Royal Holloway, University of London
Course specification for an undergraduate award
BSC COMPUTER SCIENCE (FOUR YEAR PROGRAMME WITH FOUNDATION YEAR) (G40F)

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 programme in BSc Computer Science with an integrated Foundation Year is delivered in four stages, each of which comprises one year of full-time study during which you must follow courses to the value of 120 credits.

Upon progressing to the first year of your degree programme you will take a combination of mandatory and elective courses to introduce you to the theory and practice of Computer Science, including software development techniques and the technologies underlying specific application areas such as gaming and robotics.

The Foundation Year 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 Engineering, Physical and Mathematical Science 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.

The structure encourages you to develop your own interests through informed choice among specialist options. In the final stage of the programme, you undertake a project, which accounts for 25% of your studies in the final stage. There is a free choice of other final stage courses reflecting both core material, such as compiler theory, and currently important research areas such as machine learning, information security, software language engineering, intelligent agents, computational finance and bioinformatics.

Your course aims to equip you with a range of personal attributes relevant to the world beyond higher education (HE), allowing you to engage in lifelong learning, to consider ethics and values, and to contribute to the wider community. Your degree courses at Royal Holloway, University of London, will be delivered over three years, each of which normally involves modules to the value of 120 credits.

Section 2 – Course details			
Date of specification update	May 2024	**Location of study**	Egham Campus
Course award and title	BSc Computer Science	**Level of study**	Undergraduate
Course code	3449	**UCAS code**	G40F
Year of entry	2024/25		
Awarding body	Royal Holloway, University of London		
Department or school	Computer Science	**Other departments or schools involved in teaching the course**	N/A
Mode(s) of attendance	Full-time	**Duration of the course**	4 years
Accrediting Professional, Statutory or Regulatory Body requirement(s)	British Computer Society (BCS), and European Quality Assurance Network for Informatics Education (EQANIE). To comply with British Computer Society and EQANIE accreditation requirements students must successfully complete the degree programme and pass the final year project.		
Link to Coursefinder for further information:	https://www.royalholloway.ac.uk/studying-here/	**For queries on admissions:**	https://royalholloway.ac.uk/applicationquery

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 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	FY0022	Foundation Programming	15	HE level 0	MC
0	FY0020	Foundation Physical Sciences I	15	HE level 0	MC
0	FY0030	Foundation Mathematics I	15	HE level 0	MNC
0	FY0019	Foundation Programming Group Project	15	HE level 0	MC
0	FY0018	Engineering Society	15	HE level 0	MC
0	FY0031	Foundation Mathematics II	15	HE level 0	MNC
0	CS1998	Foundation Practical Skills	15	HE level 0	MC
0	CS1999	Foundation Individual Scientific Project	15	HE level 0	MC
1	CS1811	Object Oriented Programming I	15	4	MNC
1	CS1812+	Object Oriented Programming II	15	4	MNC
1	CS1822++	Programming Laboratory	30	4	MNC
1	CS1840	Internet Services	15	4	MC
1	CS1860	Mathematical Structures	15	4	MC
1	CS1870	Machine Fundamentals	15	4	MC
1	CS1890	Software Design	15	4	MC
2	CS2800	Software Engineering	15	5	MNC

2	CS2810	Team Project	15	5	MNC
2	CS2850	Operating Systems	15	5	MC
2	CS2855	Databases	15	5	MC
2	CS2860	Algorithms and Complexity	15	5	MC
2	IY2760	Introduction to Information Security	15	5	MC
3	CS3821	Full Unit Project	30	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.

+ You may take CS1813 Software Development instead of CS1812 at the discretion of the department.

++ You may take CS1823 Programming in Practice instead of CS1822 at the discretion of the department.

In the **second year** you will take two further non-project CS2xxx or IY2xxx elective courses.

In the **final year** you will take two further non-project CS3xxx or IY3xxx elective courses.

Note: students for each year are expected to take part in the Advanced topics seminar course (CS3010). This course is not part of the degree programme but attendance will be shown on your transcript.

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.

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.

