

Royal Holloway, University of London

Course specification for an undergraduate award

BENG COMPUTER SYSTEMS ENGINEERING (FOUR YEAR PROGRAMME WITH FOUNDATION YEAR) (HGo1)

Section 1 – Introduction to your course

This course specification is a formal document, which provides a summary of the main features of your course and the learning outcomes that you might reasonably be expected to achieve and demonstrate if you take full advantage of the learning opportunities that are provided. Further information is contained in the College prospectus, and in various handbooks, all of which you will be able to access online. Alternatively, further information on the College's academic regulations and policies can be found [here](#). Further information on the College's Admissions Policy can be found [here](#).

The Foundation Year (stage 0) prepares you for university study by offering a rigorous introduction to university level study methods and skills transitioning from FHEQ level 3 to FHEQ level 4. It provides progressive structures in which you are able to gain ever-wider knowledge and understanding of approaches to scientific study and your chosen degree subject, together with embedded practice and study skills, leading towards increasingly discipline specific activities in the practical laboratories or individual project modules which facilitate greater levels of specialisation and individual choice. All modules are mandatory for the foundation year, but subject to good academic performance will allow transfer to other foundation years. The modules are to provide a strong foundation in mathematics, computing and practical skills to succeed in later years of the degree programme. The mathematics and physics taught modules are primarily assessed by examinations, which will allow to practice key skills and exam techniques. The laboratory and project modules are assessed by lab-reports and project reports respectively.

Your degree course in BEng Computer Systems Engineering provides progressive structures in which students can broaden their knowledge and understanding, and appropriate skills in Computer Sciences and Electronic Engineering enabling them to graduate ready for employment in industry. The courses contain a combination of mandatory modules in Computer Sciences and 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 Computer and Network Security Systems, renewable energy systems, smart transportation, voice and music technologies, human factors and healthcare engineering. The structure in stage one and two encourages you to work in teams, and in stage three to develop your own interests through informed choice among specialist options. In stage three you will be required to produce an individual project from conception through to production.

While Royal Holloway keeps all the information made available under review, courses and the availability of individual modules, especially optional modules are necessarily subject to change at any time, and you are therefore advised to seek confirmation of any factors which might affect your decision to follow a specific course. In turn, Royal Holloway will inform you as soon as is practicable of any significant changes which might affect your studies.

The following is a brief description for some of the most important terminology for understanding the content of this document:

Degree course – May also be referred to as 'degree programme' or simply 'programme', these terms refer to the qualification you will be awarded upon successful completion of your studies.

Module – May also be referred to as ‘course’, this refers to the individual units you will study each year to complete your degree course. Undergraduate degrees at Royal Holloway comprise a combination of modules in multiples of 15 credits to the value of 120 credits per year. On some degree courses a certain number of optional modules must be passed for a particular degree title.

Section 2 – Course details			
Date of specification update	June 2023	Location of study	Egham Campus
Course award and title	BEng Computer Systems Engineering	Level of study	Undergraduate
Course code	3380	UCAS code	HG01
Year of entry	2023/24		
Awarding body	Royal Holloway, University of London		
Department or school	Electronic Engineering	Other departments or schools involved in teaching the course	Computer Science
Mode(s) of attendance	Full-time	Duration of the course	4 years
Accrediting Professional, Statutory or Regulatory Body requirement(s)	Institution of Engineering and Technology. In order to receive a degree accredited by the IET, students need to pass the modules designated as mandatory non-condonable in section 3.1 and have a maximum of 30 credits of condonable fails at the end of their studies. Students who do not meet the requirements for an IET accredited degree at the end of stage three, will normally exit with a BEng in Computer Systems.		
Link to Coursefinder for further information:	https://www.royalholloway.ac.uk/studying-here/	For queries on admissions:	https://royalholloway.ac.uk/applicationquery

