

PROGRAMME SPECIFICATION

This document describes BEng **Honours Degree programmes in Electronic Engineering**. This specification is valid for new entrants from **September 2017**.

The aims of all BEng Electronic Engineering Honours Degree programmes are:

- to engage students imaginatively in the process of learning through creative hands-on group and individual project based activities, enabling them to develop independent critical thinking and judgement;
- to encourage students to appreciate how electronic engineering is the heart of many systems used on a daily basis, including mobile communications, computers, transport systems, energy systems, medical applications, domestic appliances, TV, radio, music studios and gaming devices;
- to equip students with the technical knowledge, practical skills and confident verbal and written communication abilities that are key to successful industrial team working in electronic engineering;
- to produce graduates that fully meet the demands required for employment in industry;
- to develop an understanding of working in groups ;
- to prepare students to present reasoned verbal and written arguments in a confident manner; gain experience in the application of creativity in solving engineering problems;
- to encourage an awareness of environmental and social issues, investigating new materials and using them in ways that have a beneficial effect on humanity;
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The BEng degree programmes correspond to level 6 in the QAA framework. The length of the degree varies from three years for the standard BEng to four years for the BEng with a year in industry programme.

The programmes are designed to meet the educational requirements at Bachelors level for CEng registration..

Apart from the year in industry, programmes are delivered in three stages, each of which comprises one year of full-time study during which the student must follow courses to the value of 120 credits.

The programmes provide progressive structures in which students are able to broaden their knowledge and understanding, and appropriate skills in Electronic Engineering enabling them to graduate ready for employment in industry. The programmes contain a combination of mandatory courses in Electronic Engineering to introduce students to the theoretical knowledge and practical skills relevant to professional practice, with a range of stage three specialist options such as renewable energy systems, smart transportation, voice and music technologies, human factors and healthcare engineering.

The structure in stages one and two encourages students to work in teams, and in stage three to develop their own interests through informed choice among specialist options. In stage three all students are required to produce an individual project from conception through to production.

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This document provides a summary of the main features of the programme(s), and of the outcomes which a student might reasonably be expected to achieve if full advantage is taken of the learning opportunities provided. Further information is contained in the College prospectus, the College Regulations and in various handbooks issued to students upon arrival. Whilst Royal Holloway keeps all its information for prospective applicants and students under review, programmes and the availability of individual courses are necessarily subject to change at any time, and prospective applicants are therefore advised to seek confirmation of any factors which might affect their decision to follow a specific programme. In turn, Royal Holloway will inform applicants and students as soon as is practicable of any substantial changes which might affect their studies.

Learning outcomes

Teaching and learning in the programme are designed to prepare students for professional practice in electronic engineering. In addition, the programme includes material that is closely informed by the active research of staff, particularly in the areas of nanotechnology, spintronics, energy generation, signal processing, communications, smart transport, voice and music technologies, human factors and healthcare engineering and information security and cryptography. In general terms, the programmes provide opportunities for students to develop and demonstrate the following learning outcomes:

Additional for programmes with a Year in Industry

The year in an industrial placement will provide real world experience of how electronic engineering impacts on the world around us. It gives an appreciation of the importance of well-managed product development in a competitive environment. Students will have completed two years of their programme and therefore will be able to apply methods and techniques they have learned and extend their knowledge, understanding and practical skills in the workplace.