Section 5 – Educational aims of the course

The aims of this course are:

For the Foundation Year:

- to develop the required skills in mathematical concepts and techniques and for you to apply these concepts to problems in Engineering, Computer Science, Maths and Physics, in preparation for level 4 study;
- to equip you with the basic experimental, programming or practical techniques required for scientific degrees;
- to start the process of independent project work in science with support of expert academics;
- to put in context scientific knowledge and developments into a wider context of history, society and globalisation.

Following on to aims for the BSc:

- to produce graduates with the ability to engage in the lifelong learning and with the skills required for a professional career in a computer-based environment or for a research career in Computer Science and related areas;
- to develop computing-related cognitive abilities and skills as described in the QAA Computer Science benchmark statement;
- to develop, in a flexible and progressive structure, students' knowledge and understanding of essential facts and theory, with the ability to use this knowledge to devise, specify, design, implement, test, document and critically evaluate computer-based systems;
- to develop an understanding of professional and ethical issues involved in the deployment of computer technology;
- to produce graduates with a range of personal attributes relevant to the world beyond higher education, including information retrieval and use, numeracy, the ability to devise and present logical arguments to inform and support actions, and organisational skills.

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 3	Level 4	Level 5	Level 6
1. Explain and apply the fundamental mathematical knowledge underpinning computer science.	Knowledge of and ability to apply mathematics to scientific and computational problems.	1.4.1: Explain the basic mathematical building blocks of computer science, and apply this knowledge in small exercises and programs.	1.5.1: Compare key algorithms and data-structures and select the most appropriate depending on the situation.	1.6.1: Apply knowledge to design and compare solutions to problems in a large-scale individual project. 1.6.3: Apply foundational knowledge of a broad range of advanced computer science topics.
2. Discuss in detail how computer systems are constructed and how they communicate, and apply this knowledge in practice.	Working knowledge of a least one programming high level programming language.	2.4.1: Describe the fundamentals of system design and computer/internet communication.	2.5.1 Explain the theory and design of operating systems and be able to write systems software with knowledge of low-level concepts such as memory management.	
3. Design, plan, and execute software projects, then present, document, and reflect on the results.	Understanding of applying fundamental computer science technologies to simple problems.	3.4.1 Explain and apply software design techniques to analyse requirements and specify software systems. 3.4.2 Discuss and apply the core concepts of modern industrially relevant programming languages in small-to-medium-sized programs. 3.4.3Present and document the design and features of a system and evaluate both the software and the process.	3.5.1 Utilise advanced software development tools and environments. 3.5.2 Describe and deploy best-practice software development practices.	3.6.1 Plan, evaluate the risks of, and execute a large supervised project, and communicate the results via presentations and a critical report.

4. Discuss and apply methods, techniques and tools for information modelling, management and security.	Start to take responsibility and developing the individual learning, communication and research skills	4.4.1 Recognise the basic principles of computer data representation and organisation.	4.5.1 Explain and deploy the principles of database design and usage. 4.5.2 Describe the principles of information security.	4.6.1 Systematically apply software engineering tools for designing and creating appropriate software systems.
5. Work independently and as a team, demonstrating time-management and organisational skills.		5.4.1 Complete and manage the delivery of multiple pieces of individual and team-based work.	5.5.1 Put into practice industry-standard team working principles and methodologies.	5.6.1 Plan and deliver a large-scale individual project.
6. Develop and demonstrate new skills independently.		6.4.1 Deliver a medium-sized group project incorporating elements of self-learning.	6.5.1 Deliver a large group project incorporating elements of self-learning.	6.6.1 Deliver a large individual project incorporating elements of self-learning.
7. Explain and apply knowledge of cutting-edge topics in computer science.				7.6.1 Explain and apply knowledge of cutting-edge topics of computer-science.
8. Discuss and appreciate the professional, commercial, moral, and ethical aspects of computer-based systems.		8.4.1 Follow codes of conduct in informal team-based environments. 8.4.2 Recognise the wider societal context of software systems and the developer responsibilities.	8.5.1 Follow codes of conduct in professional team-based environments. 8.5.2 Develop code to meet external and commercial, rather than self-driven, requirements.	8.6.1 Reflect on the societal and professional impact of a large-scale software product.

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 Computer Science. 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.
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**
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