## Software Engineering MEng (Hons) 2012-2013

### Summary

<table>
<thead>
<tr>
<th>UCAS code</th>
<th>Award</th>
<th>Title</th>
<th>Duration</th>
<th>Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG64</td>
<td>MEng</td>
<td>Software Engineering MEng (Hons)</td>
<td>4 years</td>
<td>FT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Schools</th>
<th>Computer Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty</td>
<td>Engineering and Physical Sciences</td>
</tr>
<tr>
<td>Awarding Institution</td>
<td>University of Manchester</td>
</tr>
<tr>
<td>Programme Accreditation</td>
<td>BCS, IET</td>
</tr>
<tr>
<td>Relevant QAA benchmark(s)</td>
<td>Computing</td>
</tr>
</tbody>
</table>
Aims and intended learning outcomes

Software systems are at the heart of all successful modern businesses. These systems are complex and long-lived, and must be robust and adaptable. Our Software Engineering programmes emphasise a study of software design and production techniques, and equip you with the skills needed to follow a career specifying and developing such systems. Software engineering techniques consider the whole life cycle of an application, from its specification and design, through its implementation and testing, to its maintenance and adaptation.

Our programmes aim to:

1) enable graduates to exhibit a high level of practical and theoretical skills over a broad range of Computer Science together with a knowledge of currently available techniques and technologies.
2) explore the principles that support developments in a rapidly changing subject.
3) provide opportunities for students to understand the wide range of research challenges facing Computer Science, as well as the breadth and depth of research undertaken in this top-rated school, so they are prepared to embark on research here or elsewhere.
4) develop competent professionals able to play a leading part in many different commercial, industrial and academic activities and adapt rapidly to changing technology.
5) meet industry demand for high calibre graduates who will take a lead in continuing technological change.
6) meet the educational requirements of the Engineering Council thus enabling graduates to progress to professional membership of the BCS and IET and attain the highest professional status of Chartered Engineer.
7) prepare students for the social, organisational and professional context in which they will be working.
8) The MEng programmes aim to: prepare high fliers for professional practice in Computer Science by enhanced depth and breadth of study together with increased emphasis on industrial relevance through industrially related group projects. All MEng students spend a short period working in industry with the option to extend this to a complete year. The period in industry gives extensive practical experience of an industrial or business environment where students are able to apply and develop their skills, both technical and personal.

Intended learning outcomes (UG)

Knowledge & understanding

A1 (UG) Know and understand the essential mathematics relevant to computer science.
A2 (UG) Understand and apply a wide range of principles and tools available to the software engineer, such as design methodologies, choice of algorithm, language, software libraries and user interface techniques
A3 (UG) Demonstrate a grasp of the principles of computer systems, including architecture, networks and communication
A4 (UG) Recognise and appreciate the professional and ethical responsibilities of the practising computer professional, including understanding the need for quality
A5 (UG) Know and understand the principles and techniques of a number of application areas informed by the research directions of the subject, such as artificial intelligence, databases and computer graphics
A6 (UG) Apply their knowledge of computing in a commercial or industrial context
A7 (UG) Show a critical understanding of the broad context within which Computer Science resides, including issues such as quality, reliability, enterprise, employment law, accounting and health and safety
A8 (UG) Have a comprehensive knowledge and critical awareness of selected specialist fields at the forefront of computer science, studied at masters level

Intellectual (thinking) skills

B1 (UG) Solve a wide range of problems related to the analysis, design and construction of computer systems.
B2 (UG) Design and implement a software or hardware system of significant size
B3 ⊳ Identify a range of solutions and critically evaluate and justify proposed design solutions

B4 ⊳ Solve computer science problems with pressing commercial or industrial constraints

B5 ⊳ Generate an innovative design to solve a problem containing a range of commercial and industrial constraints

**Practical skills**

C1 ⊳ Plan and undertake a major individual project

C2 ⊳ Prepare and deliver coherent and structured verbal and written technical reports

C3 ⊳ Give technical presentations suitable for the time, place and audience

C4 ⊳ Use the scientific literature effectively and make discriminating use of Web resources

C5 ⊳ Design, write and debug computer programs in appropriate languages

C6 ⊳ Use appropriate computer-based design support tools

C7 ⊳ Apply computer science skills in a commercial or industrial environment

C8 ⊳ Demonstrate initiative taking, innovation and self-management in an industrially related group project