Knowledge and understanding

- the fundamental principles of electronic engineering, components and circuit design;
- the historical context and development of the technology used in everyday life;
- an understanding of issues facing this and future generations such as green energy provision, communication systems and appliance control
- sustainability generation and environmental issues
- future development of electronic devices and circuits
- the practical use of embedded systems
- the C++ programming language
- Specialise in an area of personal interest in their individual project
- Management techniques, which are used to achieve successful team project development from conception to production

Skills and other attributes

- analysis and critical interpretation of text and data;*
- ability to produce ingenious solutions that are prototyped and brought to product readiness for market;
- take progressive responsibility for their own study through negotiating subject areas of specialism with each other in practical's and workshops, through the informed choice of options and an individual major project in the final year that leads to a final product*
- sensitivity to and responsiveness and an understanding of industrial conventions;
- the ability to conduct literary research independently using traditional and electronic resources, *
- command of a relevant wider vocabulary and appropriate critical and theoretical terminology;
- planning and execution of formal reports and project-work, bibliographical skills, developing a reasoned argument;*
- advanced written and oral presentation skills, including the ability to present logical and coherent written and oral arguments of varying lengths;*
- the ability to organise and interpret complex information in a structured and systematic way, and to comprehend and develop sophisticated concepts;*

- the capacity for independent thought and judgement, along with skills in critical reasoning;*
- information technology skills (including word processing, email, WWW, information handling and retrieval), and the ability to engage with the textual use of new media, video, TV, DVD and electronic;*
- interpersonal skills required for team working, involving non-judgmental communication whilst recognising and respecting the viewpoints of others;*
- time management and organisational skills including working to deadlines, prioritising tasks, organising work/social time;*
- lifelong learning and contributions to the wider community (these include personal motivation; the ability to work autonomously and with others; self-awareness and self-management; empathy and insight; intellectual integrity; awareness of responsibility as a local, national and international citizen; interest in lifelong learning; flexibility and adaptability; creativity).

* transferable skills

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Teaching, learning and assessment

Teaching activities will include lectures, tutorials and seminars and practical project work will be carried out in groups and individually in purpose-built thinking, prototyping and fabrication laboratories. In particular, the underlying principles of the programme are the exploitation and development of creative skills in the context of proposing ingenious solutions to tomorrow's problems prior to the prototype and product development stages.

Various assessment methods will be used including examinations for theoretical subjects, formal presentations, reports and practical demonstrations for project work with an additional viva voce examinations for final year individual projects. In addition, students will be involved in workshops and will produce various forms of creative work. Students will contribute to group presentations and demonstrations for the assessment of group project work. Full details of the assessments for individual courses can be obtained from the [Department](#).

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Details of the programme structure(s)

Please note that not all courses run each year. A full list of courses including optional courses for the current academic year can be obtained from the Department.

Single Honours Degree programmes

Stage one:

Students must take the following **mandatory** courses:

EE1000 Embedded systems team project 1	(30 credits) condonable
EE1010 Programming in C++	(15 credits) condonable
EE1020 Electronic circuits and components	(15 credits) condonable
EE1030 Communication engineering 1	(15 credits) condonable
EE1040 Principles of sustainable engineering	(15 credits) condonable
PH1110 Mathematics for Scientists 1	(15 credits) condonable
PH1120 Mathematics for Scientists 2	(15 credits) condonable

Stage two:

Students must take the following **mandatory** courses:

EE2000 Embedded systems team project 2	(30 credits) condonable
EE2010 Software engineering for electronics	(15 credits) condonable
EE2020 Communications engineering 2	(15 credits) condonable
EE2030 Energy generation, conversion and distribution	(15 credits) condonable
EE2040 Control engineering	(15 credits) condonable
EE2050 Digital coding and data networking	(15 credits) condonable

EE2060 Electronic materials and devices (15 credits) condonable

Stage three:

Students must take the following **mandatory** courses:

EE3000 Individual project (60 credits) non-condonable
EE3010 Signal processing (15 credits) condonable

plus choose options equal to the value of 45 credits from a list of stage three courses offered by the Department.

For the title with a year in industry

Students must take the following mandatory course:

EE3001 Year in Industry (30 credits) non-condonable

Students are thus assessed on 150 credits in their final year;

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Progression and award requirements

The progression and award requirements are essentially the same across all Honours Degree programmes at Royal Holloway as outlined in the [College's Undergraduate Regulations](#). On some programmes there may be a requirement to pass specific courses in order to progress to the next stage or to qualify for a particular degree title and this will put restrictions on courses in which failing marks can be condoned (see programme structure above for details). Additionally there are requirements on the number of courses that must be passed in order to qualify for particular joint or combined Honours degrees.

