MEng Applied Computer Science and Cybernetics **UCAS code:**
For students entering Part 1 in 2008/9

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	Computing
Faculty:	Science Faculty
Programme length:	5 years
Date of specification:	05/Apr/2011
Programme Director:	Dr Virginie Ruiz
Programme Advisor:	Dr Richard Mitchell
	Dr Gerard McKee
Board of Studies:	UG Systems Engineering
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.

The programme aims 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.

Transferable skills
During the course of their studies at Reading, all students will be expected to enhance their academic and personal transferable skills in line with the University's Strategy for Learning and Teaching. In following this programme, students will have had the opportunity to develop such skills, in particular relating to communication, interpersonal skills, learning skills, numeracy, self-management, use of IT and problem-solving and will have been encouraged to further develop and enhance the full set of skills through a variety of opportunities available outside their curriculum.

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,I,H,M in the right most column show the level of each module.

Part 1 (three terms)
Compulsory modules

Code	*Module title*	*Credits*	*Level*
SE1CA5	Cybernetics and its Application	20	C
SE1EB5	Computer and Internet Technologies	20	C
SE1SA5	Programming	20	C
SE1SB5	Software Engineering	20	C

and			
SE1CB5*	Engineering Mathematics	20	C
or			
MA116*	Mathematics for Computer Scientists	20	C
and either			
SE1SC5	Computer Science Roadmap	20	C
or			
SE1EA5	Electronic Circuits	20	C

*Students who have A-level Mathematics should take SE1CB5; students who do not have A-level Mathematics should take MA116.

Part 2 (three terms)
Compulsory modules

Module	*Title*	*Credits*	*Level*
CS2L7	Human Computer Interaction	10	I
CS2TD7	Databases	10	I
CY2A9	Control Systems	10	I
CY2C9	Control and Measurement	10	I
CY2D9	Neural Nets	10	I
CY2G2	Signals	10	I
CY2H6	Further Computer Systems	10	I
CY2K9	Neuroscience	10	I
EE2C2	Digital Circuit Design	10	I
SE2P6	Engineering Applications	20	I
Students who took SE1EA5 in Part 1 should take:			
CS2T7	Introduction to Algorithms	10	I
Otherwise:			
CY2B9	Electronics for Intelligent Systems	10	I

Year abroad/Year away/Additional year (three terms)
Compulsory modules

Mod Code	*Module Title*	*Credits*	*Level*
SE2W9	Industrial Year	120	I

Part 3 (three terms)
Compulsory modules

Code	*Module title*	*Credits*	*Level*
SE3GP11	MEng Group Project	40	H
SE3SL11	Social, Legal and Ethical Aspects of Science and Engineering	10	H
SE3LM11	Law and Management	10	H
SE3SI11	System Identification and Control	20	H
SE3MH11	Modern Heuristics	10	H

Optional modules
Select modules worth 30 credits from:

SE3CN11	Computer Networking	20	H
SE3EC11	Evolutionary Computation	10	H
SE3SE11	Sustainable Electrical Energy	10	H

SE3BI11	Bionics	10	H
SE3DM11	Data Mining	10	H
SE3MM11	Machines in Motion	10	H
SE3IA11	Image Analysis	10	H
SE3VR11	Virtual Reality	10	H
LA1XX1	Institution Wide Language Programme	20	C

Part 4 (three terms)
Compulsory modules

Code	*Module title*	*Credits*	*Level*
Either:			
SE4IP11	Industrial Project	60	M
Or both:			
SE4RP11	Research Project	50	M
SE4RS11	Research Studies	10	M
SE4MM11	Mind as Motion	10	M
SE4NN11	Advanced Neural Networks	10	M

Optional modules
Select modules worth 40 credits from:

SE4SI11	Swarm Intelligence and Artificial Life	10	M
SE4MD11	Manipulator Dynamics and Haptics	10	M
SE4MI11	Medical Image and Signal Processing	10	M
SE4OC11	Optimal Control	10	M
SE4VI11	Visual Intelligence	10	M
SE4CR11	Computational Robotics	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 level C 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 Applied CS/Cyb degree.

A student must obtain at least 40% in both their projects (SE3GP11, and SE4RP11 or SE4IP11) 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 SE2W9). Otherwise students will be eligible for the non-Applied degree.

The relative contributions to the final assessment of Parts 2, 3 and 4 are 1:2:2.

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.

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: 320 points with a Grade B or higher in Mathematics or science subject.
International Baccalaureate: 32 points.
Equivalent qualifications are acceptable.

Admissions Tutor: Dr Faustina Hwang

Support for students and their learning
University support for students and their learning falls into two categories. Learning support is provided by a wide array of services across the University, including: the University Library, the Student Employment, Experience and Careers Centre (SEECC), In-sessional English Support Programme, the Study Advice and Mathematics Support Centre teams, IT Services and 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 is provided by Personal Tutors, School Senior Tutors, the Students' Union, the Medical Practice and advisers in the Student Services Centre. The Student Services Centre is housed in the Carrington Building and offers advice on accommodation, careers, disability, finance, and wellbeing. Students can get key information and guidance from the team of Helpdesk Advisers, or make an appointment with a specialist adviser; Student Services also offer drop-in sessions and runs workshops and seminars on a range of topics. For more information see www.reading.ac.uk/student

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 further year of higher education and a period of professional experience, a graduate can expect to achieve Chartered Engineer status.

Opportunities for study abroad or for placements
Either may be taken as part of Industrial Year

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:*	**Teaching/learning methods and strategies**
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	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:*	**Teaching/learning methods and strategies**
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	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 process or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.