C9 ⊳ Integrate previously acquired skills and apply them to new, demanding situations

**Transferable skills**

D1 ⊳ Display an integrated approach to the deployment of communication skills

D2 ⊳ Use IT skills and display mature computer literacy

D3 ⊳ Work effectively with and for others

D4 ⊳ Strike the balance between self-reliance and seeking help when necessary in new situations

D5 ⊳ Display personal responsibility by working to multiple deadlines in complex activities

D6 ⊳ Employ discrete and continuous mathematical skills as appropriate

D7 ⊳ Demonstrate significantly enhanced group working abilities

D8 ⊳ Further develop career plans and personal objectives

D9 ⊳ Communicate effectively with non-specialist as well as computer scientist professionals at a range of levels

D10 ⊳ Undertake a range of technical roles within a team and be able to display leadership

**Intended learning outcomes (PG)**

**Knowledge and Understanding**

A1 ⊳ (At all levels) Acquire a knowledge of a range of advanced topics in Computer Science beyond undergraduate level and at the forefront of research

A2 ⊳ (At all levels) Understand, apply and develop leading-edge technologies in two of the following themes: Advanced Web Technologies, Computational Biology, Concurrency, Data Management, Health Informatics, Learning from Data, Logic and Automated Reasoning, Management, Mobile Computing, Text Mining, Security, Software Engineering, Visual Computing

A3 ⊳ (MSc & PG Diploma) Have a knowledge & understanding of research methodology & practice
**Intellectual Skills**

B1 ☐ Develop and evaluate original ideas in a research context (MSc and PG Diploma levels only)

B2 ☐ Use methodologies for development of computational systems at an advanced level (All)

B3 ☐ Perform problem-solving in academic and industrial environments (All)

**Practical Skills**

C1 ☐ Develop applications to satisfy given requirements

C2 ☐ Organise & pursue a scientific or industrial research project (MSc and PG Diploma only)

C3 ☐ Use, manipulate and develop large computational systems

C4 ☐ Perform independent information acquisition and management

**Transferable Skills and Personal Qualities**

D1 ☐ Work and communicate effectively as a team member

D2 ☐ Prepare and present seminars to a professional standard (MSc level only)

D3 ☐ Understand ethical issues related to professional activities

D4 ☐ Write theses and reports to a professional standard (MSc and PG Diploma)

D5 ☐ Perform independent and efficient time-management

**Generic reference to outcome group**

G1 ☐ Knowledge and Understanding

G2 ☐ Intellectual Skills

G3 ☐ Practical Skills

G4 ☐ Transferable Skills and Personal Qualities

G5 ☐ Not specified
Learning and Teaching on all our programmes aims to combine an understanding of fundamental CS principles, development of strong practical skills and the group-working, learning and communication skills that are essential for any computing professional.

Course units which involve practical elements all have associated laboratory exercises, usually in timetabled sessions with staff and demonstrator support. Most labs operate a system of face-to-face marking in the lab so that students receive immediate feedback on their work. Units without labs all have regular coursework exercises to support skills development and feedback.

Most units are lecture based, with lab or coursework exercises used to reinforce and enhance knowledge and skills first encountered in lectures. The first year team project deviates significantly from this model and takes an Enquiry Based Learning approach. This unit aims to encourage students to be more actively engaged with, and responsible for, their own learning, to develop skills in problem solving, communication, independent learning, and group work, and to signal the importance we attach to independent learning. This approach is followed up in the second year with the workshop based approach used in the compulsory Software Engineering unit, which also contains a major group working component.

The choice of units offered to students on our programmes is very broad, but they also require depth in particular subject areas. This is achieved using the notion of Themes. A theme is a group of related second and third year course units which form a coherent whole; usually one second year and two third year units. All single honours students are required to complete at least two themes; those on the Computer Science programme can choose any pair of themes, but those on specialist programmes must complete at least two themes associated with their specialism. It is the choice of these themes that characterises the specialist programmes. The Programme Structure section below indicates the Themes for this group of programmes and the tables in that section show the Theme for each course unit.

All students undertake an individual 3rd year project, supervised by a member of academic task, which usually involves the development of significant software or hardware product. Assessment of this unit involves presentations of plans and results and a major written report.

