

School of Physics, Engineering & Computer Science

Title of Programme: BSc (Hons) Computer Science and Information Technology

Programme Code: CMCSITBSC

Programme Specification

This programme specification is relevant to students entering:
01 September 2021

Associate Dean of School (Academic Quality Assurance):



Mariana Lilley

A programme specification is a collection of key information about a programme of study (or course). It identifies the aims and learning outcomes of the programme, lists the modules that make up each stage (or year) of the programme, and the teaching, learning and assessment methods used by teaching staff. It also describes the structure of the programme, its progression requirements and any programme-specific regulations. This information is therefore useful to potential students to help them choose the right programme of study, to current students on the programme, and to staff teaching and administering the programme.

Summary of amendments to the programme:

Section	Amendment
D	4COM2004 and 4COM2009 adjusted from 50% exam/ 50% coursework to 100% coursework* in the academic year 2021/22, due to the covid pandemic.
D	5COM1054 adjusted from 85% exam/ 15% coursework to 100% coursework* in the academic year 2021/22, due to the covid pandemic.
D	5COM1055 adjusted from 50% exam/ 50% coursework to 100% coursework* in the academic year 2021/22, due to the covid pandemic.
D	5COM2003 adjusted from 50% exam/ 50% coursework to 100% coursework* in the academic year 2021/22, due to the covid pandemic.
D	6COM1040 adjusted from 75% exam/ 25% coursework to 100% coursework* in the academic year 2021/22, due to the covid pandemic.

D	6COM1048 adjusted from 50% exam/ 50% coursework to 100% coursework* in the academic year 2021/22, due to the covid pandemic.
D	6COM2004 adjusted from 50% exam/ 50% coursework to 100% coursework* in the academic year 2021/22, due to the covid pandemic.
D	6COM2008 adjusted from 50% exam/ 50% coursework to 100% coursework* in the academic year 2021/22, due to the covid pandemic.

* Learning outcomes for this module will be assessed via coursework using alternative modes of assessment. Alternative modes of assessment include, but are not limited to, take home coursework and online timed assessments.

If you have any queries regarding the changes please email AQO@herts.ac.uk

Programme Specification

BSc (Hons) Computer Science and Information Technology

This programme specification (PS) is designed for prospective students, enrolled students, academic staff and potential employers. It provides a concise summary of the main features of the programme and the intended learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the teaching, learning and assessment methods, learning outcomes and content for each module can be found in Definitive Module Documents (DMDs) and Module Guides.

Section 1

Awarding Institution/Body	University of Hertfordshire
Teaching Institution	University of Hertfordshire
University/partner campuses	College Lane
Programme accredited by	Accreditation by the BCS is being sought
Final Qualification	BSc Honours
All Final Award titles	BSc Honours in Computer Science
(Qualification and Subject)	BSc Honours in Computer Science (Software Engineering) BSc Honours in Computer Science (Cyber Security and Networks) BSc Honours in Computer Science (Artificial Intelligence) BSc Honours in Information Technology

Note: All awards listed above are available with an optional Sandwich award, or Study Aboard or Year Abroad

FHEQ level of award	6
UCAS code(s)	G400, G403, G491, GG46, GG47, G501
Language of Delivery	English

A. Programme Rationale

The BSc Honours in Computer Science and Information Technology is a very well-established and highly popular degree programme, both for applicants to the programme, and for employers seeking to recruit graduates from the programme. The programme draws on the research strengths of the Department of Computer Science, in particular its internationally recognised research into artificial intelligence. The programme structure and its content have been developed with reference to the benchmark statements of the QAA and the British Computer Society (BCS), and to the curriculum guidelines published by the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers (IEEE). In addition to academic development, the programme also recognises the importance of developing students' professional and civic character, as articulated through the University's Graduate Attributes.

The programme recognises a clear distinction between Computer Science (CS) and Information Technology (IT), and is structured so as to allow students to progress along two different routes. There is a common core of compulsory material to both themes in the first year of study to ensure that all students have the appropriate foundation for either route. For the computer science theme, the programme offers further specialisation at level 6 providing the opportunity for students to graduate with degree awards in four areas: computer science, software engineering, cyber security and networking, and artificial intelligence.

Both themes provide the opportunity for students to undertake a period of industrial placement, and so develop their understanding and skills within a professional environment. Alternatively, students may choose

to undertake a period of study abroad, and so develop their understanding and skills within a different cultural environment.

The programme therefore equips graduates for a wide variety of careers in professional roles (not necessarily constrained to the Computing and IT sectors) that involve designing, developing, configuring, operating, maintaining or evaluating programmed systems, or wider socio-technical systems involving a programmed sub-system.

Further information on entry requirements is given in section F.

B. Educational Aims of the Programme

The programme has been devised in accordance with the University's graduate attributes of programmes of study as set out in [UPR TL03](#).

Additionally this programme aims to:

Provide students with the opportunities to:

- develop a range of cognitive abilities relevant to the design, development and evaluation of programmed solutions to problems;
- develop a range of practical skills relevant to the design, development and evaluation of programmed solutions to problems;
- develop a range of transferable skills including communication, logical presentation of ideas and arguments, and independent and team working; and practice these skills within the context of their studies;
- recognise and begin to appreciate the legal, social, ethical and professional issues involved in the application of their knowledge and skills to a range of problems; and
- provide students with a broad range of activities drawn from a variety of problem domains.

For the Computer Science awards the programme additionally aims, at a high level, to provide students with opportunities to:

- develop specific in-depth technical abilities and skills that are relevant to the design, development, evaluation and management of computational systems; and
- develop a broad understanding of, and practical abilities in, a range of computing disciplines.

For the Information Technology award the programme additionally aims, at a high level, to provide students with opportunities to:

- develop specific in-depth technical abilities and skills that are relevant to the design, development, configuration and operation of computing-based systems that support information handling and decision making; and
- develop a broad understanding of, and practical abilities in, a range of computing disciplines.

Additionally for either the Computer Science with a Study/Year Abroad award or the Information Technology with a Study/Year Abroad awards, the programme aims to provide students with opportunities to:

- develop understanding of the appropriate subject domain topics within the context of a non-United Kingdom cultural environment; and
- gain experience of developing appropriate solutions drawn from a variety of problem domains in the context of non-United Kingdom cultural environment.

For the specialist awards in Computer Science, students will acquire a deeper understanding and more specific skills relevant to a particular domain, and the generic aims can be further refined as follows:

For the Computer Science (Software Engineering) specialist award, the programme aims to provide students with opportunities to:

- develop the ability to choose suitable tools and techniques for software development depending on the characteristics of the problem;
- develop an appreciation of good practice in the management of software development;

- develop an appreciation of software development as an engineering discipline;
- develop a responsible and professional attitude to the quality and timeliness of their products; and
- develop an appreciation of the role of theory in practical applications.

For the Computer Science (Cyber Security and Networks) specialist award, the programme aims to provide students with opportunities to:

- develop a knowledge of the function of both hardware and software aspects of networked systems;
- gain an understanding of the principles of operation of a wide variety of network technologies;
- develop an appreciation of how network services are developed and a knowledge of their uses;
- gain an understanding of the special problems of the development networked systems, including design, implementation, validation and testing.
- develop an appreciation of the necessity to protect computing and communication resources from security threats at all levels: systems, software and networks.
- gain an understanding of security counter-measures, such as firewalls and intrusion detection systems.

