BSc in Software Engineering

For students entering Part 3 in 2009

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 2009
Programme Director: Dr Gerard McKee
Programme Adviser: Dr Corin Gurr
Admissions Tutor: Dr Michael Evans
Board of Studies: Computer Science & Informatics
Accreditation: British Computer Society (to be sought)

Summary of programme aims

This programme aims to prepare students for a career in the software or information technology industry, with a specific emphasis on the development of software within a whole system (hardware, software, people) context.
Note the choice of optional modules will in some cases be restrained by the timetable. Students should consult the Programme Advisor to ensure that a coherent set of modules are followed.

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 in the following transferable skills: IT (programming, word processing, databases and use of standard software), technical writing, oral presentations, 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 material			
SE1EB5	Computer and Internet Technologies	20	C
SE1SA5	Programming	20	C
SE1SB5	Software Engineering	20	C
SE1TR5	E-Business 1	20	C
SE1TQ5	COTS 1	20	C

Optional material

20 Credits from:

SE1SC5	Computer Science Roadmap	20	C
SE1TT5	IT Support 1	20	C
MM1F10	Student Enterprise	20	C
MA115	Codes and Code Breaking	20	C

Other options (including a foreign language from the IWLP) may be selected with the approval of the Course Adviser.

Part 2 (three terms)		*Credits*	*Level*
Compulsory material			
CS2A6	Compilers	10	I
CS2B6	Operating Systems	10	I
CS2SF8	Collaborative Design	10	I
CS2J7	Programming with Java	10	I
CS2TQ6	Databases for Business	20	I
CS2TS6	Software Engineering 2 and Career Management	20	I

Optional material

40 credits from:

CS2C6	Computer Architecture	10	I
CS2G7	Essential Algorithms	10	I
CS2M7	Further Algorithms	10	I
CS2K7	XML and Web Technologies	10	I
CS2L7	Human Computer Interaction	10	I
SE1ST8	Introductory Algorithms	10	C
CS2TR6	E-Business 2	20	I
MM270	Practice of Entrepreneurship	20	I

Note: SE1ST8 may only be taken if SE1SC5 was *not* taken optionally in first year. It comprises 10 credits "out of year" material.

CS2G7 may only be taken if SE1SC5 was taken optionally in the first year.

CS2M7 has CS2G7 as a pre-requisite.

Part 3 (three terms)		*Credits*	*Level*
Compulsory material			
CS3Q2	Computer Science Final Year project	30	H
SE3Z5	Social, Legal and Ethical Aspects of Science and Engineering	20	H
CS3TC4	Project Management	10	H

Optional material

Choose 60 further credits from the following:

SE3C9	Computer Networks	20	H
CS3C5	Dependable Systems Design	10	H
CS3E6	Distributed Computing	10	H
CS3K7	Data Mining	10	H
CS3W7	Multi-Agent Systems	10	H
CS3TB4	Software Quality and Testing	10	H
CS3TE4	Requirements Analysis	10	H
CS3TZ4	Network Security	10	H
CS3TQ7	Data Management	10	H
MM374	Informatics for E-Enterprise	20	H
CS2G7	Essential Algorithms	10	I
CS2M7	Further Algorithms	10	I

Some Part 3 option choices depend on relevant pre-requisite Part 1 and/or 2 options having been selected. Sufficient credits are always available in final year, no matter the options taken in first and second years. Specific combinations of options are subject to timetabling requirements, including a balance of material taken in autumn and spring terms.
CS2G7 requires either SE1SC5 taken in Part 1 or CS1ST8 taken in Part 2. CS2G7 constitutes 10 credits taken "out of year".
CS2M7 requires CS2G7 taken in Part 2 or Part 3. CS2M7 constitutes 10 credits taken "out of year".
CS3TA4 requires CS2TR6 taken in Part 2.

Progression requirements
To gain a threshold performance at Part 1 a student shall normally be required to achieve an overall average of 40% over 120 credits taken in Part 1, 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 obtain at least 30% in all compulsory 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.

