Royal Holloway, University of London
Course specification for an undergraduate award
MENG COMPUTER SYSTEMS ENGINEERING (HG02)

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 University prospectus, and in various handbooks, all of which you will be able to access online. Alternatively, further information on the University's academic regulations and policies can be found here. Further information on the University's Admissions Policy can be found here.

Your degree course in MEng Computer Systems Engineering provides progressive structures in which you are able to gain ever-wider knowledge and understanding, and appropriate skills. The courses contain a combination of mandatory modules to introduce you to the theoretical knowledge and practical skills, with a range of stage three specialist options. 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. Stage 4 develops group working/team dynamics and personal research techniques. In Stage 4 advanced options are available which allow personal and in-depth research, evaluation and practical application skills to be developed.

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	April 2024	**Location of study**	Egham Campus
Course award and title	MEng Computer Systems Engineering	**Level of study**	Undergraduate
Course code	3382	**UCAS code**	HG02
Year of entry	2024/25		
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**
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
4	EE4000	Team Project	30	7	MNC
4	EE4100	Agile Engineering	30	7	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)
In stage 4 you must choose 60 credits of optional modules at FHEQ level 7 (EE4xxx, CS4xxx, IY4xxx)

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.

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.

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 Academic Taught Regulations but fail to pass the Moodle-based Academic Integrity module will not be permitted to progress into their second year of academic study.

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 them to develop leadership, management and independent critical thinking and judgement;
- to encourage you to appreciate how computer sciences and electronic engineering is the heart of many systems.
- to equip you with the technical knowledge, practical skills and confident verbal and written communication abilities that demonstrate their decision making skills in new, complex and unpredictable situations in industrial team working;
- to produce graduates that fully meet the demands required for employment in industry, including independent learning in the development of new ideas ;
- to gain experience in the application of creativity in solving computer systems 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 encourage you to take progressive responsibility for your own study through negotiating subject areas of specialism with other students 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;
- 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 (*)*)

Course learning outcome	Level 4	Level 5	Level 6	Level 7
1: Apply knowledge of science, mathematics and engineering principles. Select and apply appropriate analytical tools to engineering problems. (1*, 2*)	1.4.1: Implement scientific and mathematical processes using programming tools. 1.4.2: Use a range of mathematical and statistical techniques to solve engineering problems. 1.4.3: Apply analytical techniques to fundamental engineering problems.	1.5.1: Analyse complex mathematical problems related to signals, systems and communications engineering. 1.5.2 Select suitable analytical tools to solve problems in network security and algorithms theory.	1.6.1: Design complex mathematical solutions to engineering problems in digital signal processing design. 1.6.2: Evaluate appropriate analytical tools to solve complex problems in communications systems.	1.7.1: Formulate original designs and analyse complex engineering problems within the major group project. 1.7.2: Judge and evaluate work with information that may be uncertain or incomplete, discussing the limitations of the techniques employed.
2: Analyse engineering problems using relevant tools, technical literature and computational techniques to solve complex problems (3, 4*)	2.4.1: Apply relevant computational techniques to solve engineering communication problems. 2.4.2: Use relevant technical literature relevant to internet services and communication technology.	2.5.1: Differentiate relevant technical literature related to information security. 2.5.2: Select appropriate computational techniques for the analysis of problems in sustainable engineering showing an awareness of their limitations.	2.6.1: Determine relevant tools and techniques to solve complex digital system designs. 2.6.2: Evaluate computational tools to solve complex problems in digital signal processing.	2.7.1: Create solutions from appropriate analytic models in AI and group project work. 2.7.2: Assemble and critically evaluate technical literature within the research report.
3: Design integrated solutions for complex problems that meet a combination of societal needs (5*, 6)	3.4.1: Develop integrated solutions to complex engineering specifications using relevant technologies. 3.4.2: Integrate original engineering solutions showing an awareness of health and safety, and commercial matters.	3.5.1: Select and apply original solutions to meet customer needs in team project work. 3.5.2 Integrate different sub-systems to solve complex computer and network security problems.	3.6.1: Create integrated solutions to complex engineering problems though the major individual project. 3.6.2: Design solutions for complex problems in digital signal processing and communication systems technology.	3.7.1: Design original and integrated solutions to complex engineering problems within the group project that satisfy the needs of society and business. 3.7.2: Generate novel integrated systems in immersive engineering that meet customer needs. 3.7.3: Create novel user interfaces that consider inclusive, cultural