For the Computer Science (Artificial Intelligence) specialist award, the programme aims to provide students with opportunities to:

- gain an understanding of the theoretical basis of Artificial Intelligence;
- acquire the software engineering skills necessary for the design, implementation and testing of Artificial Intelligence systems;
- acquire the requisite mathematical and modelling skills to engineer Artificial Intelligence systems;
- gain experience of a range of applications of Artificial Intelligence and an understanding of their suitability to a range of problem domains.

C. Intended Learning Outcomes

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills and other attributes in the following areas. The programme outcomes are referenced to the QAA benchmark statements for Computing and the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (2014) and relate to the typical student. Additionally, the SEEC Credit Level Descriptors for Further and Higher Education (2016) have been used as a guiding framework for curriculum design.

Knowledge and Understanding	Teaching and learning methods	Assessment strategy
A1- The methodology of developing programmed solutions and a subset of the tools, notations and techniques appropriate to the various stages of development, from problem identification to system implementation and evaluation.	At level 4, A1–A5 are introduced via specific topics using a combination of lectures, tutorials, practical classes, online material, and guided self- study. The material is integrated via the core theme of programmed system design, and students will be helped to appreciate these topics within this framework.	At level 4, A1 – A5 are assessed through a combination of primarily coursework and in-class tests, with some unseen examinations. Where appropriate assessments will also include a component of peer assessment by students. Assessments concentrate on specific topics, within a provided framework, rather than on substantive integrative tasks.
A2- The complexity of interactions between agents, which could be human or programmed systems, at various levels, and the implications of this for the developer of a programmed solution.	Tasks will in general concentrate on building proficiency and confidence at the topic level, and students will not be expected to work at the systems level without considerable support. It is at level 5 that the main routes of computer science and	At level 5, A1 – A5 will be assessed through a more 'balanced' combination of coursework, in-class tests,

A3- The context within which a professional software designer operates and implications for professional practice including the legal, social, ethical and professional issues involved.

Additionally for BSc Computer Science (CS) and specialist CS awards

A4- An in-depth understanding of principles and practices relevant to the design and development of programmed systems and their subsequent use in specific contexts.

Additionally for Information Technology (IT) award

A5- An in-depth understanding of principles and practices relevant to the design, development, configuration and operation of information technology systems and their subsequent use in specific contexts.

Additionally for Computer Science (Software Engineering) award

A6- An in-depth understanding of principles and practices relevant to the specification, design, implementation and evaluation of programmed systems.

Additionally for Computer Science (Cyber Security and Networks) award

A7- An in-depth understanding of principles and practices relevant to evaluating and improving the security of systems, including threats and countermeasures. This includes in-depth understanding of

information technology distinguish themselves, and therefore the respective knowledge and understanding (for A4 and A5) begins to diverge.

At level 5, for both routes, additional topics addressing A1–A5 will be introduced using lectures, tutorials, practical classes, online material and guided self- study, and students will be expected to begin to integrate material and adopt a more critical and analytical attitude to their learning, and to the topics and tasks being taught.

The learning opportunities will provide insight into the range of options available for solving design problems and therefore into the selection of appropriate methodological and system components, as well as of their evaluation.

Level 5 provides the opportunity for computer science students to begin to specialise their knowledge and understanding for A1, A2, and A6, A7 and A8.

A3 will be addressed explicitly via lectures, tutorials, online material and guided self-study on specific topics.

The professional work placement provides the opportunity to contextualise A1, A2, A4 and A5 in a working environment, and to develop A3 through interaction with professionals in the discipline.

At level 6, learning relating to A1–A8 is expected to be increasingly independent, critical and evaluative; and students are expected to take increasing responsibility for the selection and use of theories, principles and methods in particular contexts, and for tackling particular problems. This understanding is expected to include an appreciation of the limits of applicability of theories, the uncertainty and inherent open-

and unseen examinations. Where appropriate assessments will also include a component of peer assessment by students. Assessments will begin to include more substantial elements of teamwork and project work and, through those, more substantive assessment tasks.

Students passing the four level 4 core modules together with the appropriate level 5 core modules will be deemed to have met the minimum threshold level in A1 – A5 necessary to progress to examination for an Honours award. At level 6, A1 – A8 will again be assessed through a combination of coursework, in-class test and unseen examinations; with again the opportunity for peer assessment where appropriate. There will be a substantial component of individual project-type activity, for which students will be expected to: establish for themselves the framework within which the work is carried out; select and apply knowledge and understanding as appropriate to the specific problem(s) being addressed; and evaluate solutions, referencing appropriate research or scholarship.

At level 6, A3 may additionally be assessed through the professional placement.

principles and practices relevant to the design, implementation and evaluation of computer networks and systems operating in a networked environment.

Additionally for Computer Science (Artificial Intelligence) award

A8- An in-depth understanding of principles and practices relevant to the specification, design, implementation and evaluation of mechanisms enabling intelligence of various kinds in humans, robots and information processing systems.

endedness of many practical problems in computing and of the human and societal constraints on approaches to problem solution. Some material will be presented via lectures, tutorials, practical classes and online, with significant learning undertaken and achieved through independent, self- directed study.

Students at all levels of the programme are expected to continue their development in A3 outside of their formal studies as they start to consider their future careers, and they will be supported in this by a range of activities such as research seminars, talks from professional bodies and careers talks and advice.

At all levels of the programme, students are encouraged to undertake independent study both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject.

Intellectual skills	Teaching and learning methods	Assessment strategy
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Not applicable under QAA Benchmarking statement. Intellectual skills are subsumed under Knowledge and Understanding.

Practical skills	Teaching and learning methods	Assessment strategy
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C1- Use specific tools, techniques, notations and methods in the context of the design and development of programmed computer systems.

C2- Use computer systems and associated technology to support the development of programmed systems.

C3- Engage in effective discussion of technical information as appropriate to the system design and development task.

C4- Carry out design activities ranging from initial problem

Level 4, 5 and 6 will address C1 – C3 using lectures and tutorials for the presentation of instructional material, with practical classes, independent study and project work offering the opportunity to practise the skills in a supportive environment. The amount of instructional material will decrease as the programme progresses, with students being expected to take an increasing responsibility for developing their own skills and identifying resources to support their development.

Level 4, 5 and 6 will address C4. The examples used at level 4 will be simple, and considerable support will be given in problem identification and evaluation. At levels 5 and 6 this support will be

At level 4 practical skills C1 and C2 will be assessed directly through coursework and assessed indirectly through unseen examinations and in-class tests. The examinations and in-class tests will assess understanding that has developed, or been consolidated, as a result of practical activity.

At level 5, C3 and C4 are assessed, through a group design task.

At level 6, C1 – C6 will be assessed directly and indirectly. The independent project at level 6 will assess C4 – C6.

identification to system implementation and evaluation, and as an individual or participate as a member of a team carrying out a subset of these activities.

Additionally for BSc Computer Science (CS) and specialist CS awards

C5- Design, implement and evaluate systems as characterised by Computer Science approaches, methodologies and practices.

Additionally for BSc Information Technology (IT) awards

C6- Configure, evaluate the performance of, and protect from cyber security threats information technology systems.

increasingly reduced, and more open tasks will be set. Students will be exposed to employ a variety of technologies such as operating environments, programming languages, applications and specification techniques.

At level 6 students will be expected to extend their skills developed in C1–C6 to the task of evaluating and selecting appropriate approaches to addressing specific tasks appropriate to that level.

The industrial placement period offers enhanced opportunities for developing either a wider range of skills, or developing specific skills to higher levels of proficiency.