For IET accreditation a maximum of 30 credits can be condoned per stage. Failing marks must be between 35-39% to be condoned.

Students are considered for the award and classified on the basis of a weighted average. This is calculated from marks gained in courses taken in stages two and three, and gives twice the weighting to marks gained in stage three. The [College's Undergraduate Regulations](#) include full details on progression and award requirements for all undergraduate programmes offered by the College.

For the award of BEng in Electronic Engineering EE3000 Individual Project must be passed.

For the award of BEng Electronic Engineering with a year in industry E3000 Individual Project and EE3001 Year in industry must be passed.

Failure to pass the individual project (EE3000) and its resit would mean being unable to graduate with an accredited BEng. Therefore an unaccredited BSc Electronic Engineering is offered as an exit route.

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Student support and guidance

- Personal Advisers: All students are allocated a personal adviser who meets with them regularly through the programme. The adviser's role is to advise on academic, pastoral and welfare issues. Students meet with their personal advisers two or three times during each term. Subsequently, responsibility for additional meetings is placed on the student.
- Year Tutors, Programme Co-ordinators, course leaders, workshop leaders and departmental administrators provide a back-up system of academic, pastoral and welfare advice.
- All staff available and accessible through dedicated office hours system.
- Representation on the Staff-Student Committee;
- Detailed student handbook and course resources;

- Extensive supporting materials and learning resources in College libraries and Computer Centre.
- College Careers and Employability Service and Departmental Careers and Employability Tutor;
- Access to all College and University support services, including Student Counselling Service, Health Centre and the Disability and Dyslexia Services for students with disabilities and Specific Learning Difficulties.

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Admission requirements

Details of the Department's typical offer for each programme of study is available on the [Course Finder](#) web page. However, the Department also has flexibility in its admissions and offers policy and strongly encourages applications from non-standard applicants. Students whose first language is not English may also be asked for a qualification in English Language at an appropriate level. For further guidance it may be helpful to contact the [Recruitment and Partnerships Office](#)

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Further learning and career opportunities

These new and exciting programmes have yet to produce a graduating cohort, but it is expected that graduates will successfully progress into a wide range of professions, often via Postgraduate studies at Masters or Doctoral level. For further details please refer to the [Careers and Employability Service](#).

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Indicators of quality and standards

Royal Holloway's position as one of the UK's leading research-intensive institutions was confirmed by the results of the most recent Research Excellence Framework (REF 2014) conducted by the Higher Education Funding Council (HEFCE). The scoring system for the REF 2014 measures research quality in four categories, with the top score of 4* indicating quality that is world-leading and of the highest standards in terms of originality, significance and rigour and 3* indicating research that is internationally excellent. 81% of the College's research profile was deemed to be within the 4* or 3* categories, an increase of over 20% since 2008. The results for the quality of our research outputs placed Royal Holloway 15th in the UK based on an overall Grade Point Average (GPA) score and 20th in the UK for 4* and 3* research.

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List of programmes

The QAA subject benchmark statement in Engineering describes the general features which one might expect from Honours Degree programmes in the subject, and can therefore be used as a point of reference when reading this document (see www.qaa.ac.uk). UCAS codes are given in parentheses (see www.ucas.ac.uk).

The intention is to apply for formal accreditation by the IET (Institution of Engineering and Technology) to fulfil the educational requirements that enables graduates to use CEng (chartered engineer) after their name following the relevant in industry. This can only be done when a second year cohort is in place. Assuming this is successful, the department have agreed with the IET that accreditation will be back-dated to the initial 2017 cohort.

Single Honours Degree programmes in Electronic Engineering

BEng Electronic Engineering (HH61)

BEng Electronic Engineering with a Year in Industry (H661)

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