Assessment in almost all units is a combination of lab/coursework and examination.

### Learning, Teaching and Assessment of intended learning outcomes

#### Knowledge and Understanding

<table>
<thead>
<tr>
<th>Learning and Teaching Processes</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures (A1, A2, A3, A4, A5, A6, A7)</td>
<td>Unseen written examinations (A1, A2, A3, A4)</td>
</tr>
<tr>
<td>Laboratory sessions (A2, A3)</td>
<td>Marked tutorial exercises (A1, A2, A3, A4)</td>
</tr>
<tr>
<td>Personal tutorials (A1, A2, A3, A4, A7)</td>
<td>Laboratory reports (A2, A3)</td>
</tr>
<tr>
<td>Problem solving classes (A1, A2, A3, A4)</td>
<td>Project reports (individual and group) (A3, A4, A5, A6, A7)</td>
</tr>
<tr>
<td>Problem-based learning (A2, A3, A4, A5, A6, A7)</td>
<td>Oral presentations (individual and group) (A3, A4, A5, A6, A7)</td>
</tr>
<tr>
<td>Projects (A3, A4, A5, A6, A7)</td>
<td></td>
</tr>
<tr>
<td>Industrial seminars (A4, A5, A6, A7)</td>
<td></td>
</tr>
</tbody>
</table>

#### Intellectual Skills

<table>
<thead>
<tr>
<th>Learning and Teaching Processes</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures (B1, B2, B4, B5)</td>
<td>Unseen written examinations (B1, B2, B4)</td>
</tr>
<tr>
<td>Laboratory sessions (B1, B2)</td>
<td>Marked tutorial exercises (B1, B2)</td>
</tr>
<tr>
<td>Personal tutorials (B1, B2, B4)</td>
<td>Laboratory reports (B1, B2)</td>
</tr>
<tr>
<td>Problem solving classes (B1, B2, B4)</td>
<td>Project reports (individual and group) (B1, B2, B3, B4, B5)</td>
</tr>
<tr>
<td>Problem-based learning (B1, B2, B4)</td>
<td>Oral presentations (individual and group) (B1, B2, B3, B4, B5)</td>
</tr>
<tr>
<td>Projects (B1, B2, B3, B4, B5)</td>
<td></td>
</tr>
</tbody>
</table>

#### Practical Skills

<table>
<thead>
<tr>
<th>Learning and Teaching Processes</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures (C4, C6)</td>
<td>Laboratory reports (C1, C2, C3, C4, C5, C6, C7)</td>
</tr>
<tr>
<td>Laboratory sessions (C1, C2, C3, C4, C5, C6, C7)</td>
<td>Project reports (individual and group) (C3, C4, C5, C6)</td>
</tr>
<tr>
<td>Projects (C3, C4, C5, C6, C9)</td>
<td>Oral presentations (individual and group) (C6, C8, C9)</td>
</tr>
</tbody>
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### Transferable skills

<table>
<thead>
<tr>
<th>Learning and Teaching Processes</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures (D3, D4, D5, D7)</td>
<td>Laboratory reports (D1, D3, D5, D6)</td>
</tr>
<tr>
<td>Laboratory sessions (D1, D3, D5, D6)</td>
<td>Essays (D2, D3)</td>
</tr>
<tr>
<td>Personal tutorials (D1, D2, D3, D4, D7)</td>
<td>Project reports (individual and group) (D1, D2, D3, D4, D5, D6, D7)</td>
</tr>
<tr>
<td>Problem solving classes (D4)</td>
<td>Oral presentations (individual and group) (D1, D3, D6, D7, D8)</td>
</tr>
<tr>
<td>Problem-based learning (D1, D2, D3, D4, D5, D6)</td>
<td>Industrial placement reports (D8)</td>
</tr>
<tr>
<td>Projects (D1, D2, D3, D4, D5, D6, D7)</td>
<td></td>
</tr>
<tr>
<td>Industrial placement (D8)</td>
<td></td>
</tr>
</tbody>
</table>
Programme structure

If you wish to take an external unit which is not listed on your programme course unit list (such as, for example, from University College) you must get permission from your Year Tutor. This applies for every year of your programme. If your choices do not meet the School’s course unit and theme requirements you will be contacted and be required to change your choices.