For BSc students, C1 – C6 are further developed and deepened through an individual self-managed project at level 6.

Throughout the levels of the programme, the learner is encouraged to further develop their practical skills by independent study.

Typically, students passing the five level 4 core modules together with the appropriate level 5 core modules will be deemed to have met the minimum threshold level in C1 – C6 necessary to progress to examination for an Honours award.

Transferable skills	Teaching and learning methods	Assessment strategy
<p>D1- Communicate effectively orally, in writing and visually using the conventions, vocabulary, form and register of academic expression.</p> <p>D2- Manage their own learning including time management, the organization and retrieval of information, and the identification of personal needs for continuing professional development.</p> <p>D3- Select and use a variety of modes of discourse, including mathematical, informal and diagrammatic.</p> <p>D4- Work effectively both independently and as part of a team.</p>	<p>Transferable skills are developed through using a variety of teaching and learning methods and strategies.</p> <p>Students are expected to take an increasing responsibility for their own learning as the programme progresses, and are supported in meeting D1 through tutoring and guided independent study using resources provided both locally and centrally (e.g. the Learning Resources Centre runs sessions and produces self-study guides on information retrieval and similar topics).</p> <p>The development of confidence and ability to use more formal, mathematical, modes is addressed at level 4 explicitly. Central support, such as the Mathematics drop-in centre and courses on written and spoken</p>	<p>Transferable skills are assessed through a variety of means built into the curriculum.</p> <p>At level 4, 5 and 6, D1 is assessed in different ways e.g. a short report at level 4, a team presentation at level 5, an individual presentation at level 6.</p> <p>At level 4, 5 and 6, D2 is assessed by setting different kinds of task, providing feedback on those tasks to students (partly through peer assessment) and encouraging reflection by students.</p> <p>At level 4, 5 and 6, D3 is assessed in different ways, depending on the topic and the nature of the</p>

D5- Reflect upon their work and the work of others, and explain, justify and otherwise defend their work and ideas, with reference to academic, professional issues, debates and conventions.

English, are available for students having particular difficulties in meeting aspects of D2. Students are encouraged to form study groups at level 4, and to start building a collaborative attitude towards studying, whilst also taking responsibility for their own learning.

All courses include a level 4 Team Project. At level 5, team-working is used explicitly in the context of a development task, and students will be supported in meeting D3 through this.

The industrial placement offers the opportunity to address D1 – D5.

At level 6, the project addresses D1 – D5, together with the independent aspects of D4. D5 is developed through exposure to contemporary issues at level 6 and beyond.

During the course of the programme, assessed and non-assessed work encourages the learner to develop a wide range of transferable skills. In level 4, this starts with closely defined and directed assignments. At level 5 the learner is encouraged by more loosely defined projects and at level 6 these are supported through the self-definition of work in the project. Throughout, the learner is encouraged to develop transferable skills by maintaining a record of evidence and completing a personal development plan.

assessment. Additionally, the independent project at level 6 provides opportunities for students to select appropriate modes of discourse for the problem(s) they are seeking to address.

Students' ability to work independently (D4) is assessed throughout the programme via individual coursework assignments, culminating in the major individual project at Level 6. Their ability to work as part of a team (also D4) is assessed at Levels 4 and 5 via two substantial teamwork exercises.

At level 6, for BSc students, D4 is assessed through the individual project.

D5 is assessed by reviewing the outcomes of assignments, and additionally through peer assessment, where appropriate e.g. Level 4 and 5 team projects. At level 6, D5 is assessed as part of the individual project.

The programme provides opportunities for students to develop all of the University's Graduate Attributes i.e.

- Professionalism, employability and enterprise
- Learning and research skills
- Intellectual depth, breadth and adaptability
- Respect for others
- Social responsibility
- Global awareness

D. Programme Structures, Features, Levels, Modules, and Credits

The programme is offered in the following modes:

- BSc full-time (3 years)
- BSc sandwich (4 years)
- BSc year abroad (4 years)
- BSc sandwich with study abroad (4 years)

Entry to the programme is normally at level 4, but entry is also possible at level 5 or at level 6 with appropriate entry qualifications (see further information in section F).

Once a student has progressed to Level 5, they have made the decision to study on the Information Technology route or on the Computer Science route, and cannot transfer between the two routes. Students on the Computer Science route elect to follow one of four pathways, but may transfer between these pathways before they progress to Level 6.

Intake is normally in Semester A (September).

Professional and Statutory Regulatory Bodies

The programme will be submitted to accreditation by the British Computer Society.

Work-Based Learning, including Sandwich Programmes

An award in the sandwich mode is made to a student who has successfully completed the requirements for a full-time award, and also successfully completed at least 30 weeks of approved, supervised work experience. Students are supported by the Careers and Employment Service in finding a placement.

Year Abroad

An award in the “Year Abroad” mode is made to a student who has successfully completed the requirements for a full-time BSc award, and also successfully completed a two-semester programme of study at a partner institution in a non-UK country, as organised and approved by the University’s Study Abroad Office. The Year Abroad typically occurs between Level 5 and Level 6 of the programme and typically takes place over Semester A and Semester B.

The programme of study for the Year Abroad mode will be negotiated and approved by the Study Abroad Office in consultation with appropriate others, such as the Programme Leader (or equivalent) and the appropriate representative at the hosting institution. The programme provided by the host institution may consist of (for example): taught modules, a research project, field studies, or a mixture of these components. Prior to starting the Year Abroad, the student and programme officers from UH and the host institution will agree a learning contract and mode of assessment for the study at the hosting institution.

Programme Structure

There are two principal routes through the programme: one leading to BSc (Hons) awards in Computer Science and the other leading to BSc (Hons) awards in Information Technology.

There are four pathways through the Computer Science route: one leading to the award of a BSc (Hons) Computer Science, a second leading to the award of a BSc (Hons) Computer Science (Artificial Intelligence), a third leading to the award of a BSc (Hons) Computer Science (Cyber Security and Networks) and a fourth leading to the award of a BSc (Hons) Computer Science (Software Engineering). The Information Technology route has a single pathway, leading to the award of a BSc (Hons) Information Technology.

Students who fail to meet certain programme-specific requirements at Level 4 may be transferred to a third route, leading to a BSc (Hons) Computer Studies, upon progression to Level 5. Transfer back to the Computer Science or Information Technology route is available to those who redeem the relevant Level 4 failure(s).

The programme structure and progression information below (Table 1a, 1b, 1c and 1d) is provided for the

Honours award. Any interim awards are identified in Table 1d. The Programme Learning Outcomes detailed above are developed and assessed through the constituent modules. Table 2 identifies where each learning outcome is assessed.

