

PROGRAMME SPECIFICATION - UNDERGRADUATE PROGRAMMES

KEY FACTS

Programme name	Computer Science
Award	BSc (Hons)
School	School of Mathematics, Computer Science and Engineering
Department or equivalent	Computer Science
UCAS Code	G400
Programme code	USCSCI
Type of study	Full Time, Professional Pathway
Total UK credits	360
Total ECTS	180

PROGRAMME SUMMARY

The BSc (Hons) in Computer Science will prepare you for a successful career in technical areas of the computing profession. You will develop expertise in programming and the design and build of a broad range of computer systems; core skills that are sought after throughout the computing industry.

The programme establishes the theoretical underpinning of computer science and builds practical skills such as programming and software engineering as a foundation to enable you to progress onto advanced topics informed by work in our research centres, such as cloud computing, artificial intelligence, data mining and data visualization. A 450-hour individual project will allow you to further explore a specialism of your choice. The programme will also provide you with the professional skills essential for developing your career in today's computing industry.

The BSc (Hons) in Computer Science is a full-time three-year Undergraduate Programme, with the option of a one-year industrial placement and a place on our Professional Pathway Scheme. The programme consists of three Programme Stages, each corresponding to an academic year. The programme shares Programme Stage 1 and Programme Stage 2 with the MSci (Hons) in Computer Science and MSci (Hons) in Computer Science with Cyber Security and you can transfer to/from these programmes at the end of Programme Stage 2. The programme also shares Programme Stage 1 with the BSc (Hons) / MSci (Hons) Computer Science with Games Technology and you can transfer to/from these programmes at the end of Programme Stage 1. These transfers allow you to choose your final degree programme based on at least a year's experience of university study.

Each of the three Programme Stages of the programme consists of 120 credits:

- Programme Stage 1 consists of compulsory foundational material, including programming and databases.
- Programme Stage 2 consists of further compulsory core computer science subject matter and includes a 30-credit team project,

- You may elect to take an industrial placement between Programme Stage 2 and Programme Stage 3
- Programme Stage 3 consists of two core module and three elective modules, allowing you to develop specialisms drawing on the expertise of academic staff, and a large, 45-credit, individual project supervised by a member of academic staff

Aims

This programme aims to prepare you with the knowledge, skills and values needed for a technical career as computer scientist by

- equipping you with the computer scientist's core skills in programming, databases and mathematics
- equipping you with a breadth of knowledge, skills and techniques needed as a professional in computer science
- developing your knowledge in specialised and advanced topics in computer science
- developing your practical problem solving capabilities in applying your technical skills
- enabling you to critically evaluate the technical, social and management dimensions of computing systems and technologies

Professional Pathway

The Professional Pathway (PP) scheme is an innovative mode of study allowing students to transfer to relevant four-day-a-week employment after a period of study and complete their degree by a combination of day-release and e-learning. PP students do the same course content (with the exception of the Programme Stage 2 Team Project and Professional Development in IT module – PP students, instead, attend Work-based Project and Continuous Professional Development in IT modules, respectively) as full-time students, but over a longer period.

Professional Pathway Entry (if you are not on a Tier 4 Visa)

Students on this programme may also undertake the Professional Pathway scheme, with entry points at Programme Stages 2 and 3, if they:

- do well in their studies in the Programme Stage preceding PP entry (usually upwards of 55% average);
 - are successful in an interview with the PP tutor who assesses their ability to cope with the demands of balancing employment and study;
- secure an approved IT placement that allows two half-days a week attendance at City.

Professional Pathway Entry (if you are on a Tier 4 Visa)

Students on this programme may also undertake the Professional Pathway scheme, with entry points at Programme Stage 3, if they:

- do well in their studies in the Programme Stage preceding PP entry (usually upwards of 55% average);

- are successful in an interview with the PP tutor who assesses their ability to cope with the demands of balancing employment and study;
- secure an approved IT placement that allows two half days a week attendance at City
- have not already undertaken a placement year.

A placement year may precede entry to the Programme Stage 3 Entry variant of the Professional Pathway (if you do not hold a Tier 4 Visa).