Section 3 – Degree course structure					
3.1 Mandatory module information					
The following table summarises the mandatory modules which students must take in each year of study					
Year	Module code	Module title	Credits	FHEQ level	Module status (Mandatory Condonable MC or Mandatory Non-Condonable MNC)
0	FY1001	Global Perspectives and Academic Skills 1	15	HE level 0	MC
0	FY1002	Global Perspectives and Academic Skills 2	15	HE level 0	MC
0	FY1005	Foundation Maths 1	15	HE level 0	MNC
0	FY1006	Foundation Maths 2	15	HE level 0	MNC
0	FY1009	Foundation Programming	15	HE level 0	MC
0	FY1010	Foundation Physical Sciences	15	HE level 0	MC
0	EE1998	Foundation Practical Skills	15	HE level 0	MC
0	EE1999	Foundation Individual Scientific Project	15	HE level 0	MC
1	EE1000	Embedded Systems Creative Team Project 1	30	4	MC
1	EE1010	Programming in C++	15	4	MC
1	EE1020	Electronic circuits and components	15	4	MC
1	EE1030	Communications engineering	15	4	MC
1	EE1110	Mathematics for Engineers 1	15	4	MC
1	EE1120	Mathematics for Engineers 2	15	4	MC
1	CS1840	Internet services	15	4	MC
2	EE2000	Embedded Systems Creative Team Project 2	30	5	MC

2	IY2840	Computer and Network Security	15	5	MC
2	IY2760	Introduction to information security	15	5	MC
2	EE2010	Software engineering	15	5	MC
2	EE2020	Signals, Systems and Communications	15	5	MC
2	EE2080	Professional and Sustainable Engineering	15	5	MC
2	CS2860	Algorithms and complexity	15	5	MC
3	EE3000	Individual project	30	6	MNC
3	EE3010	Digital signal processing design	15	6	MC
3	EE3030	Principles of Engineering Management	15	6	MC
3	EE3070	Digital Systems Design	15	6	MC
3	EE3080	Advanced Communication Systems	15	6	MC

This table sets out the most important information for the mandatory modules on your degree course. These modules are central to achieving your learning outcomes, so they are compulsory, and all students on your degree course will be required to take them. You will be automatically registered for these modules each year. Mandatory modules fall into two categories: 'condonable' or 'non-condonable'.

In the case of mandatory 'non-condonable' (MNC) modules, you must pass the module before you can proceed to the next year of your course, or to successfully graduate with a particular degree title. In the case of mandatory 'condonable' (MC) modules, these must be taken but you can still progress or graduate even if you do not pass them. Please note that although Royal Holloway will keep changes to a minimum, changes to your degree course may be made where reasonable and necessary due to unexpected events. For example: where requirements of relevant Professional, Statutory or Regulatory Bodies have changed and course requirements must change accordingly, or where changes are deemed necessary on the basis of student feedback and/or the advice of external advisors, to enhance academic provision.

3.2 Optional modules

In addition to mandatory modules, there will be a number of optional modules available during the course of your degree. Although Royal Holloway will keep changes to a minimum, new options may be offered or existing ones may be withdrawn. For example where reasonable and necessary due to unexpected events, where requirements of relevant Professional, Statutory or Regulatory Bodies (PSRBs) have changed and course requirements must change accordingly, or where changes are deemed necessary on the basis of student feedback and/or the advice of External Advisors, to enhance academic provision. There may be additional requirements around option selection; please contact the Department for further information.

In stage 3 you must choose 30 credits of optional modules at FHEQ level 6 (EE30XX, CS3XXX, IY3XXX)

Section 4 - Progressing through each year of your degree course

For further information on the progression and award requirements for your degree, please refer to Royal Holloway's [Academic Regulations](#).

To progress from the Foundation Year (Year 0) to Year One you must pass all 120 credits. Opportunities for resits are detailed in Royal Holloway's [Academic Regulations](#). There is flexibility within the Foundation Year for you to take your Individual Project in one of the other departments in the School of Engineering, Physical and Mathematical Sciences offering a Foundation Year. The degree programme you choose to take after progression is likely to depend on the individual project you select during the foundation year.