Table 1a Outline Programme Structure

Module Title	Module Code	Credit Points	Language of Delivery	% examination	% coursework	% Practical	Semesters
Compulsory Modules (Levels 4 and 5)							
Data Modelling for Databases	4COM2004	15	English	0	100	0	A
Introduction to Programming and Discrete Structures	4COM2002	30	English	0	100	0	A
From Silicon to C	4COM2003	30	English	0	100	0	AB
Computational Problem Solving	4COM2005	30	English	0	100	0	B
Team Software Project	4COM2006	15	English	0	100	0	B
Accessibility and Usability	5COM2002	15	English	0	100	0	A
Database Systems	5COM2005	15	English	50	50	0	A
Algorithms and Data Structures	5COM1054	15	English	0	100	0	A
Principles and Practices of Large-Scale Programming	5COM2007	30	English	0	100	0	AB
Artificial Intelligence	5COM2003	15	English	0	100	0	B
Computing Things	5COM2004	15	English	60	40	0	B
Operating Systems and Networks	5COM1055	15	English	0	100	0	B
Web Application Development and Deployment	5COM2009	30	English	0	100	0	A
Design and Configuration Project	5COM2006	30	English	0	100	0	B
Systems and Network Administration	5COM2008	30	English	0	100	0	B

Modules (Level 6)
Module Title

Module Title	Module Code	Credit Points	Language of Delivery	% examination	% coursework	% Practical	Semesters	Core or Optional
Professional Work Placement in Computer Science	6COM0244	0	English	0	100	0	AB	O
Computer Science – Year Abroad	6COM1058	0	Varies	0	100	0	AB	O
Computer Science – Study Abroad	6COM1059	0	Varies	0	100	0	A or B	O
Software Architecture	6COM2013	15	English	0	100	0	A	C(AI, CN, CS, SE, CompStu)
Responsible Computing	6COM2010	15	English	0	100	0	B	C(All)
Mobile Computing	6COM1047	15	English	0	100	0	A	C(CS)
Real-time and Control Systems	6COM2009	15	English	0	100	0	A	C(CS)
Internet of Things	6COM2008	15	English	0	100	0	B	C(CS)
Advanced Artificial Intelligence	6COM2000	15	English	0	100	0	A	C(AI)
Social and Collective Artificial Intelligence	6COM2012	15	English	0	100	0	A	C(AI)
Intelligent Adaptive Systems	6COM2007	15	English	0	100	0	B	C(AI)
Cyber Security	6COM1040	15	English	0	100	0	A	C(CN)
Incident Response Digital Forensics	6COM2006	15	English	0	100	0	A	C(CN)
Network Protocols and Architectures	6COM1039	15	English	0	100	0	B	C(CN)
Cloud Computing	6COM2002	15	English	0	100	0	A	C(IT)
Computer Systems Security	6COM1033	15	English	0	100	0	A	C(IT, CompStu)
Data Mining and Visualisation	6COM2005	30	English	0	100	0	AB	C(IT, CompStu)
Software Engineering Techniques	6COM2014	15	English	0	100	0	A	C(SE)
Software Quality	6COM2015	15	English	0	100	0	A	C(SE)
Advanced Programming Paradigms	6COM2001	15	English	0	100	0	B	C(SE)
Machine Learning and Neural Networks	6COM1044	15	English	0	100	0	B	O
Advanced Database Topics	6COM1048	15	English	0	100	0	B	O
Information Security Management	6COM1050	15	English	0	100	0	B	O
Concurrent Programming	6COM2004	15	English	0	100	0	B	O
Robotics	6COM2011	15	English	0	100	0	B	O
User Experience	6COM1032	15	English	0	100	0	B	O
Web Application Penetration Testing	6COM2016	15	English	0	100	0	B	O
Artificial Intelligence Project	6COM2017	30	English	0	90	10	AB	C(AI)
Computer Science Project	6COM2018	30	English	0	90	10	AB	C(CS)
Computer Studies Technical Report	6COM2003	30	English	0	100	0	AB	C(CompStu)
Cyber Security and Networks Project	6COM2019	30	English	0	90	10	AB	C(CN)
Information Technology Project	6COM2020	30	English	0	90	10	AB	C(IT)
Software Engineering Project	6COM2021	30	English	0	90	10	AB	C(SE)

Level 4 modules for Hertfordshire International College (HIC) students

Compulsory Modules Module Title	Module Code HIC	Credit Points	Language of Delivery	% examination	% coursework	% Practical	Semesters
Data Modelling for Databases (HIC)	4COM2009	15	English	-	100	-	A
Introduction to Programming and Discrete Structures (HIC)	4COM2007	30	English	-	100	-	A
From Silicon to C (HIC)	4COM2008	30	English	-	100	-	AB
Computational Problem Solving (HIC)	4COM2010	30	English	-	100	-	B
Team Software Project (HIC)	4COM2011	15	English	-	100	-	B

Level 4 module that must be re-taken by those on the BSc (Hons) Computer Studies route in order to return to Computer Science or Information Technology at Level 6

Notes: Students who have failed 4COM2002 Introduction to Programming and Discrete Structures and who intend to progress to Level 5 may not continue on either the Computer Science route or the Information Technology route. If they pass this module on re-enrolment before they progress to Level 6, they may return to the route for which they have prepared at Level 5.

Compulsory Modules Module Title	Module Code	Module Code (HIC)	Credit Points	Language of Delivery	% Examination	% Coursework	% Practical	Semesters
Introduction to Programming and Discrete Structures	4COM2002	4COM2007	30	English	0	100	0	A

Level 5 modules for those on the BSc (Hons) Computer Studies route who intend to return to Computer Science at Level 6

Compulsory Modules Module Title	Module Code	Credit Points	Language of Delivery	% examination	% coursework	% Practical	Semesters
Accessibility and Usability	5COM2002	15	English	0	100	0	A
Database Systems	5COM2005	15	English	50	50	0	A
Algorithms and Data Structures	5COM1054	15	English	0	100	0	A
Operating Systems and Networks	5COM1055	15	English	0	100	0	B
Computing Things	5COM2004	15	English	40	60	0	B

Level 5 modules for those on the BSc (Hons) Computer Studies route who intend to return to Information Technology at Level 6

Compulsory Modules Module Title	Module Code	Credit Points	Language of Delivery	% examination	% coursework	% Practical	Semesters
Accessibility and Usability	5COM2002	15	English	0	100	0	A
Database Systems	5COM2005	15	English	50	50	0	A
Web Application Development and Deployment	5COM2009	30	English	0	100	0	A
Systems and Network Administration	5COM2008	30	English	0	100	0	B
Design and Configuration Project	5COM2006	30	English	0	100	0	B

Level 6 modules for those on the BSc (Hons) Computer Studies route

Compulsory Modules (Computer Studies route) Module Title	Module Code	Credit Points	Language of Delivery	% examination	% coursework	% Practical	Semesters
Software Architecture	6COM2013	15	English	0	100	0	A
Computer Systems Security	6COM1033	15	English	0	100	0	A
Responsible Computing	6COM2010	15	English	0	100	0	B
Data Mining and Visualisation	6COM2005	30	English	0	100	0	AB
Information Technology Project	6COM2020	30	English	0	100	0	AB

Optional Modules (choose ONE) Module Titles	Module Code	Credit Points	Language of Delivery	% examination	% coursework	% Practical	Semesters
User Experience	6COM1032	15	English	0	100	0	B
Advanced Database Topics	6COM1048	15	English	0	100	0	B
Web Application Penetration Testing	6COM2016	15	English	0	100	0	B
Concurrent Programming	6COM2004	15	English	0	100	0	B
Machine Learning and Neural Networks	6COM1044	15	English	0	100	0	B
Robotics	6COM2011	15	English	0	100	0	B
Information Security Management	6COM1050	15	English	0	100	0	B

Notes: Computer Studies students do **NOT** take the final year project. Instead they are required to complete a non-practical Technical Report. Students on a Level 6 Computer Studies course instance will have an unredeemed failure in 4COM2002 Introduction to Programming and Discrete Structures, typically with an FNFA status code.

Table 1b Modules on offer for each award

Notes: All optional modules are offered subject to timetable availability and other operational constraints. This programme specification does not commit the School to make optional modules available to students choosing to take a module as an option.