Exit from the PP shall occur when:

- the student wishes to return to normal study;
- the student fails to pass the assessment for the approved placement for that year on PP and must return to normal study;
- the student is otherwise required to withdraw from the degree.

Return to normal study will require the student to pass all of modules for the Programme Stage they are in, before resuming the following Programme Stage. If a student has credit for the later Programme Stage, then this credit will be counted and need not be retaken. The student must complete all outstanding modules at the earliest opportunity.

Awards

The programme provides you with a number of exit routes.

CERTIFICATE OF HIGHER EDUCATION IN COMPUTER SCIENCE The first exit route is for the Certificate of Higher Education in Computer Science which you are entitled to if you successfully complete Programme Stage 1 of the programme, earning 120 level 4 credits.

All of you completing Programme Stage one *or* the Certificate in Computer Science will be able to discuss underlying concepts and principles of computer science and relate these to concepts to relevant problems. You will be able to express solutions to problems using the formalism introduced in Programme Stage one.

DIPLOMA OF HIGHER EDUCATION IN COMPUTER SCIENCE The second exit route is for the Diploma of Higher Education in Computer Science, which you are entitled to if you have completed the Certificate in Higher Education and in addition you have successfully completed Programme Stage 2 of the programme, earning 120 level 5 credits.

All of you completing Programme Stage Two *or* the Diploma in Computer Science will build on your previous knowledge and experience to develop skills of enquiry in computer science and apply a variety of approaches to problem-solving as well as identify the limitations of your knowledge. You will be able to interpret open ended problems, apply your knowledge and skills to solve them and be able to write reports on your findings.

BSc (Hons) IN COMPUTER SCIENCE The third exit route is the BSc (Hons) in Computer Science, which you are entitled to if you have completed the Diploma in Higher Education and in addition you have successfully completed Programme Stage 3 of the programme, earning a further 120 credits, 90 of which at level 6, the rest at level 5 or level 6.

All of you completing the BSc (Hons) in Computer Science will through core and elective modules further develop a coherent systematic, detailed knowledge of computer science. You will be able to evaluate solutions to computer science problems, assess current techniques for designing and developing solutions to computer science problems and argue for your solutions using research and scholarship demonstrating your role as a reflective practitioner.

WHAT WILL I BE EXPECTED TO ACHIEVE?

On successful completion of this programme, you will be expected to be able to:

Knowledge and understanding:

- Use and explain the theory of computer science
- Discuss scientific and engineering practice and theory in computing and extend your knowledge through self-led study
- Discuss management issues concerning the planning, design and delivery of computer-based systems
- Identify and model requirements for specialised computing systems and propose and evaluate solutions to fulfil them
- Demonstrate knowledge of systems architecture
- Use appropriate theories, practices and tools for the specification, design, implementation and evaluation of computer-based systems
- Explain security issues in relation to the design and use of computer systems
- Explain the concepts of computer programming
- Demonstrate advanced, specialist theoretical and practical knowledge in a range of computer science sub-fields
- Explain the legal, social, ethical and professional issues involved in the exploitation of computer technology with respect to good professional practice

Skills:

- Develop and critically evaluate specifications for specialist computer systems
- Analyse, develop and select algorithms for computational tasks
- Analyse and solve problems based on theoretical considerations
- Analyse and abstract problems and propose and apply effective solutions
- Synthesise information from disparate sources to compose systems and documents
- Design and construct computer systems from given specifications
- Plan and manage a large-scale individual problem-solving computing project
- Identify the risks and beneficiaries involved in a practical computing project
- Apply controlled compromise in meeting requirements
- Apply techniques and tools for modelling and managing information
- Communicate requirements and proposals for computer systems to other computing professionals
- To work as a member of a development team recognising the different roles within a team
- Design and execute methodologically sound scientific and engineering studies
- Plan work
- Manage personal time
- Present and communicate complex ideas
- Apply sound research methods
- Understand, evaluate, synthesise and apply complex ideas

Values and attitudes:

- Assess the nature of intellectual property and its ownership, and respect it accordingly
- Explain the issues of professionalism in computing including the need for continuing professional development

This programme has been developed in accordance with the QAA Subject Benchmark for Computing.