All first year undergraduate students are required to take and pass the non-credit bearing Moodle-based Academic Integrity module SS1001 in order to progress into the second year of study (unless their course includes the alternative mandatory SS1000 module). The pass mark for the module assessment is stated in the on-line Academic Integrity Moodle module. Students may attempt the assessment as often as they wish with no penalties or capping. Students who meet the requirements for progression as stipulated in the College's Undergraduate Regulations (Section: Conditions for progression to the next stage) but fail to pass the Moodle-based Academic Integrity module will not be permitted to progress into their second year of academic study at the College.

Progression throughout the year/s is monitored through performance in summative or formative coursework assignments. Please note that if you hold a Student Visa and you choose to leave (or are required to leave because of non-progression) or complete early (before the course end date stated on your CAS), then this will be reported to UKVI.

Section 5 – Educational aims of the course

The aims of this course are:

- to engage you imaginatively in the process of learning through creative hands-on group and individual project based activities, enabling you to develop independent critical thinking and judgement;
- to enable your understanding of the fundamentals of computer technologies and electrical/electronic engineering techniques.to encourage you to appreciate how electronics and computer systems engineering is the heart of many systems used on a daily basis, including mobile communications systems, computer system, transport systems, energy systems, software engineering, medical applications, domestic appliances, TV, radio, music studios and gaming devices;
- to equip you with the technical knowledge, practical skills and confident verbal and written communication abilities that are key to successful industrial team working in computer sciences and 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 you 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, ethical, and societal responsibility of engineering, investigating new materials and using them in ways that are beneficial to humanity;
- to develop an understanding of legal and ethical issues and responsibilities of a professional engineer in social and industrial context

Section 6 - Course learning outcomes

In general terms, the courses provide opportunities for students to develop and demonstrate the following learning outcomes. (Categories – Knowledge and understanding (K), Skills and other attributes (S), and Transferable skills (*))

<ol style="list-style-type: none"> 1. the fundamental principles of electronic engineering, software engineering, components and circuit design, including modern computer systems engineering, digital systems design, coding techniques for specific industry engineering applications (K); 2. the historical context and development of the technology used in everyday life (K); 3. an understanding of issues facing this and future generations such as green energy provision, communication systems and appliance control (K); 4. sustainable engineering and related environmental issues (K); 5. to understand the ethical dilemmas that engineers are confronted with in the workplace, analyse real-life case studies and offer solutions (K); 6. to study and practice the IET code of conduct; scrutinise and evaluate sustainable engineering examples (K); 7. future development of electronic devices and circuits (K); 8. the practical use of embedded systems (K); 9. the C++ programming language (K); 10. specialise in an area of personal interest in their individual project (K); 11. management techniques, which are used to achieve successful team project development from conception to production (K); 12. analysis and critical interpretation of text and data (S);* 13. ability to produce ingenious solutions that are prototyped and brought to product readiness for market (S); 14. take progressive responsibility for your own study through negotiating subject areas of specialism with each other in practicals and workshops, through the informed choice of options and an individual major project in the final year that leads to a final product (S)* 	<ol style="list-style-type: none"> 15. sensitivity to and responsiveness and an understanding of industrial conventions (S); 16. the ability to conduct literary research independently using traditional and electronic resources (S), * 17. command of a relevant wider vocabulary and appropriate critical and theoretical terminology (S); 18. planning and execution of formal reports and project-work, bibliographical skills, developing a reasoned argument (S);* 19. advanced written and oral presentation skills, including the ability to present logical and coherent written and oral arguments of varying lengths (S);* 20. the ability to organise and interpret complex information in a structured and systematic way, and to comprehend and develop sophisticated concepts (S);* 21. the capacity for independent thought and judgement, along with skills in critical reasoning (S);* 22. 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, broadcast, IoT and electronic forms of IT (S);* 23. interpersonal skills required for team working, involving non-judgmental communication whilst recognising and respecting the viewpoints of others (S);* 24. time management and organisational skills including working to deadlines, prioritising tasks, organising work/social time (S);* 25. 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)(S). 26. awareness of environmental, social, legal and ethical issues, in professional engineering and industrial communities;
---	--

Section 7 - Teaching, learning and assessment

Teaching and learning on your course is closely informed by the active research of staff, particularly in the areas of Electronic Engineering. In general terms, the course provides an opportunity for you to develop and demonstrate the learning outcomes detailed herein.