Module Title	Module Code	Credit Points	Computer Science pathway	Artificial Intelligence pathway	Cyber Security and Networks pathway	Software Engineering pathway	Information Technology route
Data Modelling for Databases	4COM2004	15	Core	Core	Core	Core	Core
Introduction to Programming and Discrete Structures	4COM2002	30	Core	Core	Core	Core	Core
From Silicon to C	4COM2003	30	Core	Core	Core	Core	Core
Computational Problem Solving	4COM2005	30	Core	Core	Core	Core	Core
Team Software Project	4COM2006	15	Core	Core	Core	Core	Core
Accessibility and Usability	5COM2002	15	Core	Core	Core	Core	Core
Database Systems	5COM2005	15	Core	Core	Core	Core	Core
Algorithms and Data Structures	5COM1054	15	Core	Core	Core	Core	X
Principles and Practices of Large-Scale Programming	5COM2007	30	Core	Core	Core	Core	X
Artificial Intelligence	5COM2003	15	Core	Core	Core	Core	X
Computing Things	5COM2004	15	Core	Core	Core	Core	X
Operating Systems and Networks	5COM1055	15	Core	Core	Core	Core	X
Web Application Development and Deployment	5COM2009	30	X	X	X	X	Core
Design and Configuration Project	5COM2006	30	X	X	X	X	Core
Systems and Network Administration	5COM2008	30	X	X	X	X	Core
Professional Work Placement in Computer Science	6COM0244	0	Optional	Optional	Optional	Optional	Optional
Computer Science – Year Abroad	6COM1058	0	Optional	Optional	Optional	Optional	Optional
Computer Science – Study Abroad	6COM1059	0	Optional	Optional	Optional	Optional	Optional
Software Architecture	6COM2013	15	Core	Core	Core	Core	X
Responsible Computing	6COM2010	15	Core	Core	Core	Core	Core
Mobile Computing	6COM1047	15	Core	X	X	X	X
Real-time and Control Systems	6COM2009	15	Core	X	X	X	X
Internet of Things	6COM2008	15	Core	X	X	X	X
Advanced Artificial Intelligence	6COM2000	15	X	Core	X	X	X
Social and Collective Artificial Intelligence	6COM2012	15	X	Core	X	X	X
Intelligent Adaptive Systems	6COM2007	15	X	Core	X	X	X
Cyber Security	6COM1040	15	X	X	Core	X	X
Incident Response Digital Forensics	6COM2006	15	X	X	Core	X	X
Network Protocols and Architectures	6COM1039	15	X	X	Core	X	X
Cloud Computing	6COM2002	15	X	X	X	X	Core
Computer Systems Security	6COM1033	15	X	X	X	X	Core
Data Mining and Visualisation	6COM2005	30	X	X	X	X	Core
Software Engineering Techniques	6COM2014	15	X	X	X	Core	X
Software Quality	6COM2015	15	X	X	X	Core	X
Advanced Programming Paradigms	6COM2001	15	X	X	X	Core	X
Machine Learning and Neural Networks	6COM1044	15	Optional	Optional	Optional	Optional	Optional
Advanced Database Topics	6COM1048	15	Optional	Optional	Optional	Optional	Optional
Information Security Management	6COM1050	15	Optional	Optional	Optional	Optional	Optional
Concurrent Programming	6COM2004	15	Optional	Optional	Optional	Optional	Optional
Robotics	6COM2011	15	Optional	Optional	Optional	Optional	Optional

User Experience	6COM1032	15	Optional	Optional	Optional	Optional	Optional
Web Application Penetration Testing	6COM2016	15	Optional	Optional	Optional	Optional	Optional
Artificial Intelligence Project	6COM2017	30	X	Core	X	X	X
Computer Science Project	6COM2018	30	Core	X	X	X	X
Cyber Security and Networks Project	6COM2019	30	X	X	Core	X	X
Information Technology Project	6COM2020	30	X	X	X	X	Core
Software Engineering Project	6COM2021	30	X	X	X	Core	X

Table 1c Progression

From the following course instance	To the following course instance	Minimum requirements
Progression from Level 4 to Level 5		
CMS1S CMSAI1S CMSCN1S CMSSE1S IFT1S	CMS2S CMSAI2S CMSCN2S CMSSE2S IFT2S	<p>90 credit points from compulsory modules at Level 4, including 4COM2002 Introduction to Programming and Discrete Structures.</p> <p>Students progressing to CMS2S, CMSAI2S, CMSCN2S, CMSSE2S are on the Computer Science route, those progressing to IFT2S are on the Information Technology route. Students may progress from one route to the other, and may switch between pathways on the Computer Science route.</p> <p>For students with fewer than 120 credit points at Level 4, the maximum study rate permissible is 120 credits per year at Level 5, plus 30 credits of Level 4 modules. Any Level 4 shortfall should be redeemed at the first available opportunity.</p>
CMS1S CMSAI1S CMSCN1S CMSSE1S IFT1S	CSTCS2S CSTIT2S	<p>90 credit points from compulsory modules at Level 4, excluding 4COM2002 Introduction to Programming and Discrete Structures.</p> <p>Students progressing under this rule are en-route to a Computer Studies award. Those intending to return to one of the pathways on the Computer Science route progress to CSTCS2S, whilst those intending to return to the Information Technology route progress to CSTIT2S. Until they redeem the relevant Level 4 failure(s).</p> <p>For students with fewer than 120 credit points at Level 4, the maximum study rate permissible is 120 credits per year at Level 5, plus 30 credits of failed Level 4 modules. Any Level 4 shortfall should be redeemed at the first available opportunity.</p>
Progression from Level 5 to Level 6		
CMS2S CMSAI2S CMSCN2S CMSSE2S IFT2S	CMS3S CMSAI3S CMSCN3S CMSSE3S IFT3S	<p>210 credit points of compulsory modules at Levels 4 and 5, including 90 credit points at Level 5, and a pass in 4COM2002 Introduction to Programming and Discrete Structures.</p> <p>Students may switch between pathways on the Computer Science route. Students on the Computer Science route may not progress to the Information Technology route. Students on the Information Technology route may not progress to the Computer Science route.</p>
CMS2S CMSAI2S CMSCN2S	CMSNH3F IFTNH3F	180 credit points of compulsory modules at Levels 4 and 5, but fewer than 210 credit points.