HOW WILL I LEARN?

The programme is delivered and assessed via a coordinated combination of: lectures (including programmed student activity); supervised tutorials; supervised laboratory work; independent coursework; group project work; and individual project work and dissertation.

The teaching and assessment methods used are largely constant throughout the programme, though the level of each module determines the level at which assessment is carried out. i.e. it is the nature of the problems encountered and the solutions required that determine the level of the modules, not the activities performed. The intention is to require greater levels of analysis, autonomy, etc as the student progresses through the programme. This is reflected in the programme structure: fundamental concepts and skills are addressed first, followed by core knowledge that builds on this, which in turn prepares students for advanced electives and a large individual project in the final Programme Stage.

The majority of the taught modules are each delivered through a series of 20 lectures and 10 hours of tutorials/laboratory sessions. Each lecture and tutorial/laboratory session lasts 1 or 2 hours.

Project work plays an important Programme Stage in computing undergraduate programmes. The Team Project provides students with experience of the issues involved in software development projects as well as enhancing team-working and related transferrable skills.

In the Individual Project students are expected to carry an independent investigation of a significant computing problem allowing them to apply what they learnt through the programme. This activity is carried out under the supervision of academic staff, offered through a series of supervision sessions.

Lectures are normally used to: (a) present and explain the theoretical concepts underpinning a particular subject; (b) highlight the most significant aspects of a module's syllabus; and (c) indicate additional topics and resources for private study. Tutorials are used to help students to develop skills in applying the concepts covered in the lectures of the relevant module normally in practical problem solving contexts.

Laboratory sessions serve a similar purpose as the tutorials but their strategy will be to demonstrate application of concepts and techniques through the use of software development tools and environments.

Project supervision sessions will be used to indicate theories, methods, techniques and concepts which are relevant to the issues being investigated by the particular project as well as ways of applying these instruments in specific problem solving

contexts.

Increasing use is being made of e-learning tools to supplement face to face delivery especially for the Professional Pathway cohort.

Finally, placements and the workplace learning opportunities they provide are available to all students. A professional placement and career development module supported by visits from a Work-based Learning Advisor, ensures that students are able to identify learning opportunities that will enable them to attain and demonstrate competence in a work role; these opportunities arise naturally from workplace tasks, others are provided by negotiation focussed on the students career and development plan.

WHAT TYPES OF ASSESSMENT AND FEEDBACK CAN I EXPECT?

Assessment and Assessment Criteria

A broad range of skills and knowledge are in demand in the computing profession and assessments are tailored to the particular activity being undertaken and to your learning needs. Assessed activities include the development of working software, the application of theory to practical problems, team work, project work and the communication of problem analysis and solutions through reports and presentations. The assessment of these activities are guided by assessment criteria. Some modules are assessed by project work or coursework only, while others are assessed by a combination of coursework and invigilated exam.

Assessment Criteria are descriptions, based on the intended learning outcomes, of the skills, knowledge or attitudes that you need to demonstrate in order to complete an assessment successfully, providing a mechanism by which the quality of an assessment can be measured. Grade- Related Criteria are descriptions of the level of skills, knowledge or attributes that you need to demonstrate in order achieve a certain grade or mark in an assessment, providing a mechanism by which the quality of an assessment can be measured and placed within the overall set of marks. Assessment Criteria and Grade-Related Criteria will be made available to you to support you in completing assessments. These may be provided in programme handbooks, module specifications, on the virtual learning environment or attached to a specific assessment task.

Feedback on Assessment

Feedback on assessment is given in a variety of ways to maximise your learning opportunities. For written reports or problem solving tasks the feedback may be written, while feedback on more qualitative work may be through audio files. Face-to-face feedback is given for lab work, presentations and some group work. In all cases feedback is given so that you can learn the most you can from the work that you have done and apply that learning to future activities.