				and commercial matters in user centred design.
4: Evaluate the environmental, societal and ethical impact of solutions to complex problems and minimise adverse impacts (7*, 8)	4.4.1: Reflect on environmental, societal and ethical impact of solutions to problems encountered in engineering project development.	4.5.1: Evaluate environmental, societal, ethical impact and lifecycle of solutions to problems in professional and sustainable engineering.	4.6.1: Reflect on the environmental, societal and ethical impact during the major individual project. 4.6.2: Evaluate the product lifecycle within the major individual project.	4.7.1: Design products for sustainable energy generation that consider the entire lifecycle of the product and its environmental impact. 4.7.2: Reflect on the ethical concerns related to professional codes of practice with a major group project.
5: Assess risks and uncertainty, making reasoned choices informed by professional codes of conduct. Adopt a holistic and proportionate approach to the mitigation of risks (9, 10)	5.4.1: Reflect on potential risks using a risk management approach within the team project context.	5.5.1: Identify potential risks using a risk management approach within the team project context.	5.6.1: Evaluate and mitigate risk and effects of uncertainty in engineering management. 5.6.2: Reflect on the cyber-security risks inherent in internet connected devices in information security.	5.7.1: Plan a risk management process within the major group project to mitigate losses or uncertainty. 5.7.2: Determine a holistic and proportionate approach to mitigate risk in user interface design process.
6: Function effectively as an individual, and as a member or leader of a team. Adopting an inclusive approach to engineering practice and recognise the benefits of supporting equality, diversity and inclusion. (11, 16*)	6.4.1: Show responsibility and self-awareness when working as a member of a team. 6.4.2: Demonstrate an inclusive approach to teamwork and recognise diversity among peers.	6.5.1: Assess yourself and your peers fairly when working as a member of a team in software engineering. 6.5.2: Recognise the diverse needs of a team and integrate inclusivity among peers in team project work.	6.6.1: Critique your own work in context of the team whilst solving problems in engineering.	6.7.1: Design user interfaces in emerging technologies that consider equality, diversity and inclusivity. 6.7.2: Reflect and evaluate on one's own effectiveness and peers throughout the major group project.
7: Use practical laboratory and workshop skills to investigate complex problems. Select and apply appropriate materials, equipment, engineering technologies and processes,	7.4.1: Undertake practical laboratory work to show knowledge of electronic engineering circuits. 7.4.2: Select appropriate electronic devices and equipment to solve	7.5.1: Select appropriate components and tools in practical lab work to solve complex engineering problems. 7.5.2: Differentiate the efficiency of specific algorithms for different	7.6.1: Evaluate and judge effective application of materials and equipment during the major individual project. 7.6.2: Design experiments to investigate complex problems in	7.7.1: Design and create novel solutions to complex multi-faceted engineering problems using practical skills in the major group project.

recognising their limitations. (12, 13)	electronic and communications engineering problems.	problems and be aware of their limitations.	the major individual project using practical technologies and processes whilst identifying their limitations.	7.7.2: Assemble appropriate materials and equipment to synthesise effective solutions to complex problems whilst acknowledging their limitations.
8: Apply knowledge of quality management and continuous improvement. Apply knowledge of engineering management principles, in a commercial context, project and change management. (14, 15)	8.4.1: Show project solutions improvements during creative team project development.	8.5.1: Demonstrate quality management and continuous improvement in the software engineering development cycle.	8.6.1: Evaluate engineering management principles and processes in a commercial context. 8.6.2: Reflect on the process of continuous improvement in the major individual project.	8.7.1: Extend knowledge of project management principles through immersive engineering and major group projects. 8.7.2: Generate effective processes of continuous improvement within the major group project.
9: Communicate effectively on complex engineering matters with technical and non-technical audiences. Plan and record self-learning and development as the foundation for lifelong learning/CPD. (17*, 18)	9.4.1: Use logbooks and formal reports to communicate complex engineering problems. 9.4.2: Engage with the professional bodies to develop a foundation for lifelong learning.	9.5.1: Develop effective communication of complex engineering problems through combination of oral presentations and formal reports. 9.5.2: Demonstrate and plan professional development through ethical case studies and formal reports.	9.6.1: Generate a coherent structured formal report on complex engineering matters within the major individual project. 9.6.2: Create a professional logbook of progress throughout the year as a record of self-learning.	9.7.1: Produce novel solutions to complex problems and disseminate the results via oral and poster presentations and formal reports in project work. 9.7.2: Engage in CPD through regular research seminars, external speakers, industrial visits and professional bodies.

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. Assessments designated as 'summative' will receive a mark 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. 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.

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	4-7
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 Engineering	Failure to pass the group project (EE4000) would mean being unable to graduate with an accredited MEng. The BEng will have been completed successfully to have entered the MEng year, and therefore an accredited BEng Computer Systems Engineering is offered as an exit route.	Royal Holloway, University of London
MEng in Computer Systems	Failure to meet IET accreditation requirements on condonement at the end of stage four will result in the award of an unaccredited MEng in Computer Systems. Information about these requirements is set out in the undergraduate academic regulations.	Royal Holloway, University of London

BEng in Computer Systems	Failure to meet IET accreditation requirements on condonement at the end of stage three will result in the award of an unaccredited BEng in Computer Systems. Information about these requirements is set out in the undergraduate academic regulations.	Royal Holloway, University of London
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