MEng Applied Computer Science and Cybernetics UCAS code: GHL6

For students entering Part 1 in 2004

Awarding Institution: The University of Reading
Teaching Institution: The University of Reading
Relevant QAA subject benchmarking group(s): Computing
Faculty of Science Programme length: 5 years
Date of profile: 02/03/06
Programme Director: Dr. V.F.Ruiz
Programme Adviser: Dr R.J.Mitchell (Cybernetics), Dr G.T.McKee (Computer Science)
Board of Studies: Computer Science and Cybernetics
Accreditation: British Computer Society

Summary of programme aims

The programme combines a sound understanding of computer science and cybernetics. It aims to impart skills in the assimilation of technically complex material, team working, meeting deadlines, the production of clearly written reports, and to introduce some current research in computing and cybernetics. (For a full statement of the programme aims and learning outcomes see below)

Transferable skills

The University's Strategy for Teaching and Learning has identified a number of generic transferable skills which all students are expected to have developed by the end of their degree programme. In following this programme, students will have had the opportunity to enhance their skills relating to career management, communication (both written and oral), information handling, numeracy, problem-solving, team working and use of information technology.

As part of this programme students are expected to have gained experience and show competence in the following such skills: IT (word-processing, using standard and mathematical software, scientific programming), scientific writing, oral presentation, team-working, problem-solving, use of library resources, time-management, career planning and management, and business awareness.

Programme content

The profile below states which modules must be taken (the compulsory part), together with lists of modules from which the student must make a selection (the "selected" modules). Students must choose such additional modules as they wish, in consultation with their programme adviser, to make 120 credits in each Part. The credit for each module is shown in the second column from the right. The codes C,M,I,H in the right most column show the level of each module.

		Part 1 (three terms)	*Credits*	*Level*
Compulsory modules				
	CY1A2	*Cybernetics and Its Application*	20	C
	SE1A2	*Introduction to Computer Systems*	10	C
	CS1G2	*Introduction to Algorithms*	10	C
and either both				
	SE1B2	*Systems and Circuits*	20	C
	EG1C2	*Engineering Mathematics*	20	C
or	CY1B2	*Analysis of Cybernetic Systems*	20	C
and either				
	CS1A2	*Programming 1*	10	C
&	CS1B2	*Programming 2*	10	C
or	CS1C2	*Introductory Programming 1*	10	C
&	CS1D2	*Introductory Programming 2*	10	C
Optional modules - choose modules worth a further 20 or 40 credits, to have a total of 120 credits				
	CS1H2	*Functional Programming*	20	C
	MA113	*Logic and Discrete Maths*	20	C
	EE1A2	*Electronic Devices and Telecoms*	20	C
		Institution Wide Language Programme	20	C

Part 2 (three terms)		*Credits*	*Level*
Compulsory modules			
CS2D2	*Databases*	10	I
CS2E2	*Software Engineering*	10	I
CS2G2	*Algorithmic Techniques*	20	I
CY2B2	*Further Cybernetic Systems*	20	I
CY2D2	*Neurocomputation*	20	I
CY2G2	*Signals*	10	I
SE2B2	*Further Computer Systems*	20	I
SE2R2	*Transferable Skills*	10	I

Industrial year (three terms)		*Credits*	*Level*
Compulsory modules			
CS2S2	*Industrial year*	120	I

Part 3 (three terms)		*Credits*	*Level*
Compulsory modules			
CY3A2	*Computer Controlled Feedback Systems*	20	H
CY3B2	*Machine Intelligence*	10	H
SE3Z5	*Social, Legal and Ethical Aspects of Science and Engineering*	20	H
& CS3Q2	*Computer Science Project*	30	H
or CY3P2	*Cybernetics Project*	30	H
Optional modules must be chosen to give a total of 120 credits:			
CY3F2	*Virtual Reality*	10	H
CY3G2	*Modern Heuristics*	10	H
CY3L2	*Mechatronics*	10	H
CY4E2	*Bionics*	10	M
CS3A2	*Computer Networking*	10	H
CS3B2	*GUI, Web and Multimedia Design*	10	H
CS3F6	*XML & Semantic Web Technologies & Applications*	10	H
CS3M6	*Evolutionary Computation*	10	H
CS3E6	*Distributed Computing*	10	H
CS3J2	*Computer Graphics I*	10	H
CS3D2	*Computer Graphics II*	10	H
CS3G2	*Computer Vision*	10	H
CS3U2	*Linear Algebra for Computer Vision and Robotics*	10	H
CS3Y2	*Robotic Architectures*	10	H
CS3W2	*Artificial Intelligence*	10	H
	Language from IWLP	20	H