CMSSE2S IFT2S		<p>Students progressing to CMSNH3F are en-route to a non-honours degree in Computer Science; those progressing to IFTNH3F are en-route to a non-honours degree in Information Technology</p> <p>Progression from CMS2S, CMSAI2S, CMSCN2S, or CMSSE2S to IFTNH3F is not permitted, nor is progression from IFT2S to CMSNH3F</p> <p>The maximum study rate permissible is 120 credits per year, including any failed Level 4 / 5 modules that are being re-taken.</p>
CSTCS2S CSTIT2S	CMS3F CMSAI3F CMSCN3F CMSSE3F IFT3F	<p>210 credit points of compulsory modules at Levels 4 and 5, including at least 90 credit points at Level 5, and a pass in 4COM2002 Introduction to Programming and Discrete Structures.</p> <p>Students progressing under this rule are returning from the Computer Studies route to one of the Computer Science pathways, or to the Information Technology route.</p> <p>Progression from CSTCS2S to IFT3F is not permitted, nor is progression from CSTIT2S to CMS3F, CMSAI3F, CMSCN3F, or CMSSE3F.</p>
CSTCS2S CSTIT2S	CSTCSNH3F CSTITNH3F	<p>180 credit points of compulsory modules at Levels 4 and 5, but fewer than 210 credit points.</p> <p>Students progressing under this rule are en-route to a non-honours degree in Computer Studies</p> <p>Progression from CSTC2S to IFTNH3F is not permitted, nor is progression from CSTIT2S to CSTCSNH3F.</p> <p>The maximum study rate permissible is 120 credits per year, including any failed Level 4 / 5 modules that are being re-taken.</p>
CSTCS2S CSTIT2S	CSTCS3F CSTIT3F	<p>210 credit points of compulsory modules at Levels 4 and 5, including at least 90 credit points at Level 5, WITHOUT a pass in 4COM2002 Introduction to Programming and Discrete Structures. Students remain on the Computer Studies route.</p> <p>Progression from CSTCS2S to CSTIT3F is not permitted, nor is progression from CSTIT2S to CSTCS3F.</p>
Progression to Placement or Year Abroad		
CMS2S CMSAI2S CMSCN2S CMSSE2S	CMS3S CMSAI3S CMSCN3S CMSSE3S	210 credits or more at Level 4 and Level 5, with at least 90 credits at Level 5; and successfully secured placement or Year Abroad.
IFT2S	IFT3S	210 credits or more at Level 4 and Level 5, with at least 90 credits at Level 5; and successfully secured placement or Year Abroad.
Progression from Placement or Year Abroad		
CMS3S CMSAI3S CMSCN3S CMSSE3S	CMS4S CMSAI4S CMSCN4S CMSSE4S	210 credits or more at Level 4 and Level 5, with at least 90 credits at Level 5; and successfully completed placement, or successfully completed Year Abroad.

IFT3S	IFT4S	210 credits or more at Level 4 and Level 5, with at least 90 credits at Level 5; and successfully completed placement, or successfully completed Year Abroad.
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Honours classification

The University has approved structure and assessment regulations common to all programmes. Full details are provided in [UPR AS14](#), Section D.

Table 1d Final and interim awards available

The programme provides the following final and interim awards:

Final Award	Award Title	Minimum requirements	Available at end of Level	Programme Learning Outcomes developed (see above)
BSc (Hons)	<p>BSc (Hons) is available as a final award with the following titles, all of which are available with an optional sandwich award, or Year Abroad or Study Abroad:</p> <ul style="list-style-type: none"> • Computer Science • Computer Science (Software Engineering) • Computer Science (Cyber Security and Networks) • Computer Science (Artificial Intelligence) • Information Technology 	360 credit points including 240 at level 6/5 of which 120 must be at level 6	6	All programme learning outcomes (see Table 2).

Interim Award	Award Title	Minimum requirements	Available at end of Level	Programme Learning Outcomes developed (see above)
University Certificate		45 credit points at level 4	4	See UPR AS11, section 13: http://sitem.herts.ac.uk/secreg/upr/AS11.htm
Certificate of Higher Education		120 credit points at level 4	4, 5	<i>For named awards, list all relevant learning outcomes, e.g. A1, A3, A4, B1, B2, C1, C5, D1, D2, D3</i> OR <i>For untitled awards: See UPR AS11, section 13:</i> http://sitem.herts.ac.uk/secreg/upr/AS11.htm
Diploma of Higher Education	Diploma of Higher Education in Computer Science	240 credit points including 120 at level 5	5, 6	For named awards: A1, A2, A3 and partial fulfilment of A4 C1, C2, C3 C4 and partial fulfilment of C5 D1, D2, D3, D4 and D5
Diploma of Higher Education	BSc Computer Science or BSc Information Technology	300 credit points including 180 at level 6/5 of which 60 must be at level 6	6	For named awards: A1, A2, A3 and partial fulfilment of A4 (CS) or A5 (IT) C1, C2, C3 C4 and partial fulfilment of C5 (CS) or C6 (IT) D1, D2, D3, D4 and D5
BSc	BSc Computer Science or BSc Information Technology	300 credit points including 180 at level 6/5 of which 60 must be at level 6	6	For named awards: A1, A2, A3 and partial fulfilment of A4 (CS) or A5 (IT) C1, C2, C3 C4 and partial fulfilment of C5 (CS) or C6 (IT) D1, D2, D3, D4 and D5
BSc	BSc Computer Studies <i>available as an interim award for BSc students only</i>	300 credit points including 180 at level 6/5, of which 60 must be at level 6	6	For named awards: A1, A2, A3 and partial fulfilment of A4 C1, C2, C3 C4 and partial fulfilment of C5 D1, D2, D3, D4 and D5
BSc	BSc (Hons) Computer Studies	360 credit points including 180 at level 6/5, of which 90 must be at level 6	6	For named awards: A1, A2, A3 and partial fulfilment of A4 C1, C2, C3 C4 and partial fulfilment of C5 D1, D2, D3, D4 and D5

Programme-specific assessment regulations

The programme complies with the University's academic regulations (in particular, [UPR AS11](#), [UPR AS12/UPR AS13](#) and [UPR AS14](#)) with the exception of those listed below, which have been approved by the University:

- **Progression.** Progression from one level to the next depends on meeting the pre-requisite requirements of specific chosen modules (please refer to Table 1c).
- **Period of registration.** The maximum period within which a student may gain an award on the programme is eight years from the student's first date of registration on it.
- **Final year BSc projects.** A student cannot be compensated for the final year project.

- **Eligibility for a specialist Honours award.** To be eligible for a specialist Honours award, a student must pass, or be accredited with passes, in the compulsory modules for that award as identified in Table 8 through Table 10, as well as a pass (without compensation) in the project module for that award.

E. Management of Programme & Support for student learning.

Management

The programme is managed and administered through:

- Programme Leader and a team of Assistant Programme Leaders to help students understand the programme the programme structure;
- Student representatives on programme committees;
- Module Leaders;
- A Student Forum, co-chaired by students.

Support

Students are supported by:

- An induction week at the beginning of each new academic session;
- Personal Tutors to provide academic and pastoral support;
- A substantial Student Centre that provides advice on issues such as finance, University regulations, legal matters, accommodation, international student support, etc;
- Office of Dean of Students, incorporating Chaplaincy, Counselling and nursery;
- StudyNet/Canvas, a versatile on-line inter-active intranet and learning environment;
- Guided student-centred learning on StudyNet/Canvas module sites;
- Access to extensive digital and print collections of information resources;
- Attractive modern study environments in two Learning Resources Centres;
- A Mathematics Drop-in Centre;
- Medical Centre;
- University Disability Advisors;
- An Equality Office;
- Careers Enterprise and Employment Services;
- The Students' Union.

F. Other sources of information

In addition to this Programme Specification, the University publishes guidance to registered students on the programme and its constituent modules:

- A Programme (or Student) Handbook;
- A Definitive Module Document (DMD) for each constituent module;
- A Module Handbook for each constituent module.

The [Ask Herts](#) website provides information on a wide range of resources and services available at the University of Hertfordshire including academic support, accommodation, fees, funding, visas, wellbeing services and student societies.

As a condition of registration, all students of the University of Hertfordshire are required to comply with the University's rules, regulations and procedures. These are published in a series of documents called 'University Policies and Regulations' (UPRs). The University requires that all students consult these documents which are available on-line, on the UPR web site, at: <http://www.herts.ac.uk/secreg/upr/>. In particular, [UPR SA07](#) 'Regulations and Advice for Students' Particular Attention - Index' provides information on the UPRs that contain the academic regulations of particular relevance for undergraduate and taught postgraduate students.

