## Artificial Intelligence wIE 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>MEng</td>
<td>Artificial Intelligence wIE MEng (Hons)</td>
<td></td>
<td>5 years</td>
<td>FT + Placement year</td>
</tr>
</tbody>
</table>

### Schools
- Computer Science

### Faculty
- Engineering and Physical Sciences

### Awarding Institution
- University of Manchester

### Programme Accreditation
- BCS, IET

### Relevant QAA benchmark(s)
- Computing
Aims and intended learning outcomes

One of the challenges in computing is to make computers think, or be intelligent, so that they can solve new problems, or cope with the unknown. Current achievements include image and voice recognition, and NASA’s Mars Rovers.

By combining the study of AI and traditional computing techniques with an understanding from psychology of how humans learn, our Artificial Intelligence programmes prepare you for a career applying computing in challenging applications. AI-specific topics covered include the key techniques of machine learning, which are built upon knowledge representation and reasoning. These are used in both simple learning, where solutions are remembered and reused, and in the generation of a solution from several related cases.

Our courses give you the opportunity to study these techniques in the context of general computing, and their application in areas such as computer vision, machine learning and natural language processing.

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) prepare students for the social, organisational and professional context in which they will be working.
7) 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.
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 Know and understand the essential mathematics relevant to computer science.
A2 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 Demonstrate a grasp of the principles of computer systems, including architecture, networks and communication
A4 Recognise and appreciate the professional and ethical responsibilities of the practising computer professional, including understanding the need for quality
A5 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 Apply their knowledge of computing in a commercial or industrial context
A7 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 Have a comprehensive knowledge and critical awareness of selected specialist fields at the forefront of computer science, studied at masters level

Intellectual (thinking) skills
Solve a wide range of problems related to the analysis, design and construction of computer systems.

Design and implement a software or hardware system of significant size

Identify a range of solutions and critically evaluate and justify proposed design solutions

Solve computer science problems with pressing commercial or industrial constraints

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

**Practical skills**

Plan and undertake a major individual project

Prepare and deliver coherent and structured verbal and written technical reports

Give technical presentations suitable for the time, place and audience

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

Design, write and debug computer programs in appropriate languages

Use appropriate computer-based design support tools

Apply computer science skills in a commercial or industrial environment

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

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

**Transferable skills**

Display an integrated approach to the deployment of communication skills

Use IT skills and display mature computer literacy

Work effectively with and for others

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

Display personal responsibility by working to multiple deadlines in complex activities

 Employ discrete and continuous mathematical skills as appropriate

Demonstrate significantly enhanced group working abilities

Further develop career plans and personal objectives

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

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

**Intended learning outcomes (PG)**

**Knowledge and Understanding**

Acquire a knowledge of a range of advanced topics in Computer Science beyond undergraduate level and at the forefront of research

Understand, apply and develop leading-edge technologies in two of the following themes: Advanced
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
Teaching, learning and assessment methods

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>
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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>
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</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>COMP1120</td>
<td>Mathematical Techniques for Computer Science</td>
<td>20</td>
</tr>
<tr>
<td>COMP1212</td>
<td>Fundamentals of Computation</td>
<td>10</td>
</tr>
<tr>
<td>COMP1311</td>
<td>Fundamentals of Computer Engineering</td>
<td>10</td>
</tr>
<tr>
<td>COMP1411</td>
<td>Fundamentals of Artificial Intelligence</td>
<td>10</td>
</tr>
<tr>
<td>COMP1511</td>
<td>Fundamentals of Computer Architecture</td>
<td>10</td>
</tr>
<tr>
<td>COMP1612</td>
<td>Object Oriented Programming with Java 1</td>
<td>20</td>
</tr>
<tr>
<td>COMP1712</td>
<td>Object Oriented Programming with Java 2</td>
<td>10</td>
</tr>
<tr>
<td>COMP1812</td>
<td>Fundamentals of Distributed Systems</td>
<td>10</td>
</tr>
</tbody>
</table>

Level 2 options

MANDATORY UNITS - 80 CREDITS
OPTIONAL UNITS - 40 CREDITS

From the optional lists you must choose 10 credits from semester one and 30 credits from semester two.