Part 4 (three terms)		*Credits*	*Level*
Compulsory modules			
SE4P6	*MEng Research Project*	40	M
CY4B2	*Mind as Motion*	10	M
Optional modules must be chosen to give a total of 120 credits. These must be chosen from the following except, subject to timetabling restrictions, students can also choose up to 20 credits of Part 3 optional modules they have not already taken but at least 100 credits must be at M level..			
CS4B2	*Parallel Algorithms*	10	M
CS4E7	*Computational Robotics*	10	M
CS4Q2	*Research Studies*	10	M
CS4Z4	*Computer Security*	10	M
CY4I7	*Biomechanics*	10	M
CY4J2	*Manipulator Robotics*	10	M

CY4K7	*Learning Classifier Systems*	10	M
MMM380	*Practice of Entrepreneurship*	20	M

Progression requirements
In order to progress from Part 1 to Part 2 students must:

- Achieve an overall average of 40% in 120 credits taken in Part 1; and
- Achieve not less than 30% in the compulsory modules taken in Part 1.

To gain a threshold performance at Part 2 and qualify for the DipHE a student shall normally be required to achieve an overall average of 40% over 120 credits taken in Part 2, and a mark of at least 30% in individual modules amounting to not less than 100 credits. In order to progress from Part 2 to Part 3, a student shall normally be required to achieve a threshold performance at Part 2 and achieve an overall average of 60% in the 120 credits taken in Part 2. A student whose average is below 60% may be qualified for the BSc Applied Computer Science and Cybernetics degree.

Summary of teaching and assessment
Teaching is organised in modules that typically involve both lectures and practical work. Most modules are assessed by a mixture of coursework and formal examination. However, some modules are assessed only as coursework, while others are assessed solely by examination. Details are given in the relevant module descriptions.

To be eligible for Honours, students must obtain an overall average mark of at least 40% **and** at least 40% in both the Part 3 and Part 4 Projects, and submit a satisfactory report on the industrial year module to be eligible for the Applied Degree. Students failing to submit a satisfactory report on the industrial year may be eligible for the non applied version of their degree programme.
The relative contributions to the final assessment of Parts 2, 3 and 4 are 1:2:2.

Admission requirements
Entrants to this programme are normally required to have obtained:

A minimum of GCSE: Mathematics Grade B or higher and Combined Science Grade B or higher.
UCAS Tariff: 300 points with a Grade B or higher in Mathematics or science subject.
International Baccalaureate: 32 points; or
Irish Leaving Certificate: BBBBB, including a Grade B or higher in Mathematics or Science.
Equivalent qualifications are acceptable.
Admissions Tutor: Dr Will Browne

Support for students and their learning
University support for students and their learning falls into two categories. Learning support includes IT Services, which has several hundred computers and the University Library, which across its three sites holds over a million volumes, subscribes to around 4,000 current periodicals, has a range of electronic sources of information and houses the Student Access to Independent Learning (S@IL) computer-based teaching and learning facilities. There are language laboratory facilities both for those students studying on a language degree and for those taking modules offered by the Institution-wide Language Programme. Student guidance and welfare support are provided by Personal Tutors, the Careers Advisory Service, the University's Special Needs Advisor, Study Advisors, Hall Wardens and the Students' Union.

Within the providing School additional support is given though practical laboratory classes. The development of problem-solving skills is assisted by appropriate assignment and project work. There is a Course Adviser to offer advice on the choice of modules within the programme. Course handbooks are provided for each Part of the course: these give more details about the modules which make up the degree. In addition, the School of Systems Engineering produces a Handbook for Students, which provides general information about the staff and facilities within the school.