Level 1 - compulsory units
All of the units in this pool are mandatory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP10120</td>
<td>First Year Team Project</td>
<td>20</td>
</tr>
<tr>
<td>COMP11120</td>
<td>Mathematical Techniques for Computer Science</td>
<td>20</td>
</tr>
<tr>
<td>COMP12111</td>
<td>Fundamentals of Computation</td>
<td>10</td>
</tr>
<tr>
<td>COMP13112</td>
<td>Fundamentals of Computer Engineering</td>
<td>10</td>
</tr>
<tr>
<td>COMP14112</td>
<td>Fundamentals of Artificial Intelligence</td>
<td>10</td>
</tr>
<tr>
<td>COMP15111</td>
<td>Fundamentals of Computer Architecture</td>
<td>10</td>
</tr>
<tr>
<td>COMP16121</td>
<td>Object Oriented Programming with Java 1</td>
<td>20</td>
</tr>
<tr>
<td>COMP16212</td>
<td>Object Oriented Programming with Java 2</td>
<td>10</td>
</tr>
<tr>
<td>COMP18112</td>
<td>Fundamentals of Distributed Systems</td>
<td>10</td>
</tr>
</tbody>
</table>

Level 2 options
MANDATORY UNITS - 70 CREDITS
OPTIONAL UNITS - 50 CREDITS

From the optional lists you must choose 20 credits from semester one and 30 credits from semester two.

This programme requires 2 themes to be completed from the following list.

* Agile Methods (COMP23420, COMP33711 & COMP33812)
* Rigorous Development (COMP21111, COMP31111 & COMP31212)
* Software Engineering (COMP23420, COMP33411 & COMP33512)

Level 2 - compulsory units
All of the units in this pool are mandatory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP23111</td>
<td>Fundamentals of Databases</td>
<td>10</td>
<td>Enterprise Information Systems</td>
</tr>
<tr>
<td>COMP23420</td>
<td>Software Engineering</td>
<td>20</td>
<td>Software Engineering</td>
</tr>
<tr>
<td>COMP25111</td>
<td>Operating Systems</td>
<td>10</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>COMP26120</td>
<td>Algorithms and Imperative Programming</td>
<td>20</td>
<td>Programming and Algorithms</td>
</tr>
<tr>
<td>COMP28112</td>
<td>Distributed Computing</td>
<td>10</td>
<td>Web and Distributed Systems</td>
</tr>
</tbody>
</table>

Level 2 - option pool 1
From this option pool choose a maximum of 20 credits and a minimum of 10 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP21111</td>
<td>Logic and Modelling</td>
<td>10</td>
<td>Rigorous Development</td>
</tr>
<tr>
<td>COMP22111</td>
<td>Processor Microarchitecture</td>
<td>10</td>
<td>System-on-Chip</td>
</tr>
<tr>
<td>COMP24111</td>
<td>Machine Learning and Optimisation</td>
<td>10</td>
<td>Learning and Search in Artificial Intelligence</td>
</tr>
<tr>
<td>COMP26411</td>
<td>Computer Networks</td>
<td>10</td>
<td>Mobile Computing and Networks</td>
</tr>
</tbody>
</table>

Level 2 - option pool 2
From this option pool choose a maximum of 30 credits and a minimum of 20 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP22712</td>
<td>Microcontrollers</td>
<td>10</td>
<td>None</td>
</tr>
<tr>
<td>COMP24412</td>
<td>Symbolic AI</td>
<td>10</td>
<td>Natural Language, Representation and Reasoning</td>
</tr>
<tr>
<td>COMP25212</td>
<td>System Architecture</td>
<td>10</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>COMP27112</td>
<td>Computer Graphics and Image Processing</td>
<td>10</td>
<td>Visual Computing</td>
</tr>
<tr>
<td>COMP28512</td>
<td>Mobile Systems</td>
<td>10</td>
<td>Mobile Computing and Networks</td>
</tr>
</tbody>
</table>
### Level 3 options

**MANDATORY UNITS - 60 CREDITS**

**OPTIONAL UNITS - 60 CREDITS**

From the optional lists you must choose 30 credits from semester one and 30 credits from semester two. This programme requires 2 themes to be completed from the following list.

