Department of Electronic Engineering

About the department

At Royal Holloway, we have a £20m state-of-the-art building to house our growing community and range of degrees in Electronic Engineering, alongside research groups that are addressing exciting future technology. Our staff bring their research expertise to their teaching, and our curriculum is informed by our excellent industrial links, ensuring our degree courses are designed to meet market needs and our graduates are highly employable.

Entry requirements

The modules listed below are open to all Study Abroad, International and Erasmus students, subject to any required previous knowledge or qualifications, as stated in the course outlines below.

Courses in Electronic Engineering are only open to visiting students enrolled on engineering majors at their home institution, or on related disciplines such as mathematics, physics or computer science. Applications will be assessed on a case by case basis and must be accompanied by evidence of prior study of mathematics at degree level, e.g. a transcript from the home institution.

Each module is either 15 or 30 UK credits and starts in either the Autumn Term (September) or the Spring Term (January).

The information contained in the module outlines on the following pages is correct at the time of publication but may be subject to change as part of our policy of continuous improvement and development.

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Module options for visiting students

Course code	Course name	Credits	Start date	Course description/pre-requisites
EE3000	Individual Project	30 UK credits FHEQ L6	September 2021 (*NOT available to students taking only 1 term*)	The aim of the individual project is to enable students to engage in theoretical and practical work on an agreed specific area relevant to electronic engineering. This will usually be a prototype that demonstrates the feasibility of a product or a fully functioning prototype depending on the nature of the topic itself. Topics will be proposed by supervisors from which students can state three (rank ordered) preferences or students may propose their own topic subject to agreement. The allocation of project topic and supervisor is carried out with the intention of enabling students to work on their preferred (highest ranked where possible) area. Projects will be completed on the basis of a specification agreed with their supervisor and progress will be monitored against the specification in terms of implementation and testing as appropriate. Where specifications cannot be met for practical reasons, there is the expectation that this will be properly documented in the written report without prejudice to the final mark. **Syllabus information**: EE3000 Individual Projects
EE3010	Digital Signal Processing Design	15 UK credits FHEQ L6	September 2021	The aim of this module is to provide theoretical and practical knowledge in processing signals. This course includes as its indicative content extending frequency and time domain knowledge gained in earlier years for analysis and synthesis of signals 1-dimension (e.g. speech and audio) and 2-dimensions (e.g. images), practical analogue and digital filters, different orders and their time and frequency responses, the Laplace and z transform and their application, averaging filters, all-pass filters, linear phase filters, comb filters, equalisation filters, recursion and adaptive filters. Practical work in digital filter design will involve the use of MATLAB. **Syllabus information**: EE3010 Digital Signal Processing Design

ROYAL HOLLOWAY UNIVERSITY OF LONDON

Module options for visiting students

Course code	Course name	Credits	Start date	Course description/pre-requisites
EE3030	Principles of Engineering Management	15 UK credits FHEQ L6	September 2021	The aim of this module is to cover the entire process of using a primary source of energy, converting it to electricity and delivering the generated electricity to where it is required. It provides students with useful knowledge and skills which can further be applied during the fourth year course on renewable energy systems. This course covers the power system basics, such as complex power, calculations including phasors, reactive compensation, power factor, conversion of circuits to phasor domain, instantaneous values, three phase circuits, calculations related to transmission lines, transformers, per unit calculations, synchronous and induction machines, powerflow and optimal power flow. Labs are designed to allow students to actively engage with the covered material and to work through the calculations using Matlab as well as hand calculations. **Syllabus information**: <u>EE3030 Principles of Engineering Management</u>
EE3050	Voice Technologies	15 UK credits FHEQ L6	January 2022	The aim of this module is to provide students with advanced knowledge of voice synthesis, recognition and processing in the context of present-day and future engineering systems that make use of a voice input or output. The indicative content for this course includes the synthesis of human speech and singing in terms of the sound source and sound modifiers in practice to create electronic voice signals, standard voice processing techniques, used for example, to enhance speech quality, remove background noise and improve perceived voice quality, and techniques used for automatic speech recognition, for example Apple's 'Siri' system. **Syllabus information**: <u>EE3050 Voice Technologies</u>

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Course code	Course name	Credits	Start date	Course description/pre-requisites
EE3060	Fundamentals of Biomedical Engineering	15 UK credits FHEQ L6	September 2021	The aim of this module is to provide theoretical and practical knowledge relating to biomedical engineering, physiological phenomena and electronics used to acquire them safely and accurately. The indicative content of this module includes the study of fundamental modern healthcare technologies in relation to the data acquisition of EEG, ECG, EMG, and PPG signals. The nature of these signals will be studied along with engineering techniques for developing diagnostic and therapeutic devices from them. Further, medical imaging technologies such as MRI and CT scanners will be studied. Signal processing and pattern recognition techniques relevant to biomedical engineering applications will also be investigated. **Syllabus information**: <u>EE3060 Fundamentals of Biomedical Engineering</u>
EE3070	Digital Systems Design	15 UK credits FHEQ L6	January 2022	At the end of the module the student should be able to apply the principles of designing digital logic circuits. Be familiar with the principles of hardware description languages, in particular VHDL, in relation to the design of digital systems for deployment onto Field Programmable Gate Arrays (FPGA). Also, to understand the principles of control unit design and be able to design controllers from written specifications. Be competent at testing digital circuits using suitable CAD tools. Evaluate and make decisions about specific digital system designs, taking account of constraints such as speed, power, size, etc. Finally, to interpret simulation results and modify them to complete a given practical task. **Syllabus information**: <u>EE3070 Digital Systems Design</u>

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Course code	Course name	Credits	Start date	Course description/pre-requisites
EE3080	Advanced Communication Systems	15 UK credits FHEQ L6	January 2022	This module aims to develop knowledge and understanding in advanced communications systems, principally modern microwave, optical and broadband technologies. At the end of this module, students will be able to analyse complex microwave systems using mathematical and computational tools, for example, estimating satellite link budgets. Further, they will be able to breakdown and categorise different elements of a complete communication system including, for example, high-speed optical data network architectures. Radio propagation will be studied along with the design principles of advanced microwave systems and inherent sources of degradation, distortion and losses. Finally, students will be introduced to the latest CAD tools for the evaluation and synthesis of practical microwave systems. **Syllabus information**: <u>EE3080 Advanced Communication Systems</u>
EE3100	Power Systems	15 UK credits FHEQ L6	January 2022	The aim of this module is to cover the entire process of using a primary source of energy, converting it to electricity and delivering the generated electricity to where it is required. It provides students with useful knowledge and skills which can further be applied during the fourth year course on renewable energy systems. This course covers the power system basics, such as complex power, calculations including phasors, reactive compensation, power factor, conversion of circuits to phasor domain, instantaneous values, three phase circuits, calculations related to transmission lines, transformers, per unit calculations, synchronous and induction machines, powerflow and optimal power flow. Labs are designed to allow students to actively engage with the covered material and to work through the calculations using Matlab as well as hand calculations. **Syllabus information**: <u>EE3100 Power Systems</u>