Career prospects
In recent years most students who have followed this programme have gone into careers in the software industry. These range from small start up companies to multi-nationals and several graduates have started their own businesses. Others have joined research groups in university and industry, the public service, and the teaching professions. Graduates from this programme are

partially exempt from the professional examinations of the British Computer Society. After a further year of higher education and a period of professional experience, a graduate can expect to achieve Chartered Engineer status.

Opportunities for study abroad
N/A

Educational aims of the programme
To develop the students' knowledge of the theory and practice of modern computer science, necessary for them to secure employment as professional software engineers in a wide variety of industries; to encourage their critical and analytical skills; and to develop their skills in applying theoretical concepts to the practice of computer systems design.

Many students find that the experience and knowledge gained during the Industrial Year allows them to make better use of their final year of University study, and provides useful background knowledge for more permanent career choices.

Programme Outcomes
The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas:

Knowledge and Understanding

A. Knowledge and understanding of:	***Teaching/learning methods and strategies***
1. computer science and cybernetics 2. information technology. 3. appropriate mathematical techniques, including the use of mathematics as a tool for communicating results, concepts and ideas 4. business context. 5. engineering practice. →	The knowledge required for 1-5 is obtained via lectures, exercises, practicals, assignments and project work. Appropriate IT packages are taught. Practical demonstrators and project supervisors advise students, and feedback is provided on all continually assessed work. As the course progresses students are expected to show greater initiative. There is more project work than in the BSc with substantial projects in Parts 3 and 4. The year spent in industry gives the student a first hand understanding of the business context. ***Assessment*** Most knowledge is tested through a combination of practicals, assignments and formal examinations. Students write reports on many assignments, and also make oral presentations of their work.

Skills and other attributes

B. Intellectual skills – able to:

1. select and apply appropriate computer based methods, mathematical and scientific principles for analysing general systems.
2. analyse and solve problems.
3. organise tasks into a structured form.
4. understand the evolving state of knowledge in a rapidly developing area.
5. transfer appropriate knowledge and methods from one topic within the subject to another.
6. plan, conduct and write a report on a project or assignment.
7. prepare an oral presentation.

Teaching/learning methods and strategies

Appropriate software, mathematical, scientific and IT skills and tools are taught in lectures, and problems to be solved are given as projects or assignments. Project planning is part of the Part 3 project, and written and oral presentations are required for various assignments and projects.

Assessment

Skills 1-5 are assessed partly by examination, though sometimes also by project or assignment work. Skills 6 and 7 are assessed as part of project work.

C. Practical skills – able to:

1. use appropriate software tools.
2. program a computer to solve problems.
3. use relevant software and analyse the results critically.
4. design, build and test a system.
5. research into computer science problems.
6. utilise project management methods.
7. present work both in written and oral form.
8. manage projects effectively

Teaching/learning methods and strategies

Software tools are introduced in lectures and their use is assessed by examinations and assignments.

Programming assignments are set, and students may write programs to solve other projects.

Practicals and projects are used to teach about skill 3, and projects are used for skills 4, 5, 6, 7 and 8.

Assessment

Skills 1 and 5 are tested in coursework and in examinations. Skillss2, 5 and 7 are tested by assignments and projects, 3 is assessed in practicals and sometimes in projects, Skills 4, 5 and 6 are assessed through project work.

D. Transferable skills – able to:

1. use software tools.
2. acquire, manipulate and process data.
3. use creativity and innovation.
4. solve problems.
5. communicate scientific ideas.
6. give oral presentations.
7. work as part of a team.
8. use information resources.
9. manage time.

Teaching/learning methods and strategies

Software tools are taught partly in lectures, mainly through practical sessions and assignments.

Data skills are acquired in laboratory and projects. Creativity and innovation and problems solving are experienced through projects, as are team working, time management and presentations. Use of information resources, such as the library and IT methods is experienced through projects and assignments.

Assessment

Some skills, like the use of software tools and ability to communicate orally and in written form are directly assessed, in assignments or projects, other skills are not directly assessed but their effective use will enhance the students overall performance.

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 he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the module description and in the programme handbook. The University reserves the right to modify this specification in unforeseen circumstances, or where the process of academic development and feedback from students, quality assurance processes or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.