BSc Systems Engineering **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):	Engineering
Faculty:	Science Faculty
Programme length:	3 years
Date of specification:	20/Apr/2012
Programme Director:	Dr Virginie Ruiz
Programme Advisor:	Dr Richard Mitchell
Board of Studies:	UG Systems Engineering
Accreditation:	None

Summary of programme aims
The programme comprises modules in Computer Science, Cybernetics, Electronic Engineering and Information Systems, the four subjects in the School of Systems Engineering, and students can choose those modules for which they are qualified which are of interest. The programme aims to provide an understanding of systems engineering; to appreciate relevant modern technology and techniques; to produce good practically oriented engineers whose systems grounding allows them to work in an industrial or academic environment, as individuals or as part of a team. The programme is distinctive in that students are given as much freedom as possible to make a degree programme, in the area of Systems Engineering, which contains topics of interest to the student.

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 competenace 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). Students must choose 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 4, 5, 6 or 7 in the right most column show the level of each module.

Part 1 (three terms)
Compulsory modules

Code	*Module title*	*Credits*	*Level*
SE1EB9	Computer and Internet Technologies	20	4
SE1SA5	Programming	20	4
SE1SB9	Software Engineering	20	4
and			
SE1CB9	Engineering Mathematics*	20	4
or			
MA116	Mathematics for Computer Scientists*	20	4

*Students with A level Maths Grade C or above (or equivalent) should take SE1CB9, otherwise MA116.

Optional modules

SE1CA9	Cybernetics and Its Application	20	4
SE1EA5	Electronic Circuits	20	4
SE1SC9	Computer Science Roadmap	20	4

Part 2 (three terms)
Compulsory modules

Code	*Module title*	*Credits*	*Level*
SE2SM11	System Design and Project Management	20	5

Students should select optional modules worth 100 credits from any School of Systems Engineering module for which they are qualified, subject to timetabling constraints.

Part 3 (three terms)
Compulsory modules

Mod Code	*Module Title*	*Credits*	*Level*
SE3IP11	Individual Project	40	6

Students should select modules worth 80 credits from:

SE3SL11	Social, Legal and Ethical Aspects of Science and Engineering	10	6
LA1XXX	Institution Wide Language Programme	20	4

and any School of Systems Engineering module for which they are qualified, subject to timetabling constraints.

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.

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.

Part 2 contributes one third of the final degree assessment and Part 3 contributes two thirds.
A student must obtain at least 40% in their project, SE3IP11, to be eligible for honours.

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 instance the Part 3 project, are assessed only as coursework.

On the compulsory modules
The compulsory modules in Part 1 are those which are compulsory for many of the degrees in the School. Thus, by careful choice of the options it is possible to do the compulsory modules for many degrees in the School, as well as meeting the pre-requisites for many modules in Part 2.
In Part 2, students must choose one of the 3 modules which provide presentation skills and career management skills, otherwise there is free choice of the modules for which they are qualified.
In Part 3, students must do a project, from one of the three subject areas (though projects often transcend the subject boundaries), and it is recommended that they take the module which provides material on management, law, etc., which may help should they apply for chartered engineering status. Otherwise, there is free choice.

Advice on module choice
In the Part 1 handbook there is a table showing which modules are needed for each School degree, and for subsequent Parts there is information on which modules are required for other modules. These sets of

information, together with advice from a Programme Advisor, will enable students to make an informed decision on the optional modules in the degree.

Admission requirements
Entrants to this programme are normally required to have obtained:
Grade B or better in Combined Science and grade B or better in Mathematics at GCSE;
and achieved
UCAS Tariff: 260 points with grade C or better in Mathematics and Physics, or equivalent
International Baccalaureat: 29 points including 6 in Higher Mathematics.
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 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 of Systems Engineering produces a Handbook for Students, which provides general information about the staff and facilities within the school, and other aspects of the University.

Career prospects
Career prospects for Systems Engineers tend to be good as the courses are very relevant to today's high technology society and, because the courses are not dependent upon any one industry, graduates are employed in a variety of areas. Some graduates join large companies, often IT based companies; others join smaller companies and consultancies; and some choose to further their research interests either in the School or at other Universities.

Opportunities for study abroad or for placements
N/A

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. Appropriate mathematical techniques to help model and analyse systems 2. Science underlying engineering systems. 3. Information technology. 4. Systems design. 5. Engineering practice.	The knowledge required for the basic topics is obtained via lectures, tutorials, laboratory practicals, assignments and project work. Appropriate IT packages are taught. Demonstrators in laboratory 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 and undertake independent research.

Assessment
Most knowledge is tested through a combination of practicals, assignments and formal examinations students write reports on most assignments after Part 1, and oral presentations also contribute.

Skills and other attributes

B. Intellectual skills - *able to:*

1. Select and apply appropriate scientific principles, mathematical and computer based methods for analysing systems.
2. Analyse and solve problems.
3. Be creative.
4. Organise tasks into a structured form.
5. Understand the evolving state of knowledge in a rapidly developing area.
6. Transfer appropriate knowledge and methods from one topic in Systems Engineering to another.
7. Plan, conduct and write a report on a project or assignment.
8. Prepare an oral presentation.

Teaching/learning methods and strategies

Appropriate 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.
In the latter part of the course, some of the research in Systems Engineering is presented.

Assessment
1-6 are assessed partly by examination, though sometimes also by project or assignment work. 7 and 8 are assessed as part of project work.

C. Practical skills - *able to:*

1. Use appropriate mathematical methods 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. Research into systems engineering problems.
6. Use project management methods.
7. Present work.

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 to solve other projects.
Laboratory practicals and projects are used to teach about 3, and projects are used for 4, 5, 6 and 7.

Assessment
1 and 5 are tested in coursework and in examinations. 2, 5 and 7 are tested by assignments and projects, 3 is assessed in practicals and sometimes in projects, 4, 5 and 6 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

Some IT tools are taught in lectures, but most through laboratory sessions and assignments.
Data skills are acquired in laboratory and projects.
Creativity 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 the 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.