BSc Applied Computer Science and Cybernetics **UCAS code:**
For students entering Part 1 in 2010/1

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	Computing
Faculty:	Science Faculty
Programme length:	4 years
Date of specification:	15/May/2013
Programme Director:	Dr Virginie Ruiz
Programme Advisor:	Dr Richard Mitchell
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, and the production of clearly written reports.

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.

Transferable skills
During the course of their studies at Reading, all students will be expected to enhance their academic and personal transferable skills. 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 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 4, 5 or 6 is shown in the rightmost column.

Part 1 (three terms)
Compulsory modules

Code	*Module title*	*Credits*	*Level*
SE1CA9	Cybernetics and its Application	20	4
SE1SA5	Programming	20	4
SE1SB9	Software Engineering	20	4
SE1EB9	Computer and Internet Technologies	20	4
and			
SE1CB9	Engineering Mathematics [for students who have A-level Maths]	20	4
or			

MA116	Mathematics for Computer Scientists [otherwise]	20	4
and either			
SE1SC9	Computer Science RoadMap	20	4
or			
SE1EA5	Electronic Circuits	20	4

Part 2 (three terms)
Compulsory modules

Code	*Module title*	*Credits*	*Level*
SE2SM11	System Design and Project Management	20	5
SE2SP11	Signal Processing	20	5
SE2EM11	Embedded Microprocessors and Digital Systems	20	5
SE2DB11	Databases	10	5
SE2CS11	Control Systems	10	5
SE2NN11	Neural Networks	10	5
SE2MI11	Machine Intelligence	10	5

Students who took SE1EA5 in Part 1 should take:

SE1FC11	Fundamentals of Computing	20	4

Otherwise:

CY2B9	Electronics for Intelligent Systems	10	5

And one of:

SE2EA11	Essential Algorithms	10	5
SE2NE11	Neuroscience	10	5

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

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

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

Part 3 (three terms)
Compulsory modules

Mod Code	Module Title	Credits	Level
SE3IP11	Individual Project	40	6
SE3SL11	Social, Legal and Ethical Aspects of Science and Engineering	10	6
SE3SI13	Systems Identification and Control	20	6

SE3MH11	Modern Heuristics	10	6

Select modules worth 40 credits form:

SE3LM11	Law & Management	10	6
SE3CN11	Computer Networking	20	6
SE3EC11	Evolutionary Computation	10	6
SE3IA11	Image Analysis	10	6
SE3SE11	Sustainable Electrical Energy	10	6
SE3BI11	Bionics	10	6
SE3VR11	Virtual Reality	10	6
SE3DM	Data Mining	10	6
SE3MM11	Machines in Motion	10	6
LA1XX1	Institution Wide Language Programme	20	4

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 4 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.

A student must obtain at least 40% in their project (SE3IP11) 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.

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

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.

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: 280 points with a grade C or higher in Mathematics or science subject.
International Baccalaureate: 30 points.
Equivalent qualifications are acceptable.

Admissions Tutor: Dr Ben Potter

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 Careers, Placement and Experience Centre (CPEC), 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, academic issues (eg problems with module selection) and exam related queries. 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
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.

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 (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	The knowledge required for 1-5 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 1, and may 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 computer and cybernetic systems	Appropriate software, mathematical, scientific and IT skills and tools are taught in lectures, and problems to be solved are given as projects or

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

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 process or external sources, such as professional bodies, requires a change to be made. In such circumstances, a revised specification will be issued.