BEng Electronic Engineering with Industrial Year **UCAS code: H615**
For students entering Part 1 in 2011/2

Awarding Institution:	University of Reading
Teaching Institution:	University of Reading
Relevant QAA subject Benchmarking group(s):	Engineering
Faculty:	Science Faculty
Programme length:	4 years
Date of specification:	12/May/2014
Programme Director:	Dr John Bowen
Programme Advisor:	Prof Simon Sherratt Dr Oswaldo Cadenas
Board of Studies:	UG Systems Engineering
Accreditation:	Institution of Engineering and Technology (IET)

Summary of programme aims
To develop the students' knowledge of the theory and practice of modern electronic engineering, necessary for them to meet the educational requirements set out by the ECUK for Chartered Engineer status; to encourage their critical and analytical skills; to develop their skills in applying theoretical concepts to the practice of electronic systems design; to provide experience of industrial engineering practice; and to provide a firm foundation for a career in design, management, or research and development.
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 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 (the compulsory part), together with one or more 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 number of modules credit for each module is shown after its title.

Part 1 (three terms)
Compulsory modules

Code	*Module title*	*Credits*	*Level*
SE1PR11	Programming	20	4
SE1SE11	Software Engineering	20	4
SE1CA11	Computer Applications	20	4
SE1EM11	Engineering Mathematics	20	4
SE1CC11	Cybernetics and Circuits	20	4

Optional modules:

SE1FC11	Fundamentals of Computing	20	4
LA1XX1	Institution Wide Language Programme	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
SE2CS11	Control Systems	10	5
SE2PL11	Programmable Logic and HDLs	10	5
SE2CA11	Computer Architecture	10	5
SE2SD11	Sensors and Devices	10	5
SE2TE11	Telecommunications	10	5

Optional modules:

SE2NN11	Neural Networks	10	5
SE2RM11	Robots and Mechanics	10	5
SE2RS11	Robotic Systems	10	5

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

Code	*Module title*	*Credits*	*Level*
SE2W9	Industrial Year	120	5

Part 3 (three terms)
Compulsory modules

Code	*Module title*	*Credits*	*Level*
SE3IP11	Individual Project	40	6
SE3SL11	Social, Legal and Ethical Aspects of Science and Engineering	10	6
SE3UI11	USB Integration	10	6
SE3CN11	Computer Networking	20	6

Optional modules
Select modules worth 40 credits from:

SE3LM11	Law and Management	10	6
SE3SI13	System Identification and Control	10	6
SE3SS13	State Space and Frequency Response	10	6
SE3ME11	Mechatronics	10	6
SE3IA11	Image Analysis	10	6
SE3SE11	Sustainable Electrical Energy	10	6
SE3MS11	Measurement Systems	10	6
SE3AE11	Analogue Electronics	10	6

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 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% at first attempt in their project (SE3IP11) and 80 credits in the Final Part with marks of at least 40, to be eligible for Honours. In order to graduate with the industrial year 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 Electronic Engineering degree.

Assessment and classification
The University's honours classification scheme is:

Mark	*Interpretation*
70% - 100%	First class
60% - 69%	Upper Second class
50% - 59%	Lower Second class
40% - 49%	Third class
35% - 39%	Below Honours Standard
0% - 34%	Fail

For the University-wide framework for classification, which includes details of the classification method, please see: www.reading.ac.uk/internal/exams/Policies/exa-class.aspx

The weighting of the Parts/Years in the calculation of the degree classification is

Four-year programmes, including placement year: Normally:
Part 2 one-third
Placement Year not included in classification
Part 3 two-thirds
(where students fail a placement year which does not contribute to classification they transfer to the three-year version of the programme)

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, in particular the Part 3 project, is assessed only as coursework. Details are given in the relevant module description.

Admission requirements
Entrants to this programme are normally required to have obtained:
Grade C or better in English in GCSE; and achieved
A Level: 280 points with grade B in A Level Mathematics and Physics; or
International Baccalaureat: 30 points including 6 in Higher Mathematics; or
Advanced GNVQ: Distinction in one of the following subject areas: Engineering, Information Technology or Science, accompanied by A Level Mathematics Grade B; or
Scottish Highers: Grade A in Mathematics and Bs in three other subjects
Irish Leaving Certificate: Grade A in Mathematics and three Bs and a C in four other subjects; or BTEC: with mostly distinctions in individual subjects but including at least a distinction in Mathematics.
Two AS grades are accepted in place of one A-Level (except for Mathematics)

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 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
In recent years most students who have followed this programme have gone into jobs involving electronic systems design. These include manufacturers of mobile phones, computers, computer networking products, and integrated circuits. Others have joined research groups in university and industry, the public service, and the teaching professions. Graduates from this programme are exempt from the academic requirements for Chartered Engineer under UK-SPEC and membership of the Institution of Electrical Engineers. After a period of professional development (order of 4 years), 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. Appropriate mathematical techniques to help model and analyse systems, and use mathematics as a tool for communicating results and concepts. 2. Science underlying Electronic Engineering systems. 3. Information technology. 4. Design of electronic engineering systems, including the methods of applying engineering principles to create new products and systems, but including the constraints in applying inappropriate technology and the needs of commercial risk evaluation. 5. Management and business practices, including finance, law, marketing and quality control 6. Electronic 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 are also assessed.

Skills and other attributes

B. Intellectual skills - *able to:*	**Teaching/learning methods and strategies**
1. Select and apply appropriate scientific principles, mathematical and computer based methods for analysing general electronic engineering systems. 2. Analyse and solve electronic engineering problems. 3. Be innovative and 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 electronic engineering to another. 7. Plan, conduct and write a report on a project or assignment. 8. Prepare an oral presentation.	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. Creativity and innovation is embedded into the course, in laboratory classes and project work. *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:*	**Teaching/learning methods and strategies**
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 electronic engineering problems. 6. Manage projects effectively. 7. Present work both in written and oral form, using appropriate technology.	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:*	**Teaching/learning methods and strategies**
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.	Some IT tools are taught in lectures, but most through laboratory sessions and assignments. Data skills are acquired in laboratory and projects. Creativity, 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 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.