To enrol on ‘Leadership in Action’ course units please apply here: http://www.mlp.manchester.ac.uk/apply/
This programme requires 2 themes to be completed from the following list.

* Learning and Search in Artificial Intelligence (COMP24111 & COMP34120)
* Natural Language, Representation and Reasoning (COMP24412, COMP34411 & COMP34512)
* Visual Computing (COMP27112, COMP37111 & COMP37212)

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>COMP2311</td>
<td>Fundamentals of Databases</td>
<td>10</td>
<td>Enterprise Information Systems</td>
</tr>
<tr>
<td>COMP2320</td>
<td>Software Engineering</td>
<td>20</td>
<td>Software Engineering</td>
</tr>
<tr>
<td>COMP2411</td>
<td>Machine Learning and Optimisation</td>
<td>10</td>
<td>Learning and Search in Artificial Intelligence</td>
</tr>
<tr>
<td>COMP2442</td>
<td>Symbolic AI</td>
<td>10</td>
<td>Natural Language, Representation and Reasoning</td>
</tr>
<tr>
<td>COMP2511</td>
<td>Operating Systems</td>
<td>10</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>COMP2612</td>
<td>Algorithms and Imperative Programming</td>
<td>20</td>
<td>Programming and Algorithms</td>
</tr>
</tbody>
</table>

Level 2 - option pool 1
From this option pool choose a maximum of 10 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>COMP2111</td>
<td>Logic and Modelling</td>
<td>10</td>
<td>Rigorous Development</td>
</tr>
<tr>
<td>COMP2211</td>
<td>Processor Microarchitecture</td>
<td>10</td>
<td>System-on-Chip</td>
</tr>
<tr>
<td>COMP2311</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>COMP2271</td>
<td>Microcontrollers</td>
<td>10</td>
<td>None</td>
</tr>
<tr>
<td>COMP2521</td>
<td>System Architecture</td>
<td>10</td>
<td>Computer Architecture</td>
</tr>
<tr>
<td>COMP2711</td>
<td>Computer Graphics and Image Processing</td>
<td>10</td>
<td>Visual Computing</td>
</tr>
<tr>
<td>COMP2811</td>
<td>Distributed Computing</td>
<td>10</td>
<td>Web and Distributed Systems</td>
</tr>
<tr>
<td>COMP2851</td>
<td>Mobile Systems</td>
<td>10</td>
<td>Mobile Computing and Networks</td>
</tr>
</tbody>
</table>

Level 2 - option pool 3
From this option pool choose a maximum of 10 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>BIOL20882</td>
<td>An Introduction to Current Topics in Biology</td>
<td>10</td>
<td>None</td>
</tr>
<tr>
<td>HSTM20282</td>
<td>The Information Age</td>
<td>10</td>
<td>None</td>
</tr>
<tr>
<td>MLPX20021</td>
<td>Leadership in Action</td>
<td>10</td>
<td>None</td>
</tr>
<tr>
<td>MLPX20022</td>
<td>Leadership in Action</td>
<td>10</td>
<td>None</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.

