# Programme Specification[1]

## 1. Programme Title(s) and Code(s):

| Programme Title | UCAS Code | GU Code |
|---|---|---|
| MSci in Software Engineering | G610 | G610-2207 |
| MSci in Software Engineering (Faster Route) | G600-2207 | |

## 2. Academic Session:

2016-17

## 3. SCQF Level (see **Scottish Credit and Qualifications Framework Levels**):

11

## 4. Credits:

610

## 5. Entrance Requirements:

Please refer to the current undergraduate prospectus at:
http://www.gla.ac.uk/undergraduate/

## 6. ATAS Certificate Requirement (see **Academic Technology Approval Scheme**):

ATAS Certificate not required

## 7. Attendance Type:

Full Time

## 8. Programme Aims:

The focus of the Software Engineering degree is on topics directly relevant to the development of large and complex software systems. Initially this programme shares the fundamentals with the Computing Science Single Honours Degree. It becomes more specialised from year 3 with a focus on software design and implementation in the Team Project and subsequently in the choice of

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[1] 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 full advantage is taken of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each course can be found in course handbooks and other programme documentation and online at www.gla.ac.uk

The accuracy of the information in this document is reviewed periodically by the University and may be checked by the Quality Assurance Agency for Higher Education.

Level 4 Electives and Individual Project. This programme also includes a formally supervised and assessed industrial summer placement between Level 3 and Level 4.

This programme is an extension to the current Honours programme in Software Engineering, providing a full five year Masters programme offered as a first degree. It is designed as a research-oriented programme and thus features a research project in the 5th year of study, as well as other research-related taught material.

This degree programme aims to:
- provide students with a deep understanding of the theory and practice of computing;
- give students the opportunity to study a broad range of core computing science topics;
- encourage students to discover the connections among these topics and to understand their common theoretical foundations;
- produce graduates fit to occupy responsible positions in the information technology industry;
- expose students to software engineering in an industrial context via summer work placement;
- give students the opportunity to choose selected Software Engineering topics to study in considerable depth thereby equipping the best graduates to enter research programmes;
- emphasise unchanging principles in computing science;
- encourage independent study habits that will stand graduates in good stead throughout their professional careers;
- enable students to enhance their transferable and interpersonal skills, particularly written and oral communication and team working;
- develop research skills including an understanding of research methods and techniques reading and analysis of research papers in Software Engineering;
- enable students to prepare a research proposal and undertake a major research project in Software Engineering.

## 9. Intended Learning Outcomes of Programme:

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in areas listed below.

By the end of the programme, students will be able to:

**Knowledge and Understanding**
- demonstrate state-of-the-art knowledge and understanding of a range of topics in Computing Science;
- identify and debate the ethical, professional, and social issues raised by computerised information processing.

**Skills and Other Attributes**
*Subject-specific/practical skills*
- plan and execute a challenging and substantial Computing Science research project, to evaluate the work done, and to place that work in the context of other related work;
- summarise and review research papers in a variety of areas of Computing Science.

*Intellectual skills*
- learn independently;
- critically review the research work of others;
- solve challenging research problems;
- conduct independent research.

*Transferable/key skills*
- highly developed oral and written communication skills.

**10. Typical Learning and Teaching Approaches:**

In the compulsory courses, teaching and learning are by lectures, reading, and seminars (some of which are student-led). In the elective courses, teaching and learning are by lectures, tutorials, reading, and (where appropriate) computing laboratory work.

In the Research Proposal and Project, teaching and learning are by independent research and dissertation writing, under individual supervision.

**11. Typical Assessment Methods:**

In the compulsory courses, assessment is by written paper reviews, an annotated bibliography, oral presentations, closed-book and open-book examinations. In the elective courses, assessment is by coursework and closed-book examinations. In the Research Proposal and Project, assessment is by a research paper and through a Research Proposal coursework report.

**12. Programme Structure and Features:**

Students who have not been admitted to the University on the MSci programme can apply to transfer to the programme at the end of semester 2 in level 4. Entry will be based on their academic performance.