- Agile Methods (COMP23420, COMP33711 & COMP33812)
- Rigorous Development (COMP21111, COMP31111 & COMP31212)
- Software Engineering (COMP23420, COMP33411 & COMP33512)

### Level 3 - compulsory units

All of the units in this pool are mandatory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP30040</td>
<td>3rd Year Project (Single Honours 40 Credits)</td>
<td>40</td>
<td>None</td>
</tr>
<tr>
<td>MSEC31122</td>
<td>Managing Finance in Enterprises for Computer Scientists</td>
<td>10</td>
<td>None</td>
</tr>
<tr>
<td>MSEC31131</td>
<td>Enterprise Management for Computer Scientists</td>
<td>10</td>
<td>None</td>
</tr>
</tbody>
</table>

### Level 3 - option pool 1

From this option pool choose a maximum of 30 credits and a minimum of 20 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP31111</td>
<td>Verified Development</td>
<td>10</td>
<td>Rigorous Development</td>
</tr>
<tr>
<td>COMP32111</td>
<td>System-on-chip Modelling with SystemC</td>
<td>10</td>
<td>System-on-Chip</td>
</tr>
<tr>
<td>COMP33111</td>
<td>Data Integration and Analysis</td>
<td>10</td>
<td>Enterprise Information Systems</td>
</tr>
<tr>
<td>COMP33411</td>
<td>Software Design using Patterns</td>
<td>10</td>
<td>Software Engineering</td>
</tr>
<tr>
<td>COMP33711</td>
<td>Agile Software Engineering</td>
<td>10</td>
<td>Agile Methods</td>
</tr>
<tr>
<td>COMP34411</td>
<td>Natural Language Systems</td>
<td>10</td>
<td>Natural Language, Representation and Reasoning</td>
</tr>
<tr>
<td>COMP36111</td>
<td>Advanced Algorithms I</td>
<td>10</td>
<td>Programming and Algorithms</td>
</tr>
<tr>
<td>COMP36411</td>
<td>Understanding Programming Languages</td>
<td>10</td>
<td>Computer Languages</td>
</tr>
<tr>
<td>COMP37111</td>
<td>Advanced Computer Graphics</td>
<td>10</td>
<td>Visual Computing</td>
</tr>
<tr>
<td>COMP38411</td>
<td>Cryptography and Network Security</td>
<td>10</td>
<td>Mobile Computing and Networks</td>
</tr>
</tbody>
</table>

### Level 3 - option pool 2

From this option pool choose a maximum of 30 credits and a minimum of 20 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP31212</td>
<td>Concurrency and Process Algebra</td>
<td>10</td>
<td>Rigorous Development</td>
</tr>
<tr>
<td>COMP32212</td>
<td>Implementing System-on-Chip Designs</td>
<td>10</td>
<td>System-on-Chip</td>
</tr>
<tr>
<td>COMP33212</td>
<td>Advanced Database Systems</td>
<td>10</td>
<td>Enterprise Information Systems</td>
</tr>
<tr>
<td>COMP33512</td>
<td>User Experience</td>
<td>10</td>
<td>Software Engineering</td>
</tr>
<tr>
<td>COMP33812</td>
<td>Software Evolution</td>
<td>10</td>
<td>Agile Methods</td>
</tr>
<tr>
<td>COMP34512</td>
<td>Knowledge Representation and Reasoning</td>
<td>10</td>
<td>Natural Language, Representation and Reasoning</td>
</tr>
<tr>
<td>COMP35112</td>
<td>Chip Multiprocessors</td>
<td>10</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>COMP36212</td>
<td>Advanced Algorithms II</td>
<td>10</td>
<td>Programming and Algorithms</td>
</tr>
<tr>
<td>COMP36512</td>
<td>Compilers</td>
<td>10</td>
<td>Computer Languages</td>
</tr>
<tr>
<td>COMP37212</td>
<td>Computer Vision</td>
<td>10</td>
<td>Visual Computing</td>
</tr>
<tr>
<td>COMP38212</td>
<td>Topics in Advanced Information Retrieval</td>
<td>10</td>
<td>Web and Distributed Systems</td>
</tr>
<tr>
<td>COMP38512</td>
<td>Digital Wireless Communication and Networks</td>
<td>10</td>
<td>Mobile Computing and Networks</td>
</tr>
</tbody>
</table>

### Level 3 - option pool 3

From this option pool choose a maximum of 20 credits and a minimum of 0 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
<th>Theme</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP34120</td>
<td>AI and Games</td>
<td>20</td>
<td>Learning and Search in Artificial Intelligence</td>
</tr>
</tbody>
</table>

You should aim to do 45 or 60 credits in each of semester 1 and semester 2.
Pools 1 to 4 map to periods 1 to 4 in the PGT timetable. You must pick exactly one module from Pool 5 avoiding timetable clashes.