- * Learning and Search in Artificial Intelligence (COMP24111 & COMP34120)
- * Natural Language, Representation and Reasoning (COMP24412, COMP34411 & COMP34512)
- * Visual Computing (COMP27112, COMP37111 & COMP37212)

**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
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>
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</thead>
<tbody>
<tr>
<td>COMP60901</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>
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</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 30 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>
</tbody>
</table>

School of Computer Science
COMP3012 Object-Oriented Programming with Java 2
COMP3013 Fundamentals of Distributed Systems
COMP3111 Logic and Modelling
COMP3112 Presence Microstructure
COMP3202 Microcontrollers
COMP3211 Fundamentals of Databases
COMP3212 Software Engineering
COMP3213 Machine Learning and Optimisation
COMP3302 Symbolic AI
COMP3511 Operating Systems
COMP3912 System Architecture
COMP3913 Algorithms and Imperative Programming
COMP3914 Computer Graphics and Image Processing
COMP3916 Modelling and visualization of high-dimensional data
COMP3917 Text Mining
COMP3918 Parallel Programs and their Performance
COMP3921 Advanced Database Systems
COMP3922 Advanced Computer Graphics
COMP3923 Algorithms and Imperative Programming
COMP3924 Concurrency and Process Algebra
COMP3925 Computer Graphics and Image Processing
COMP3926 Foundations of Machine Learning
COMP3927 Symbolic AI
COMP3928 Business Feasibility Study
COMP3929 Future Multi-core Computing
COMP3930 Mobile Systems
COMP3931 Mobile Communications
COMP3932 Mobile Computing
COMP3933 Planning and Pathfinding for Mobile Robots
COMP3934 Computer Vision
COMP3935 Business Feasibility Study
COMP3936 Enterprise Software Development
COMP3937 Business Feasibility Study
COMP3938 Game Programming
COMP3939 Advanced Game Programming
COMP3940 Embedded Systems Design
COMP3941 Advanced Computer Graphics
COMP3942 Machine Learning and Computational Intelligence
COMP3943 Machine Learning and Computational Intelligence
COMP3944 Machine Learning and Computational Intelligence
COMP3945 Machine Learning and Computational Intelligence
COMP3946 Machine Learning and Computational Intelligence
COMP3947 Machine Learning and Computational Intelligence
COMP3948 Machine Learning and Computational Intelligence
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COMP3989 Machine Learning and Computational Intelligence
COMP3990 Machine Learning and Computational Intelligence
COMP3991 Machine Learning and Computational Intelligence
COMP3992 Machine Learning and Computational Intelligence
COMP3993 Machine Learning and Computational Intelligence
COMP3994 Machine Learning and Computational Intelligence
COMP3995 Machine Learning and Computational Intelligence
COMP3996 Machine Learning and Computational Intelligence
COMP3997 Machine Learning and Computational Intelligence
COMP3998 Machine Learning and Computational Intelligence
COMP3999 Machine Learning and Computational Intelligence

Code Title
COMP3011 Industrial Group Project
COMP3032 Automated Reasoning and Verification
COMP3034 Optimisation for Learning, Planning and Problem-solving
COMP3035 Scene-oriented Data and the Web
COMP3036 Engineering for the Semantic Web
COMP3037 Principles of Digital Biology
COMP3038 Introduction to Health Informatics
COMP3041 Parallel Programming and their Performance
COMP3042 Designing for Parallelism
COMP3043 Finite-Multicore Computing
COMP3044 Data Engineering
COMP3045 Advanced Database Management Systems
COMP3046 Foundations of Machine Learning
COMP3047 Modelling and visualisation of high-dimensional data
COMP3048 Mobile Systems
COMP3049 Mobile Communications
COMP3050 Test Mining
COMP3051 Computer Vision
COMP3052 Computer-Aided Software Development
COMP3053 Business Feasibility Study
COMP3054 Enterprise Systems 2
COMP3055 Computer-Aided Software Development
COMP3056 Business Feasibility Study
COMP3057 Business Feasibility Study
COMP3058 Business Feasibility Study
COMP3059 Business Feasibility Study
COMP3060 Business Feasibility Study
COMP3061 Business Feasibility Study
COMP3062 Business Feasibility Study
COMP3063 Business Feasibility Study
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COMP3096 Business Feasibility Study
COMP3097 Business Feasibility Study
COMP3098 Business Feasibility Study
COMP3099 Business Feasibility Study

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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.