BSc Computer Engineering   UCAS code: H611
For students entering Part 1 in 2006

Awarding Institution: University of Reading
Teaching Institution: University of Reading
Relevant QAA subject benchmarking group(s):   Computing
Faculty of Science   Programme length: 3 years
Date of specification: April 2007
Programme Director: Dr GT McKee
Programme Adviser: Dr GT McKee
Admissions Tutor: Dr MP Evans
Board of Studies: Computer Science
Accreditation: Application will be made for British Computer Science accreditation in 2008

Summary of programme aims

The programme combines traditional computer science and electronic engineering principles with good practice in design and project management applied to technically demanding problems. At the end of the course students should be capable of applying these skills to problems requiring the integration of software and hardware. There is an emphasis on team and group work, and the production of quality written reports. Graduates will be well qualified to play a disciplined and innovative part in research and development across the IT and Electronics sector.

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 transferable 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 adviser, to make 120 credits in each part.

Part 1 (three terms)

Compulsory modules		*Credits*
SE1SA5	*Programming*	20 C
SE1SB5	*Software Engineering*	20 C
SE1SC5	*Computer Science Roadmap*	20 C
SE1EB5	*Computer and Internet Technologies*	20 C
MA116	*Mathematics for Computer Science*	20 C

Optional modules
Students are required to select additional modules to the value of 20 credits to make 120 credits in total. Possible options include:

SE1CA5	*Cybernetics and its Application*	20 C
SE1TQ5	*COTS 1*	20 C
	Modern Languages (IWLP)	20 C

Part 2 (three terms)
Compulsory modules

CS2A2	*Compilers*	10 I
CS2B6	*Operating Systems*	10 I
CS2C6	*Computer Architecture*	10 I
CS2TD7	*Databases*	10 I
CS2F7	*Object Oriented Design*	10 I
CS2G7	*Essential Algorithms*	10 I
CS2R7	*Space Robotics*	10 I
CS2J7	*Programming with Java*	10 I
EE2A2	*Embedded Microprocessor Systems*	20 I
EE2C2	*Digital Circuit Design*	10 I
EE2D6	FPGAs and HDLs	10 I

Part 3 (three terms)
Compulsory modules

SE3Z5	*Social, Legal & Ethical Aspects of Science & Engineering*	20 H
SE3Q2	*Computer Engineering Final Year Project*	30 H
EE3V7	*Functional Verification*	10 H
CS3A2	*Computer Networking*	10 H

Optional modules (a total of 50 credits to be chosen):

CS3E6	*Distributed Computing*	10 H
CS3L2	*Neural Computation*	10 H
CS3M6	*Evolutionary Computation*	10 H
CS3J2	*Computer Graphics I*	10 H
CS3D2	*Computer Graphics II*	10 H
CS3H7	*Concurrent Systems*	10 H
CS3K7	*Data Mining*	10 H
CS3U7	*Image Analysis*	10 H
CS3V7	*Visual Intelligence*	10 H
CS3W7	*Multi-Agent Systems*	10 H
CS3Y7	*Robot Systems*	10 H
CS3C5	*Dependable Systems Design*	10 H
CY3F2	*Virtual Reality*	10 H
MM374	*Informatics for E-Enterprise*	20 H
CS3TB4	*Software Quality and Testing*	10 H
CS3TE4	*Requirements Analysis*	10 H
CS3TZ4	*Network Security*	10 H
CS4B2	*Parallel Algorithms*	10 H
CS4E7	*Computational Robotics*	10 H

Students may also take a maximum of 20 credits of Part 2 modules from the following list:

CS2K7	*XML and Web Technologies*	10 I

CS2L7	*Human Computer Interaction*	10 I
CS2M7	*Further Algorithms*	10 I

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% in any of the compulsory Part 1 modules.

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.

A student must obtain at least 40% in their project (SE3Q2) to be eligible for honours.

Part 2 contributes one third of the final assessment and Part 3 contributes two thirds.

Summary of teaching and assessment
Teaching is organised in modules that typically involve lectures and tutorials or practicals. Most modules are assessed by a mixture of coursework and formal examination. Some modules such as the Part 3 project are assessed by coursework.

Admission requirements
Entrants to this programme are normally required to have obtained:
Grade B in Mathematics and Grade C in English in GCSE; and achieved
A level: 300 points from 3 A Levels, or 340 points from 3 A Levels and 1 AS Level (total points exclude General Studies)
International Baccalaureate: 33 points; or
Irish Highers: AABBB
Equivalent qualifications are acceptable.

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 is 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
Career prospects are good given the market for computer related skills. Graduates can find employment connected with the software industry, either in programming, consultancy or systems analysis and design. The combination of both software and hardware design skills widens the opportunities further. Some graduates continue in research either in the Subject Group or at other Universities.

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, it is 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:	*Teaching/learning methods and strategies*
1. software engineering and theoretical issues in Computer Science 2. a range of programming languages and environments. 3. information technology. 4. appropriate mathematical techniques, including the use of mathematics as a tool for communicating results, concepts and ideas. 5. business context. 6. engineering practice.	The knowledge required for the basic topics is obtained via lectures, exercises, practicals, assignments and project work. Appropriate IT and other software 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. **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.	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 and 7. **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 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.