# BEng Electronic Engineering

**UCAS code: H610**

**For students entering Part 1 in 2005**

Awarding Institution: The University of Reading
Teaching Institution: The University of Reading
Relevant QAA subject benchmarking group(s): Engineering
Faculty of Science
Programme length: 3 years
Date of specification: 17/02/2007
Programme Director: Eur Ing Dr Simon Sherratt
Programme Advisers: Eur Ing Dr Simon Sherratt
Board of Studies: Electronic 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 secure employment as professional electronic engineers in a wide variety of industries and to also meet partial educational requirements set out by ECUK for Chartered Engineer status (further learning to Masters level is currently required by ECUK). A full statement of the educational aims and learning outcomes of the programme is given later.

**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 (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)** | | *Credits* | *Level* |
|---|---|---|---|
| *Compulsory modules (no optional modules)* | | | |
| SE1CA5 | *Cybernetics and Its Application* | 20 | C |
| SE1CB5 | *Engineering Mathematics* | 20 | C |
| SE1EA5 | *Electronic Circuits* | 20 | C |
| SE1EB5 | *Computer and Internet Technologies* | 20 | C |
| SE1SA5 | *Programming* | 20 | C |
| SE1SB5 | *Software Engineering* | 20 | C |

| **Part 2 (three terms)** | | *Credits* | *Level* |
|---|---|---|---|
| *Compulsory modules (no optional modules)* | | | |
| CY2A6 | *Control and Measurement* | 20 | I |
| EE2A2 | *Embedded Microprocessor Systems* | 20 | I |
| EE2B4 | *Electromagnetism and its applications* | 20 | I |
| EE2C2 | *Digital Circuit Design* | 10 | I |
| EE2D6 | *FPGAs and HDLs* | 10 | I |
| SE2A2 | *Signals and Telecoms* | 20 | I |
| SE2P6 | *Engineering Applications* | 20 | I |

| **Part 3 (three terms)** | | *Credits* | *Level* |
|---|---|---|---|
| *Compulsory modules* | | | |
| EE3A2 | *Digital Signal Processing* | 10 | H |
| EE3C2 | *Digital and Data Communications* | 20 | H |
| EE3P2 | *Electronic Engineering Project* | 30 | H |
| EE3V7 | *Functional Verification* | 10 | H |
| SE3Z5 | *Social, Legal and Ethical Aspects of Science and Engineering* | 20 | H |
| *Optional modules – choose modules worth 30 credits from the following* | | | |
| CY3C2 | *State Space* | 10 | H |
| CY3D2 | *Measurement Systems* | 10 | H |
| CY3L2 | *Mechatronics* | 10 | H |
| CY3N7 | *Mechanical Engineering* | 10 | H |
| EE3D2 | *Power Electronics* | 10 | H |
| EE3F2 | *Video Engineering & Digital Media* | 10 | H |
| EE3G2 | *DSP in Communications* | 10 | H |
| EE3H7 | *Analogue Circuit Simulation* | 10 | H |
| XX3?? | *Language from IWLP* | 20 | H |

**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%.

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 whose overall average is 60% or above in the 120 credits taken in Part 2 may be qualified for the MEng in Electronic Engineering degree.

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

A student must obtain at least 40% in the project (EE3P2) to be eligible for honours.

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

**Admission requirements**

Entrants to this programme are normally required to have obtained:
Grade C or better in English in GCSE; and achieved
A Level: 260 points with grade C in A Level Mathematics and Physics; or
International Baccalaureat: 26 points including 6 in Higher Mathematics; or
Advanced GNVQ: Merit in one of the following subject areas: Engineering, Information Technology or Science, accompanied by A Level Mathematics Grade C; or
Scottish Highers: Grade B in Mathematics and Cs in three other subjects
Irish Leaving Certificate: Grade B in Mathematics and three Bs and a C in four other subjects; or
BTEC: with 6 merits in individual subjects, including a merit in Mathematics.
Two AS grades are accepted in place of one A-Level (except for Mathematics)

Admissions Tutor: Dr S. A. Shirsavar

**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 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 partially exempt (at 2:2 Hons or above) from the academic requirements for Chartered Engineer under UK-SPEC, but can apply for membership of the Institution of Electrical Engineers. After a period of professional development (order of 4 years) and further learning to masters level, a graduate can expect to achieve Chartered Engineer status.

**Opportunities for study abroad or for placements**

N/A

**Educational aims of the programme**

To develop the students' knowledge of the theory and practice of modern electronic engineering, necessary for them to partially 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.

**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.<br>2. Science underlying Electronic Engineering systems.<br>3. Information technology.<br>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.<br>5. Management and business practices, including finance, law, marketing and quality control<br>6. Electronic Engineering practice. | The knowledge required for the basic topics is obtained via lectures, tutorials, laboratory practicals, assignments and project work.<br>Appropriate IT packages are taught.<br>Demonstrators in laboratory and project supervisors advise students, and feedback is provided on all continually assessed work.<br>As the course progresses, students are expected to show greater initiative and undertake independent research.<br><br>*Assessment*<br>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.<br>2. Analyse and solve electronic engineering problems.<br>3. Be innovative and creative.<br>4. Organise tasks into a structured form.<br>5. Understand the evolving state of knowledge in a rapidly developing area.<br>6. Transfer appropriate knowledge and methods from one topic in electronic engineering to another.<br>7. Plan, conduct and write a report on a project or assignment.<br>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.<br>Creativity and innovation is embedded into the course, in laboratory classes and project work.<br><br>*Assessment*<br>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 electronic engineering problems.
6. Manage projects effectively.
7. Present work both in written and oral form, using appropriate technology.

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