In accordance with section 4(5) of the Higher Education and Research Act 2017 (HERA), the UK Office for Students (OfS) has registered the University of Hertfordshire in the register of English higher education providers. The Register can be viewed at: <https://www.officeforstudents.org.uk/advice-and-guidance/the-register/the-ofs-register/>. Furthermore, the OfS has judged that the University of Hertfordshire delivers consistently outstanding teaching, learning and outcomes for its students. It is of the highest quality found in the UK. Consequently, the University received a Gold award in the 2018 Teaching Excellence and Student Outcomes (TEF) exercise. This award was made in June 2018 and is valid for up to 3 years. The TEF panel's report and conclusions can be accessed at: <https://www.officeforstudents.org.uk/advice-and-guidance/teaching/tef-outcomes/#/provider/10007147>

G. Entry requirements

The normal entry requirements for the programme are:

For Level 4 entry:

- UCAS tariff points: 104 points from a minimum of two 6-unit awards or one 12-unit award. All key skills and other tariff points will be counted; or
- BTEC ND/NC level: 7 merits in level III subjects; and
- All applicants must have passes in GCSE English language and Mathematics at grade 4 or above.

Applications are welcomed from those with qualifications equivalent to the above, for instance from Access Certificate courses.

For Level 5 entry:

- Applicants for direct entry to Level 5 from other programmes within the University or elsewhere must have gained a minimum of 120 credits at Level 4 and are required to demonstrate that their previous studies and experience have provided a broad equivalence to the learning outcomes of Level 4 of the programme.

For Level 6 entry:

- Applicants for direct entry to Level 6 from other programmes within the University or elsewhere must have gained a minimum of 240 credits at Levels 4 and 5, including a minimum of 120 credits at Level 5 and are required to demonstrate that their previous studies and experience have provided a broad equivalence to the learning outcomes of Levels 4 and 5 of the programme. Applicants that apply for direct entry to Level 6 may hold a variety of qualifications that may include (but are not restricted to) Higher National Diploma, Foundation Degree, or following successful completion of two years of a similar BSc degree programme at another HE institution and other equivalent national and international qualifications.
- Applicants from the articulated Foundation Degree (at West Herts College, and North Herts College) who have expressed an interest early in Level 5 of the Foundation Degree, are able to enter the programme directly into the sandwich placement year or Year Abroad, subject to obtaining an approved placement or Year abroad of the appropriate duration.

For current entry tariff point requirements, please refer to the relevant page for the Course on the University website or on the online prospectus.

The programme is subject to the University's Principles, Policies and Regulations for the Admission of Students to Undergraduate and Taught Postgraduate Programmes (in [UPR SA03](#)), along with associated procedures. These will take account of University policy and guidelines for assessing accredited prior certificated learning (APCL) and accredited prior experiential learning (APEL).

H. Transitional arrangements

The programme has undergone a periodic review in the academic year 2020/21, which will result in some modules being phased out. The table below summarises when modules from the previous iteration of the programme will be last offered, and which modules can be studied in lieu of phased out modules.

Academic year 2021/22

Module	Last academic year module will be offered	Replacement module after module is no longer offered
4COM1035 HDoC	2021/22	(4COM2004 <u>and</u> 4COM2006) <u>or</u> 4WCM0020 (online)
4COM1037 Prog	2021/22	4COM2002 <u>or</u> 4WCM0022 (online)
4COM1040 MMC	2021/22	4COM2005 <u>or</u> 4WCM0021 (online)
4COM1042 PfC	2021/22	4COM2003 4WCM0019 (online)

Academic year 2022/23

Module	Last academic year module will be offered	Replacement module after module is no longer offered
5COM1051 CI	2021/22	5COM2002 <u>or</u> 5WCM0019 (online)
5COM1052 DBC	2021/22	5COM2005
5COM1053 CSDE	2021/22	5COM2007
5COM1056 AI	2021/22	5COM2003
5COM1057 CA	2020/21	5COM2004, from 2022/23
5COM1058 CSR	2021/22	To be agreed with programme leader
5COM1059 C-fam	2021/22	To be agreed with programme leader
5COM1060 ITO	2021/22	5COM2002 <u>or</u> alternative module agreed with programme leader
5COM1061 ITDE	2021/22	5COM2009
5COM1062 SR	2021/22	To be agreed with programme leader
5COM1063 WS	2021/22	To be agreed with programme leader
5COM1064 EDB	2021/22	5COM2005
6COM1031 PP	2022/23	6COM2010
6COM1034 Conc	2022/23	6COM2004
6COM1035 CAI	2022/23	6COM2012
6COM1036 AIRA	2022/23	6COM2000
6COM1037 OOD	2022/23	6COM2013
6COM1038 SEP	2022/23	6COM2014
6COM1041 AL	2022/23	6COM1007
6COM1042 SQ	2022/23	6COM2015
6COM1043 ESD	2022/23	6COM2009
6COM1045 PParadig	2022/23	6COM2001
6COM1046 QC	2022/23	To be agreed with programme leader

6COM1049	SITM	2022/23	To be agreed with programme leader
6COM1051	AWS	2022/23	6COM2002
6COM1053	CS Project	2022/23	6COM2018
6COM1054	AI Project	2022/23	6COM2017
6COM1055	Net Project	2022/23	6COM2019 or alternative module agreed with programme leader
6COM1056	SE Project	2022/23	6COM2021
6COM1057	IT Project	2022/23	6COM2020

If you would like this information in an alternative format please contact hhaq@herts.ac.uk.

If you wish to receive a copy of the latest Programme Annual Monitoring and Evaluation Report (AMER) and/or the External Examiner's Report for the programme, please email a request to aqo@herts.ac.uk

Table 2: Development of Intended Programme Learning Outcomes in the Constituent Modules

This map identifies where the programme learning outcomes are assessed in the constituent modules. It provides (i) an aid to academic staff in understanding how individual modules contribute to the programme aims (ii) a checklist for quality control purposes and (iii) a means to help students monitor their own learning, personal and professional development as the programme progresses.

	Module Title	Module Code	Compulsory (C) or Optional (O)	Knowledge and Understanding								Practical Skills						Transferable Skills				
				A1	A2	A3	A4	A5	A6	A7	A8	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
Level 4	Introduction to Programming and Discrete Structures	4COM2002	C(All)	X	X							X	X		X				X	X	X	
	Data Modelling for Databases	4COM2004	C(All)	X	X		X					X	X		X			X	X	X	X	
	Computational Problem Solving	4COM2005	C(All)	X	X							X	X		X				X	X	X	
	Team Software Project	4COM2006	C(All)	X	X	X						X	X	X	X	X	X	X	X	X	X	X
	From Silicon to C	4COM2003	C(All)	X	X							X	X		X				X		X	
Level 5	Accessibility and Usability	5COM2002	C(All)	X	X	X						X		X	X			X	X	X	X	
	Database Systems	5COM2005	C(All)	X		X	X					X		X		X		X	X		X	
	Algorithms and Data Structures	5COM1054	C(AI,CN,CS,SE)	X			X					X			X	X						
	Operating Systems and Networks	5COM1055	C(AI,CN,CS,SE)		X		X					X			X	X						
	Computing Things	5COM2004	C(AI,CN,CS,SE)	X			X					X						X	X	X	X	
	Artificial Intelligence	5COM2003	C(AI,CN,CS,SE)	X	X						X	X	X		X			X	X			
	Principles and Practices of Large-Scale Programming	5COM2007	C(AI,CN,CS,SE)	X	X	X	X		X			X	X	X	X	X		X	X	X	X	X
	Web Application Development and Deployment	5COM2009	C(IT)	X	X	X		X				X	X	X	X	X	X	X	X	X	X	
	Systems and Network Administration	5COM2008	C(IT)	X	X			X			X	X			X			X		X	X	
Design and Configuration Project	5COM2006	C(IT)	X	X	X		X				X		X			X	X	X	X	X	X	