Teaching and learning is mostly by means of lectures; seminars; study groups; essay consultations; oral presentations and guided independent study. Assessment of knowledge and understanding is typically by formal examinations, coursework, examined essays, translation exercises, online tests and exercises, oral presentations and the dissertation or long essay. In addition, students may be involved in workshops and may produce various forms of creative or editorial work.

Contact hours come in various forms and may take the form of time spent with a member of staff in a lecture or seminar with other students. Contact hours may also be laboratory or, studio-based sessions, project supervision with a member of staff, or discussion through a virtual learning environment (VLE). These contact hours may be with a lecturer or teaching assistant, but they may also be with a technician, or specialist support staff.

The way in which each module on your degree course is assessed will also vary, however, the assessments listed above are all 'summative', which means you will receive a mark for it which will count towards your overall mark for the module, and potentially your degree classification, depending on your year of study. On successful completion of the module you will gain the credits listed. 'Coursework' might typically include a written assignment, like an essay. Coursework might also include a report, dissertation or portfolio. 'Practical assessments' might include an oral assessment or presentation, or a demonstration of practical skills required for the particular module

More detailed information on modules, including teaching and learning methods, and methods of assessment, can be found via the online [Module Catalogue](#). The accuracy of the information contained in this document is reviewed regularly by the university, and may also be checked routinely by external agencies, such as the Quality Assurance Agency (QAA).

Section 8 – Additional costs

There are no single associated costs greater than £50 per item on this degree course.

Costs incurred by students while on a Year in Industry will vary depending on the nature and location of the placement. For further information please contact your [Department](#).

These estimated costs relate to studying this particular degree course at Royal Holloway. General costs such as accommodation, food, books and other learning materials and printing etc., have not been included, but further information is available on our website.

Section 9 – Indicators of quality and standards	
QAA Framework for Higher Education Qualifications (FHEQ) Level	4-6
Your course is designed in accordance with the FHEQ to ensure your qualification is awarded on the basis of nationally established standards of achievement, for both outcomes and attainment. The qualification descriptors within the FHEQ set out the generic outcomes and attributes expected for the award of individual qualifications. The qualification descriptors contained in the FHEQ exemplify the outcomes and attributes expected of learning that results in the award of higher education qualifications. These outcomes represent the integration of various learning experiences resulting from designated and coherent courses of study.	
QAA Subject benchmark statement(s)	http://www.qaa.ac.uk/quality-code/subject-benchmark-statements
Subject benchmark statements provide a means for the academic community to describe the nature and characteristics of courses in a specific subject or subject area. They also represent general expectations about standards for the award of qualifications at a given level in terms of the attributes and capabilities that those possessing qualifications should have demonstrated.	

Section 10– Intermediate exit awards (where available)		
You may be eligible for an intermediate exit award if you complete part of the course as detailed in this document. Any additional criteria (e.g. mandatory modules, credit requirements) for intermediate awards is outlined in the sections below.		
Award	Criteria	Awarding body
BEng in Computer Systems	To be awarded a BEng Computer Systems Engineering accredited by the IET you must meet the specific award requirements set out in the undergraduate academic regulations. In summary, this means that by the end of your degree course in BEng Computer Systems Engineering you must have either passed 360 credits or have passed 345/330 credits and have condoned fails in the remaining 15/30 credits. If you do not meet these requirements but otherwise meet the College’s standard requirements for an honours award, you will be	Royal Holloway, University of London

	eligible for a BEng Computer Systems as an exit award.	
Diploma in Higher Education (DipHE)	Pass in 210 credits of which at least 90 must be at or above FHEQ Level 4 and at least 120 of which must be at or above FHEQ Level 5	Royal Holloway and Bedford New College
Certificate in Higher Education (CertHE)	Pass in 120 credits of which at least 90 must be at or above FHEQ Level 4	Royal Holloway and Bedford New College