BSc in Applied Computer Science and Cybernetics **UCAS code: GH4P**

For students entering Part 1 in 2005

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: 27/03/07
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, and the production of clearly written reports. (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 which follows states which modules must be taken, together with one or more lists of modules from which the student must make a selection. Students must choose such additional modules as they wish, in consultation with their programme advisor, to make 120 credits in each part. The number of credits for each module is shown in the second column from the right, and the level C, I or H is shown in the rightmost column.

	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				
	CS2D2	*Databases*	10	I
	CS2G2	*Algorithmic Techniques*	20	I
	CY2A6	*Control and Measurement*	20	I
	CY2D2	*Neurocomputation*	20	I
	CY2G2	*Signals*	10	I
	EE2C2	*Digital Circuit Design*	10	I
	CY2H6	*Further Computer Systems*	10	I
	SE2P6	*Engineering Applications*	20	I

Industrial year (three terms)		*Credits*	*Level*
Compulsory modules			
CS2S7	*Industrial year*	120	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
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
CY3B2	*Machine Intelligence*	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

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 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. A student whose average is 60% or over may be qualified for the MEng Applied CS/Cyb degree.

Summary of teaching and assessment

Teaching is organised in modules that typically involve lectures and tutorial or laboratory practicals. Most modules are assessed by a mixture of coursework and formal examination. Some modules, for example the Part 3 project, are assessed only as coursework. Details are given in the relevant module description.

A student must obtain at least 40% in their project (CY3P2/CS3Q2) to be eligible for honours. In order to graduate with the Applied variant of the degree students are required to achieve an average of at least 40% in their industrial placement (module CS2S7). Otherwise students will be eligible for the non-Applied degree.

Part 2 and Part 3 contribute to the final degree assessment in the ratio 1:2

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: 260 points with a grade C or higher in Mathematics or science subject.
International Baccalaureate: 30 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

Career prospects are good, as the programme is very relevant to today's high technology society. Most graduates find employment connected with the software industry, either in programming, consultancy or systems analysis and design. Some graduates choose to further their research interests either in the School or at other universities.

Opportunities for study abroad or for placements

Either may be taken as part of Industrial Year.

Educational aims of the programme

The programme aims to combine an understanding of computer science and cybernetics, with a knowledge of relevant modern technologies, theories and techniques; to produce good practically oriented graduates able to work in an academic, research or industrial environment, as individuals or as part of a team. This programme is distinctive in that it gives an overview of both computer science and cybernetics.

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:

1. computer science and cybernetics
2. information technology (IT)
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, tutorials, laboratory practicals, assignments and project work. Appropriate IT packages are taught. Laboratory 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. The year spent in industry gives students a first hand knowledge of the business context.

Assessment

Most knowledge is tested through a combination of practicals, assignments and formal examinations. Students write reports on many assignments after Part I, and may 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 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 with in 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 included in 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 and partly 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. utilise project management methods.
6. present work both in written and oral form.
7. manage projects effectively

Teaching/learning methods and strategies

Mathematics 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 as part of other projects. Laboratory practicals and projects are used to teach skill 3 and projects are used for skills 4-8.

Assessment

Skill 1 is tested in coursework and in examinations. Skills 2, 4 and 6 are tested by assignments and projects, 3 is assessed in practicals and sometimes in projects, Skills 4-7 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 problem 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.