MEng Applied Computer Science and Cybernetics   UCAS code: GHL6
For students entering Part 1 in 2003

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: 03/03/06

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

		Credits	Level
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

		Credits	Level
CS2S2	*Industrial year*	120	I

Part 3 (three terms) *Credits* *Level*

Compulsory modules

			Credits	Level
	CY3A2	*Computer Controlled Feedback Systems*	20	H
	CY3B2	*Machine Intelligence*	10	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:

		Credits	Level
CS3M2	*Evolutionary Computation*	10	H
CS3J2	*Computer Graphics 1*	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
CY3G2	*Modern Heuristics*	10	H
CY3L2	*Mechatronics*	10	H
CY3F2	*Virtual Reality*	10	H

Part 4 (three terms) *Credits* *Level*

Compulsory modules

		Credits	Level
SE4P6	*MEng Research Project*	40	M
CY4B2	*Mind as Motion*	10	M
SE3Z5	*Social, Legal and Ethical Aspects of Science and Engineering*	20	H

Optional modules must be chosen to give a total of 120 credits:

		Credits	Level
MMM038	*Practice of Entrepreneurship*	20	M
CS4B2	*Parallel Algorithms*	10	M
CS4E2	*Robotic Intelligence*	10	M
CS4Q2	*Research Studies*	20	M
CY4E2	*Bionics*	10	M
CY4I2	*Biomedical Engineering*	10	M
CY4J2	*Manipulator Robotics*	10	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 modules taken in Part 1, but note * below.

In order to progress from Part 2 to Part 3 students must:

- Achieve an overall average of 60% in 120 credits taken in Part 2; and
- Achieve not less than 30% in modules taken in Part 2, but note * below.

* except that marks of less than 30% in a total of 20 credits may be condoned provided that the candidate has pursued the course for the module with reasonable diligence and has not been absent from the examination without reasonable cause.

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. In the eventuality of a failure to submit a satisfactory report on the industrial year students are 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 subject.
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 Department 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:	*Teaching/learning methods and strategies*
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.	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.