Feedback will be provided in line with our Assessment and Feedback Policy. In particular, you will normally be provided with feedback within three weeks of the submission deadline or assessment date. This would normally include a provisional grade or mark. For end of module examinations or an equivalent significant task (e.g. an end of module project), feedback will normally be provided within four weeks. The timescale for feedback on final year projects or dissertations may be longer.

The full policy can be found at:

https://www.city.ac.uk/_data/assets/pdf_file/0008/68921/assessment_and_feedback_policy.pdf

Assessment Regulations

In order to pass your Programme, you should complete successfully or be exempted from the relevant modules and assessments and will therefore acquire the required number of credits. You also need to pass each Programme Stage of your Programme in order to progress to the following Programme Stage.

The pass mark for each module is 40%.

If you fail an assessment component or a module, the following will apply:

1. Compensation: where you fail up to a total of one sixth of the total credits of a Programme Stage at first or resit attempt, you may be allowed compensation if:
 - Compensation is permitted for the module involved (see the What will I Study section in the programme specification), and
 - It can be demonstrated that you have satisfied all the Learning Outcomes of the modules in the Programme Stage, and
 - A minimum overall mark of no more than 10% below the module pass mark has been achieved in the module to be compensated, and
 - An aggregate mark of 40% has been achieved for the Programme Stage.

Where you are eligible for compensation at the first attempt, this will be applied in the first instance rather than offering a resit opportunity.

If you receive a compensated pass in a module you will be awarded the credit for that module. The original component marks will be retained in the record of marks and your original module mark will be used for the purpose of your Award calculation.

2. Resit: Where you are not eligible for compensation at the first attempt, you will be offered one resit attempt.

If you are successful in the resit, you will be awarded the credit for that module. The mark for each assessment component that is subject to a resit will be capped at the pass mark for the module. This capped mark will be used in the calculation of the final module mark together with the original marks for the components that you passed at first attempt.

If you do not meet the pass requirements for a module and do not complete your resit by the date specified you will not progress to the next Programme Stage and the Assessment Board will require you to be withdrawn from the Programme.

If you fail to meet the requirements for a particular Programme Stage or the Programme, the Assessment Board will consider whether you are eligible for an Exit Award as per the table below.

The Programme has minimum attendance requirements for designated teaching and learning events for each Stage. Students failing to meet these requirements may be subject to withdrawal from the programme.

If you would like to know more about the way in which assessment works at City, please see the full version of the Assessment Regulations at:
http://www.city.ac.uk/_data/assets/word_doc/0003/69249/s19.doc

WHAT AWARD CAN I GET?

Bachelor's Degree with Honours:

Programme Stage	HE Level	Credits	Weighting (%)
1	4	120	0
2	5	120	40
3	6	120	60

Class	% required
I	70
II upper division	60
II lower division	50
III	40

In addition 360 credits must be achieved excluding IN3027.

Diploma of Higher Education:

Programme Stage	HE Level	Credits	Weighting (%)
1	4	120	50
2	5	120	50

Class	% required
With Distinction	70
With Merit	60
Without Classification	40

Certificate of Higher Education:

Programme Stage	HE Level	Credits	Weighting (%)
1	4	120	100

Class	% required
With Distinction	70
With Merit	60
Without Classification	40

WHAT WILL I STUDY?

Programme Stage 1

To pass Programme Stage 1, an Honours degree student must have acquired 120 credits as specified in Programme Stage 1 of the Programme Scheme. In addition a student must complete, achieving a mark of 100%, an online assessment covering risk/safety for safe operation of computing equipment. This online assessment is an exception to the assessment regulations; it has unlimited attempts but must be passed with a mark of 100% in order to progress to stage 2.

This Programme Stage consists of 4 compulsory core modules, worth 15 credits each, and 2 compulsory core module, worth 30 credits

Module Title	SITS Code	Module Credits	Core/ Elective	Can be compensated?	Level
Introduction to Algorithms	IN1002	15	C	Y	4
Mathematics for Computing	IN1004	15	C	Y	4
Systems Architecture	IN1006	15	C	Y	4
Programming in Java	IN1007	30	C	N	4
Operating Systems	IN1011	15	C	Y	4
Computer Science, Ethics & Society	IN1012	15	C	Y	4
Databases	IN1013	15	C	Y	4

Programme Stage 2

To pass Programme Stage 2, an Honours degree student must have acquired 120 credits as specified in Programme Stage 2 of the Programme Scheme. For an Honours degree student to progress from Programme Stage 2 to Programme Stage 3, Programme Stage 2 requirements must have been satisfied.