A candidate for the MSci degree must obtain a minimum of 610 credits, 120 of which must be awarded at level M.

Levels 1 & 2 follow the same courses as the BSc Honours programme.

**Level 1**
There are three sets of courses currently offered at level 1. Either set enables students to continue to Honours level:
Set 1: aimed at students with prior programming experience; 40 credits of CS out of 120.
Set 2: aimed at students with no prior programming experience; 40 credits of CS out of 120. A student who chooses set 2 in Level 1 will need to take Computing Fundamentals (COMPSCI2002) (10 credits) in Level 2.
Set 3: aimed at students with no prior programming experience; 50 credits of CS out of 120.

Students will be strongly encouraged to include 40 credits of Level 1 Mathematics in year 1 or 2.

| Course Title | Course Code | Credits | Core | Optional | Semester(s) taught |
|---|---|---|---|---|---|
| SET 1 [40 credits] | | | | | |
| Computing Science 1P | COMPSCI1001 | 20 | X | | 1 & 2 |
| Computing Science 1Q | COMPSCI1002 | 20 | X | | 1 & 2 |
| Other subjects (Level 1, 80 credits) | | | | | |
| SET 2 [40 credits] | | | | | |
| Computing Science 1CT | COMPSCI1016 | 20 | X | | 1 |
| Computing Science 1PX | COMPSCI1017 | 10 | X | | 2 |
| Computing Science 1S | COMPSCI1018 | 10 | X | | 2 |
| Other subjects (Level 1, 80 credits) | | | | | |
| SET 3 [50 credits] | | | | | |
| Computing Science 1CT | COMPSCI1016 | 20 | X | | 1 |
| Computing Science 1PX | COMPSCI1017 | 10 | X | | 2 |
| Computing Science 1Q | COMPSCI1002 | 20 | X | | 1 & 2 |
| Other subjects (Level 1, 70 credits) | | | | | |

## Level 2

Level 2 entry is guaranteed to students who achieve an average grade of B3 or better in their Level 1 CS courses at first sitting. Entry is not guaranteed to students with an average grade of C3 or better in their Level 1 CS courses at first sitting, but may be permitted at the discretion of the School.

In either case, all grades must be at D3 or better – students who have gained a sufficient average grade at first sitting must resit to improve any grade below D3.

| Course Title | Course Code | Credits | Core | Optional | Semester(s) taught |
|---|---|---|---|---|---|
| Java and Object Oriented Software Engineering 2 | COMPSCI2020 | 20 | X | | 1 & 2 |
| Algorithmic Foundations 2 | COMPSCI2003 | 10 | X | | 1 |
| Computer Systems 2 | COMPSCI2005 | 10 | X | | 1 |
| Algorithms & Data Structures 2 | COMPSCI2007 | 10 | X | | 2 |
| Web Application Development 2 | COMPSCI2021 | 10 | X | | 2 |
| Other subjects (Level 1 or 2, 60 credits) | | | | | |

Computing Fundamentals (COMPSCI2002) (Level 2, 10 credits) (semester 1) is required to be taken by any student who has done set 2 in Level 1.

## Level 3

Honours students in Science must achieve a grade point average of 12 over 60 credits of Level 2 courses in the subject of their Honours Programme at the first attempt.

Students who do not meet the requirements for entry to our Honours degree programmes may be eligible for entry to the Designated Degree in Computing Science (CS3). Such students must satisfy the progression requirements in Parts 10 and 11 of the Generic Undergraduate Regulations and the requirements of Part 3 of the Supplementary Regulations for the Degree of Bachelor of Science, as set out by the College of Science and Engineering, and must also meet the following additional requirement from the School of Computing Science.

Honours Entry Guaranteed: minimum average grade of B3 (15 on University 22 point scale) over all Level 2 Computing Science courses at first attempt. At School discretion: minimum average grade of C3 (12 on University 22 point scale) over all Level 2 Computing Science courses at first attempt. Entry to the SE3H class is competitive, and only a limited number of places are available for the best students.