	Module Title	Module Code	Compulsory (C) or Optional (O)	Knowledge and Understanding								Practical Skills						Transferable Skills				
				A1	A2	A3	A4	A5	A6	A7	A8	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
Level 6	Professional Work Placement in Computer Science	6COM0244	O(All)			X								X	X		X		X		X	X
	Computer Science - Year Abroad	6COM0291	O(All)			X												X		X		X
	Computer Science - Study Abroad	6COM1058	O(All)			X												X		X		X
	Software Architecture	6COM2013	C (AI, CN, CS, SE, CompStu)	X	X		X						X	X				X	X		X	
	Responsible Computing	6COM2010	C(All)			X												X	X		X	
	Mobile Computing	6COM1047	C(CS)	X			X					X				X					X	
	Real-time and Control Systems	6COM2009	C(CS)	X	X							X	X		X	X		X		X	X	
	Internet of Things	6COM2008	C(CS)	X			X					X						X	X	X	X	
	Computer Science Project	6COM2018	C(CS)	X	X	X	X					X	X	X	X	X		X	X	X	X	X
	Advanced Artificial Intelligence	6COM2000	C(AI)	X	X				X		X	X	X		X			X	X	X		
	Social and collective Artificial Intelligence	6COM2012	C(AI)	X	X				X		X	X	X		X			X	X	X		
	Intelligent Adaptive Systems	6COM2007	C(AI)	X	X				X		X	X	X		X			X	X	X		
	Artificial Intelligence Project	6COM2017	C(AI)	X	X	X	X				X	X	X	X	X	X		X	X	X	X	X
	Cyber Security	6COM1040	C(CN)				X			X		X										
	Incident Response Digital Forensics	6COM2006	C(CN)			X	X			X		X						X				
	Network Protocols and Architectures	6COM1039	C(CN)		X		X			X			X									
	Cyber Security and Networks Project	6COM2019	C(CN)	X	X	X	X			X		X	X	X	X	X		X	X	X	X	X
	Software Engineering Techniques	6COM2014	C(SE)	X			X		X			X	X	X	X	X				X		
	Software Quality	6COM2015	C(SE)	X	X		X					X										
	Advanced Programming Paradigms	6COM2001	C(SE)	X			X					X										
Software Engineering Project	6COM2021	C(SE)	X	X	X	X	X	X			X	X	X	X	X		X	X	X	X	X	

	Module Title	Module Code	Compulsory (C) or Optional (O)	Knowledge and Understanding								Practical Skills						Transferable Skills				
				A1	A2	A3	A4	A5	A6	A7	A8	C1	C2	C3	C4	C5	C6	D1	D2	D3	D4	D5
Lev	Cloud Computing	6COM2002	C(IT)	X	X	X		X				X	X		X		X	X				X
	Computer Systems Security	6COM1033	C(IT, CompStu)	X	X	X		X				X				X	X	X				
	Data Mining and Visualisation	6COM2005	C(IT, CompStu)	X	X			X				X	X	X				X	X			
	Information Technology Project	6COM2020	C(IT)	X	X	X		X				X	X	X	X		X	X	X	X	X	X
	Computer Studies Technical Report	6COM2003	C(CompStud)			X								X				X	X	X	X	X
	User Experience	6COM1032	O(All)	X	X			X				X										
	Advanced Database Topics	6COM1048	O(All)	X				X				X			X	X	X					X
	Web Application Penetration Testing	6COM2016	O(All)				X					X										
	Concurrent Programming	6COM2004	O(All)		X		X					X										
	Machine Learning and Neural Networks	6COM1044	O(All)				X					X				X						
	Robotics	6COM2011	O(All)	X	X		X					X	X		X							
	Information Security Management	6COM1050	O(All)		X												X					

KEY TO PROGRAMME LEARNING OUTCOMES

Knowledge and Understanding

- A1. The methodology of developing programmed solutions and a subset of the tools, notations and techniques appropriate to the various stages of development, from problem identification to system implementation and evaluation.
- A2. The complexity of interactions between agents, which could be human or programmed systems, at various levels, and the implications of this for the developer of a programmed solution.
- A3. The context within which a professional software designer operates and implications for professional practice including the legal, social, ethical and professional issues involved.

Additionally for BSc Computer Science (CS) and specialist CS awards:

- A4. An in-depth understanding of principles and practices relevant to the design and development of programmed systems and their subsequent use in specific contexts.

Additionally for Information Technology (IT) award:

- A5. An in-depth understanding of principles and practices relevant to the design, development, configuration and operation of information technology systems and their subsequent use in specific contexts.

Additionally for Computer Science (Software Engineering) award:

- A6. An in-depth understanding of principles and practices relevant to the specification, design, implementation and evaluation of programmed systems.

Additionally for Computer Science (Cyber Security and Networks) award:

- A7. An in-depth understanding of principles and practices relevant to evaluating and improving the security of systems, including threats and countermeasures. This includes in-depth understanding of principles and practices relevant to the design, implementation and evaluation of computer networks and systems operating in a networked environment.

Additionally for Computer Science (Artificial Intelligence) award:

- A8. An in-depth understanding of principles and practices relevant to the specification, design, implementation and evaluation of mechanisms

Practical Skills

- C1. Use specific tools, techniques, notations and methods in the context of the design and development of programmed computer systems.
- C2. Use computer systems and associated technology to support the development of programmed systems.
- C3. Engage in effective discussion of technical information as appropriate to the system design and development task.
- C4. Carry out design activities ranging from initial problem identification to system implementation and evaluation, and as an individual or participate as a member of a team carrying out a subset of these activities.

Additionally for BSc Computer Science (CS) and specialist CS awards:

- C5. Design, implement and evaluate systems as characterised by Computer Science approaches, methodologies and practices.

Additionally for BSc Information Technology (IT) awards:

- C6. Configure, evaluate the performance of, and protect from cyber security threats information technology systems.

enabling intelligence of various kinds in humans, robots and information processing systems.

Intellectual Skills

Not applicable under QAA Benchmarking statement. Intellectual skills are subsumed under Knowledge and Understanding.

Transferable Skills

- D1. Communicate effectively orally, in writing and visually using the conventions, vocabulary and the form and register of academic expression.
- D2. Manage their own learning including time management, the organization and retrieval of information, and the identification of personal needs for continuing professional development.
- D3. Select and use a variety of modes of discourse, including mathematical, informal and diagrammatic.
- D4. Work effectively both independently and/or as part of a team.
- D5. Reflect upon their work and the work of others, and explain, justify and otherwise defend their work and ideas, with reference to academic, professional issues, debates and conventions.

Section 2

Programme management

Relevant QAA subject benchmarking statements	Computing
Type of programme	Undergraduate
Date of validation/last periodic review	October 20
Date of production/ last revision of PS	December 2020
Relevant to level/cohort	Level 4 entering September 2021
Administrative School	School of Physics, Engineering & Computer Science

Table 3 Course structure

Course details		
Course code	Course description	HECOS
CMCSITBSC	BSc (Hons) Computer Science and Information Technology	100359 (8%) 100366 (12%) 100372 (12%) 100374 (50%) 100376 (18%)