To be eligible for Honours, students must obtain an overall average mark of 40% **and** pass the Computer Science Project (CS3Q2).

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:
UCAS Tariff: 300 points from 3 A levels or 340 points from 3 A levels and 1 AS. Total points exclude Key Skills and General Studies.
Grade B in Mathematics and Grade C in English in GCSE
International Baccalaureate: Pass Diploma and achieve 6,6,5 in three higher level subjects
Irish Highers: AABBB
Equivalent qualifications are acceptable.

Admissions Tutor: Dr Mike Evans

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 School of Systems Engineering 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 of Systems Engineering produces a Handbook for Students, which provides general information about the staff and facilities within the school.

Career prospects
It is expected that most graduates from this programme will pursue careers in the software industry, either for software companies or within the software development branch of large companies. Graduates in Software Engineering could be expected to have the following generic job titles:

- software engineer
- systems analyst
- systems manager
- applications developer
- web developer
- network administrator
- database administrator
- project manager
- data analyst

Opportunities for study abroad
N/A

Educational aims of the programme
To develop the students' knowledge of the practice and underlying theory of Software Engineering. In particular, students will understand the complexities of bringing together organisational needs and technological capabilities, through the medium of the software development team. A strong background in project management and team-working and communication skills should fit graduates to become key players in large software system development and business change programs underpinned by IT system development and deployment.

Programme Outcomes

Knowledge and Understanding

A. Knowledge and understanding of:

1. Software including:

1a) Programming languages

1b) Structuring of data and information

2. Practice

2a) Problem identification and analysis

2b) Design, development and evaluation

2c) Management and organisation

2d) Professionalism and ethics

3. Hardware

3a) The link between systems software and hardware operations

3b) Hardware as a component structure of a system

4. Communication and interaction

4a) The team as responsible for production of the system.

4b) The team including customer, users, analysts, developers, implementers and maintainers.

5. Theory

5a) Systems design theory

5b) Psychological theories underlying team working

Teaching/learning methods and strategies

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:

1. select and apply appropriate computer based methods, mathematical and scientific principles for analysing systems;
2. analyse and solve problems;
3. organise tasks into a structured form;
4. plan, conduct and write a report on a project;
5. recognise and conform to appropriate professional, ethical and legal practices;
6. prepare and deliver an oral presentation.

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 a major element of the degree, taught in SE1SB5, CS2TS6 and CS3TC4, and applied on a significant scale in CS3Q2.

Assessment

Skills 1-4 are assessed in a variety of individual modules via coursework and examination. Skill 5 is assessed via essay, online discussion, and portfolio

C. Practical skills – able to:

1. specify, design and construct software systems;
2. use a variety of languages and approaches to implement system construction;
3. critically appraise existing systems in terms of fitness for purpose, possibility of upgrading or necessity of replacement;
4. manage a team comprised of individuals with varied intellectual skills to achieve a project goal;
5. present work in a variety of formats and using a variety of presentation methods (written, oral, in-person, electronically...);
6. make effective use of computer systems.

Teaching/learning methods and strategies

The design and implementation of software systems is the core of the degree course, and students will be shown practical examples as well as theoretical abstractions for these. A variety of programming languages and development tools are presented in the lectures, while a wider range of tools are available within the School for students to gain experience with, particularly in their individual project work.

Group project work in second and third year modules give students experience on working within and managing a team.

As a computing degree, students are expected to do all aspects of their work using computer systems, providing ample opportunity for improving communication and IT skills.

Assessment

Skills 1 and 2 are tested with practical assignments in coursework and overall understanding of systems and solution options are tested in examinations.

Skills 3 and 4 are exercised in the Software Engineering and Project Management modules, and likewise assessed in coursework and examination.

Skills 5 and 6 are assessed in almost all modules by using coursework assignments.

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.
10. use Information Technology effectively.

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.

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.