Students in Level 3 take a curriculum designed to give breadth in the subject.

| Course Title | Course Code | Credits | Core | Options | Semester(s) taught |
|---|---|---|---|---|---|
| Advanced Programming (H) | COMPSCI4010 | 10 | X | | 1 |
| Algorithmics I (H) | COMPSCI4009 | 10 | X | | 1 |
| Interactive Systems (H) | COMPSCI4014 | 10 | X | | 1 |
| Programming Languages (H) | COMPSCI4016 | 10 | X | | 1 |
| Database Systems (H) | COMPSCI4013 | 10 | X | | 2 |
| Networked Systems (H) | COMPSCI4012 | 10 | X | | 2 |
| Operating Systems (H) | COMPSCI4011 | 10 | X | | 2 |
| Professional Software Development (H) | COMPSCI4015 | 10 | X | | 1 & 2 |
| Professional Skills and Issues (H) | COMPSCI4038 | 10 | X | | 2 |
| Team Project (H) | COMPSCI4047 | 30 | X | | 1 & 2 |
| Software Engineering Summer Placement | COMPSCI4046 | 10 | X | | Summer between Levels 3&4 |

Level 4

Entry to Level 4 of the MSci programme is dependent on the student achieving an aggregate score of at least 12 in Level 3 at the first attempt.

The student must select eight 10-credit subject courses. The courses available can vary each year depending on staff availability and resources.  The list of level H and M courses currently available are listed below:

Advanced Networking and Communications (H), Algorithmics II (H), Artificial Intelligence (H), Big Data: Systems, Programming and Management (H), Computer Architecture (H), Computing Science in the Classroom (H), Computer Vision Methods and Applications (H), Cyber Security Fundamentals (H), Distributed Algorithms and Systems (H), Functional Programming (H), Human-Computer Interaction (H), Information Retrieval (H), Machine Learning (H), Mobile Human Computer Interaction (H), Modelling Reactive Systems (H), Multimedia Systems and Applications (H),Research Methods and Techniques (H), Safety Critical Systems (H), Advanced Software Engineering Practices (H).

Advanced Operating Systems (M), Cyber Security Fundamentals (M), Enterprise Cyber Security (M), Human-Centred Security (M), Information Retrieval (M), IT Architecture (M), Machine Learning (M), Mobile Human Computer Interaction (M), Modelling Reactive Systems (M), Multimedia Systems and Applications (M), Safety Critical Systems (M).

From these courses, they must select at least one course from the group below. These courses are designed to provide students with depth in a subject area.

| Course Title | Course Code | Credits | Core | Options | Semester(s) taught |
|---|---|---|---|---|---|
| IT Architecture (M) | COMPSCI5013 | 10 | | X | 2 |
| Advanced Software Engineering Practices (H) | COMPSCI4071 | 10 | | X | 1 & 2 |

Also, from the eight courses, at least one must be:

| Course Title | Course Code | Credits | Core | Optional | Semester(s) taught |
|---|---|---|---|---|---|
| Cyber Security Fundamentals (H) | COMPSCI4062 | 10 | | X | 2 |
| Human Centred Security (M) | COMPSCI5060 | 10 | | X | 2 |
| Safety Critical Systems (H) | COMPSCI4045 | 10 | | X | 2 |
| Enterprise Cyber Security (M) | COMPSCI5077 | 10 | | X | 1 |

In addition, students undertake  the following compulsory course:

| Course Title | Course Code | Credits | Core | Optional | Semester(s) taught |
|---|---|---|---|---|---|
| Individual Project (H) | COMPSCI4025P | 40 | X | | 1 & 2 |

Level 5

Students admitted to the MSci in Software Engineering programme must normally achieve an average aggregate score of 12 (on University 22 point scale) in Level 4 to be allowed to progress to Level 5.

Students failing to achieve the minimum level for progression will be assessed as if they were BSc Software Engineering students and will be awarded the appropriate BSc (Hons) Software Engineering qualification based on their results in Levels 3 and 4, using the normal weighting for the relevant BSc Software Engineering degree.

