre (SSC) to assist you with a range of general enquiries including financial matters, accommodation, exams, graduation, student visas, ID cards
- Career and Employability services, advising on job search, applications, interviews, paid work, volunteering and internship opportunities and getting the most out of your extra-curricular activities alongside your degree programme when writing your CV.
- Other support that includes health services (GPs), chaplaincy (for all faiths) and 'out of hours' support for students in Halls and in the local community (18.00-08.00).
- A Centre for Language Study, providing assistance in the development of English language and study skills for non-native speakers.

The Students' Union provides

- an academic student representation system, consisting of Course Representatives, Academic Presidents, Faculty Officers and the Vice-President Education; SUSU provides training and support for all these representatives, whose role is to represent students' views to the University.
- opportunities for extracurricular activities and volunteering

- an Advice Centre offering free and confidential advice including support if you need to make an academic appeal
- Support for student peer-to-peer groups, such as Nightline.

Associated with your programme, you will be able to access:

- the tutorial system – every student has a Personal Tutor, and there is also the Senior Tutoring team if your personal tutor is not available (see the Student Handbook for further details on the personal tutor system)
- Faculty computer workstations with a range of software, manuals and books, with early to late access through a card-lock mechanism
- Student Teaching and Computing Support (STACS) helpdesk for computer support and programming advice
- postgraduate demonstrators, who support programming intensive modules
- a website with notes for every module
- the Student Handbook

## Methods for evaluating the quality of teaching and learning

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You will have the opportunity to have your say on the quality of the programme in the following ways:

You will have the opportunity to have your say on the quality of the programme in the following ways:

- Completing student evaluation questionnaires for each module of the programme, which feed into Faculty-level module and programme reporting
- Acting as a student representative on various committees, e.g. Staff-Student Liaison Committees, Faculty Programmes Committee OR providing comments to your student representative to feed back on your behalf
- Serving as a student representative on Faculty Scrutiny Groups for programme validation
- Taking part in programme validation meetings by joining a panel of students to meet with the Faculty Scrutiny Group

The ways in which the quality of your programme is checked, both inside and outside the University, are:

- Regular module and programme reports which are monitored by the Faculty
- Programme validation, normally every five years
- External examiners, who produce an annual report
- Professional body accreditation
- A national research evaluation (which is relevant because our research activity contributes directly to the quality of your learning experience)
- Higher Education Review by the Quality Assurance Agency

Further details on the University's quality assurance processes are given in the Quality Handbook.

Further details on the University's quality assurance processes are given in the [Quality handbook](#).

## Career Opportunities

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Graduates from our undergraduate computer science and software engineering programme are employed worldwide in development and consultancy roles by a number of leading companies at the forefront of information technology, some have gone on to doctoral study and University careers, while others have been involved in IT start-ups. ECS runs a dedicated Careers Hub which is affiliated with over 100 renowned companies, including IBM, ARM, Microsoft Research, Imagination Technologies, Nvidia, Samsung and Google to name a few, and we hold our own annual Engineering and Technology Careers Fair.

## External Examiner(s) for the programme

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Artificial Intelligence      Name:      Professor Georg Struth - University of Sheffield

Artificial Intelligence      Name:      Dr Anthony J Beaumont - Aston University

Students must not contact External Examiner(s) directly, and external examiners have been advised to refer any such communications back to the University. Students should raise any general queries about the assessment and examination process for the programme with their Course Representative, for consideration through Staff: Student Liaison Committee in the first instance, and Student representatives on Staff: Student Liaison Committees will have the opportunity to consider external examiners' reports as part of the University's quality assurance process.

External examiners do not have a direct role in determining results for individual students, and students wishing to discuss their own performance in assessment should contact their Personal Academic Tutor in the first instance.

**Please note:** This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided. More detailed information can be found in the programme handbook.



## Appendix 1:

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. In addition to this, students registered for this programme also have to pay for:

### Additional Costs

Type	Details
Stationery	You will be expected to provide your own day-to-day stationary items, e.g. pens, pencils, notebooks, etc). Any specialist stationery items will be specified under the Additional Costs tab of the relevant module profile.
Textbooks	Where a module specifies core texts these should generally be available on the reserve list in the library. However due to demand, students may prefer to buy their own copies. These can be purchased from any source.  Some modules suggest reading texts as optional background reading. The library may hold copies of such texts, or alternatively you may wish to purchase your own copies. Although not essential reading, you may benefit from the additional reading materials for the module.
Approved Calculators	Candidates may use calculators in the examination room only as specified by the University and as permitted by the rubric of individual examination papers. The University approved models are Casio FX-570 and Casio FX-85GT Plus. These may be purchased from any source and no longer need to carry the University logo.
Printing and Photocopying Costs	In the majority of cases, coursework such as essays; projects; dissertations is likely to be submitted on line. However, there are some items where it is not possible to submit on line and students will be asked to provide a printed copy.

In some cases you'll be able to choose modules (which may have different costs associated with that module) which will change the overall cost of a programme to you. Details of such costs will be listed in the Module Profile. Please also ensure you read the section on additional costs in the University's Fees, Charges and Expenses Regulations in the University Calendar available at [www.calendar.soton.ac.uk](http://www.calendar.soton.ac.uk).