MEng Computer Science and Cybernetics **UCAS code: GHK6**

For students entering Part 1 in 2006

Awarding Institution: The University of Reading
Teaching Institution: The University of Reading
Relevant QAA subject benchmarking group(s): Computing
Faculty of Science Programme length: 4 years
Date of specification: 24/03/09
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					
	SE1CA5	*Cybernetics and Its Application*		20	C
	SE1SA5	*Programming*		20	C
	SE1SB5	*Software Engineering*		20	C
	SE1EA5	*Electronic Circuits*		20	C
	SE1EB5	*Computer and Internet Technologies*		20	C
and	SE1CB5	*Engineering Mathematics*	[if have A level Maths]	20	C
or	MA116	*Mathematics for Computer Scientists*	[otherwise]	20	C

	Part 2 (three terms)		*Credits*	*Level*
Compulsory modules				
	CS2TD7	*Databases*	10	I
	CS2T7	*Introduction to Algorithms*	10	I
	CS2L7	*Human Computer Interaction*	10	I
	CY2A7	*Control and Measurement*	20	I
	CY2D7	*Neurocomputation*	20	I
	CY2G2	*Signals*	10	I
	CY2H6	*Further Computer Systems*	10	I
	EE2C2	*Digital Circuit Design*	10	I
	SE2P6	*Engineering Applications*	20	I

Part 3 (three terms)			*Credits*	*Level*
Compulsory modules				
	CS3Q2	*Computer Science Project*	30	H
or	CY3P2	*Cybernetics Project*	30	H
	CY3A2	*Computer Controlled Feedback Systems*	20	H
	CY3B2	*Machine Intelligence*	10	H
	CY3G2	*Modern Heuristics*	10	H
	SE3Z5	*Social, Legal and Ethical Aspects of Science and Engineering*	20	H
Optional modules must be chosen to give a total of 120 credits:				
	CS3A2	*Computer Networking*	10	H
	CS3D2	*Computer Graphics II*	10	H
	CS3E6	*Distributed Computing*	10	H
	CS3J2	*Computer Graphics I*	10	H
	CS3M6	*Evolutionary Computation*	10	H
	CS3U7	*Image Analysis*	10	H
	CS3V7	*Visual Intelligence*	10	H
	CS3W7	*Multi-Agent Systems*	10	H
	CS3Y7	*Robot Systems*	10	H
	CY3F8	*Virtual Reality*	10	H
	CY3J8	*Machines in Motion*	10	H
	CY3K7	*Bionics*	10	H
	CY3L2	*Mechatronics*	10	H
	CY3N7	*Mechanical Design*	10	H
	LAXXX	*Institution Wide Language Programme*	20	H

Part 4 (three terms)			*Credits*	*Level*
Compulsory modules				
	SE4P6	*MEng Research Project*	40	M
	CY4B2	*Mind as Motion*	10	M
	SE4R9	*Research Studies*	10	M
	SE4S9	*Law and Management*	10	M
Optional modules must be chosen to give a total of 120 credits.				
	CS4B2	*Parallel Algorithms*	10	M
	CS4E7	*Computational Robotics*	10	M
	CS4Z4	*Computer Security*	10	M
	CY4F8	*Swarm Intelligence and Artificial Life*	10	M
	CY4I7	*Biomechanics*	10	M
	CY4J9	*Manipulator Dynamics and Haptics*	10	M
	CY4K7	*Learning Classifier Systems*	10	M
	CY4M8	*Medical Image and Signal Processing*	10	M
	MMM038	*Practice of Entrepreneurship*	20	M

Progression requirements
To gain a threshold performance at Part 1 and qualify for the CertHE a student shall normally be required to achieve an overall average of 40% over 120 credits taken in Part 1, where all the credits are at C level or above, and a mark of at least 30% in individual modules amounting to not less than 100 credits. In order to progress from Part 1 to Part 2, a student shall normally be required to achieve a threshold performance at Part 1, and to have no module mark below 30%.

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 CS/Cyb 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.

A student must obtain at least 40% in both their projects (CY3P2/CS3Q2 and SE4P6) to be eligible for honours

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.
International Baccalaureate: 32 points.
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 Programme 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 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 period of professional experience, a graduate can expect to achieve Chartered Engineer status.

Opportunities for study abroad or for placements
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.

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:

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.

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Teaching/learning methods and strategies
The knowledge required for 1-5 (see left) 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 for the BSc, with substantial projects in Parts 3 and 4.

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 both computer and cybernetic 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.

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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.

In the latter part of the course some research topics in computer science and cybernetics are introduced.

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

Teaching/learning methods and strategies

Mathematical and IT 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.
Laboratory practicals and projects are used to teach 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. Skills 2, 5 and 7 are tested by assignments and projects, 3 is assessed in practicals and sometimes in projects, Skills 4, 5, 6, 7, 8 are assessed through project work.

D. Transferable skills – able to:

1. use IT 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

IT 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 IT 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.