Students will be required to take the following courses:

| Course Title | Course Code | Credits | Core | Optional | Semester(s) taught |
|---|---|---|---|---|---|
| Research Methods & Techniques (M) * , ** | COMPSCI5025 | 10 | X | | 1 |

| Course Title | Course Code | Credits | Core | Optional | Semester(s) taught |
|---|---|---|---|---|---|
| MSci Research Proposal & Project | COMPSCI5073P | 80 | X | | 1 & 2 |
| Project Research Readings in CS | COMPSCI5003 | 10 | X | | 2 |
| Elective 1 ** | ** | 10 | | X | 1 & 2 |
| Elective 2 ** | ** | 10 | | X | 1 & 2 |

\* If a student has already taken Research Methods and Techniques 4 (COMPSCI4065) in Level 4, RMT should be replaced by one 10 credit level M elective course. ** The list of electives can be found in the Undergraduate Class Guide.

Honours Assessment

Within each year, courses are weighted according to credits. The final Honours assessment combines the aggregated scores from levels 3, 4 and 5 in the ratio 24:36:40.

Alternative Faster Route entry (360 credits)

Students taking this route will come straight into level 2. They will take the following courses totalling 70 credits in Computing Science:

| Course Title | Course Code | Credits | Core | Optional | Semester(s) taught |
|---|---|---|---|---|---|
| Java and Object Oriented Software Engineering 2 | COMPSCI2020 | 20 | X | | 1 & 2 |
| Algorithmic Foundations 2 | COMPSCI2003 | 10 | X | | 1 |
| Computing Fundamentals 2 | COMPSCI2002 | 10 | X | | 1 |
| Systems and Networks | COMPSCI4043 | 10 | X | | 1 |
| Algorithms and Data Structures 2 | COMPSCI2007 | 10 | X | | 2 |
| Web Application Development 2 | COMPSCI2021 | 10 | X | | 2 |
| Other subjects from level 1 or 2, totalling 50 credits | | | | | |

It is strongly recommended that 40 credits of level 1 Mathematics are taken, unless the student has an equivalent mathematics qualification on entry.

Faster Route entry to Honours
Entry requirements same as standard route.

Note that from level 3 onwards, the Faster Route programme is exactly the same as the standard Honours programme.

For more information on courses see the University course catalogue:
http://www.gla.ac.uk/coursecatalogue/

Regulations

This programme will be governed by the relevant regulations published in the University Calendar. These regulations include the requirements in relation to:
(a)     Award of the degree
(b)     Progress
(c)     Early exit awards
(d)     (For undergraduate programmes, where appropriate) Entry to Honours

http://www.gla.ac.uk/services/senateoffice/calendar/

**13. Programme Accredited By:**

BCS The Chartered Institute for IT

**14. Location(s):**

Glasgow

**15. College:**

College of Science and Engineering

**16. Lead School/Institute:**

Computing Science [REG30200000]

**17. Is this programme collaborative with another institution:**

No

**18. Awarding Institution(s):**

University of Glasgow

**19. Teaching Institution(s):**

**20. Language of Instruction:**

English

**21. Language of Assessment:**

English

**22. Relevant QAA Subject Benchmark Statements (see [Quality Assurance Agency for Higher Education](#))
and Other External or Internal Reference Points:**

The following web links introduce the benchmarks that are used to guide and assess our programmes. We monitor our courses against these on a regular basis, further information about this process and about recent developments in these benchmarks can be obtained direct from the school.
http://www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Subject-benchmark-statement-Computing.aspx
http://www.theiet.org/careers/profreg/
http://www.bcs.org/server.php?show=nav.7065

**23. Additional Relevant Information (if applicable):**

Support for students is provided by the Postgraduate/Undergraduate Adviser(s) of Studies supported by University resources such as the Student Learning Service (www.gla.ac.uk/services/sls/), Counselling & Psychological Services (www.gla.ac.uk/services/counselling/), the Disability Service (www.gla.ac.uk/services/studentdisability/) and the Careers Service (www.gla.ac.uk/services/careers/).

| **24. Date of approval:** | 14/09/2016 |
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