Mandatory units - 40 credits
Optional units - 90 credits (6 course units)

### Level 4 - compulsory units
All of the units in this pool are mandatory.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP40901</td>
<td>Industrial Group Project</td>
<td>25</td>
</tr>
<tr>
<td>MSEC40001</td>
<td>Entrepreneurial Commercialisation of Knowledge</td>
<td>15</td>
</tr>
<tr>
<td>MSEC60922</td>
<td>Business Feasibility Study</td>
<td>15</td>
</tr>
</tbody>
</table>

### Level 4 - option pool 1
From this option pool choose 15 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP60411</td>
<td>Semi-structured Data and the Web</td>
<td>15</td>
</tr>
<tr>
<td>COMP60611</td>
<td>Parallel Programs and their Performance</td>
<td>15</td>
</tr>
<tr>
<td>COMP60711</td>
<td>Data Engineering</td>
<td>15</td>
</tr>
<tr>
<td>COMP61011</td>
<td>Foundations of Machine Learning</td>
<td>15</td>
</tr>
</tbody>
</table>

### Level 4 - option pool 2
From this option pool choose a maximum of 30 credits and a minimum of 15 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP60421</td>
<td>Ontology Engineering for the Semantic Web</td>
<td>15</td>
</tr>
<tr>
<td>COMP6062a</td>
<td>Designing for Parallelism</td>
<td>15</td>
</tr>
<tr>
<td>COMP6062b</td>
<td>Future Multi-core Computing</td>
<td>15</td>
</tr>
<tr>
<td>COMP60731</td>
<td>Advanced Database Management Systems</td>
<td>15</td>
</tr>
<tr>
<td>COMP61021</td>
<td>Modelling and visualization of high-dimensional data</td>
<td>15</td>
</tr>
<tr>
<td>COMP61521</td>
<td>Component-based Software Development</td>
<td>15</td>
</tr>
</tbody>
</table>

*You can choose only one of these three modules due to timetable clash) COMP6062a, COMP6062b, COMP61521.)*

### Level 4 - option pool 3
From this option pool choose a maximum of 30 credits and a minimum of 15 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP60332</td>
<td>Automated Reasoning and Verification</td>
<td>15</td>
</tr>
<tr>
<td>COMP60532</td>
<td>Principles of Digital Biology</td>
<td>15</td>
</tr>
<tr>
<td>COMP61232</td>
<td>Mobile Systems</td>
<td>15</td>
</tr>
<tr>
<td>COMP61332</td>
<td>Text Mining</td>
<td>15</td>
</tr>
</tbody>
</table>

### Level 4 - option pool 4
From this option pool choose a maximum of 15 credits and a minimum of 0 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMP60342</td>
<td>Optimization for learning, planning and problem-solving</td>
<td>15</td>
</tr>
<tr>
<td>COMP60542</td>
<td>Introduction to Health Informatics</td>
<td>15</td>
</tr>
<tr>
<td>COMP61242</td>
<td>Mobile Communications</td>
<td>15</td>
</tr>
<tr>
<td>COMP61342</td>
<td>Computer Vision</td>
<td>15</td>
</tr>
<tr>
<td>Code</td>
<td>Title</td>
<td>C2</td>
</tr>
</tbody>
</table>
Mechanisms for programme revision

Course units are reviewed annually by the Undergraduate Committee, as part of the Annual Review process, taking into account the results and comments from Course Unit Evaluation Questionnaires. Input is also received from the Teaching Assessment Panel, which has a responsibility for monitoring teaching quality in the School.

Programmes have been reviewed regularly by groups created specifically for this purpose; the last major review resulted in a new programme portfolio design which started in the first year in 2008-9. The responsibility for leadership of programme review is now in the hands of the Director of Teaching Strategy (currently Dr Steve Pettifer) who chairs a School Teaching Strategy Committee.