This Programme Stage consists of 6 core modules each of which is worth 15 credits, and a core Project module, which is worth 30 credits.

Students may transfer into this programme route at the start of Programme Stage 2 if:

- they have passed the modules in Programme Stage 1;
- resources allow the transfer;
- the programme director approves the transfer.

A student who has successfully completed Programme Stage 2 of the BSc programme may, with the approval of the Assessment Board, transfer to Programme Stage 3 of the related MSci programme provided that they have obtained:

- the required credits for Programme Stage 2, and
- an aggregate mark of least 55% at Programme Stage 2

Professional Pathway (Programme Stage 2 Entry)

Programme Stage 2 is spread over two years. The PP students take IN2030 instead of IN2018, and IN2031 instead of IN2015. The entry year, PP2(E) covers all Programme Stage 2 modules except IN2009, IN2029 and IN2031, which are taken in the following PP year - PP3(E) - along with two Programme Stage 3 electives. All module choices must be consistent with the scheme outlined in this Programme Specification.

Progression requirements between Programme Stages are the same as for non-PP students.

Module Title	SITS Code	Module Credits	Core/ Elective	Can be compensated?	Level
Data Structures and Algorithms	IN2002	15	C	Y	5
Language Processors	IN2009	15	C	Y	5
Computer Networks	IN2011	15	C	Y	5
Object-Oriented Analysis and Design	IN2013	15	C	Y	5
Professional Development in IT	IN2015	15	C (non-PP)	N	5
Team Project	IN2018	30	C (non-PP)	N	5
Programming in C++	IN2029	15	C	Y	5
Work Based Project	IN2030	30	C (PP)	N	5
Continuing Professional Development in IT	IN2031	15	C (PP)	N	5

Programme Stage 3

To pass Programme Stage 3, the student must have acquired 120 credits, excluding credits acquired for the elective module IN3027, as specified in the table below.

This Programme Stage consists of 2 core and 3 elective taught modules worth 15 credits each plus 1 project module worth 45 credits. Elective choice may be constrained by timetabling requirements. The full range of electives may not be available in all years.

If credits are acquired for elective module IN3027, the marks for this module may be substituted, where higher, for those of two 15 credit Programme Stage 3 taught modules if and only if all Programme Stage 3 modules are passed at the first attempt.

Students may transfer into Programme Stage 3 of this programme from the other computing undergraduate programmes if they can ensure that the module(s) on this programme they did not take at Programme Stage 2, are taken at Programme Stage 3. This transfer is subject to Programme Director approval and resource constraints.

Professional Pathway (Programme Stage 3 Entry)

Programme Stage 3 is spread over two years. The entry year, PP3(L) requires that three or four Programme Stage 3 modules be taken. The remaining Programme Stage 3

modules, including Individual Project, are taken in the final year, PP4(L). All module choices must be consistent with the scheme outlined in this Programme Specification.

Elective choice may be constrained by timetabling requirements. The full range of electives may not be available in all years.

Module Title	SITS Code	Module Credits	Core/ Elective	Can be compensated?	Level
Individual Project	IN3007	45	C	N	6
Theory of Computation	IN3017	15	C	Y	6
Functional Programming	IN3043	15	C	Y	6
Games Technology	IN2026	15	E	Y	5
Advanced Databases	IN3001	15	E	Y	6
Computer Graphics	IN3005	15	E	Y	6
Advanced Games Technology	IN3026	15	E	Y	6
Professional Experience (Placement) Placement Reports	IN3027	30	E	N	6
Data Visualization	IN3030	15	E	Y	6
Digital Signal Processing and Audio Programming	IN3031	15	E	Y	5
Project Management	IN3040	15	E	Y	6
Advanced Programming – Concurrency	IN3042	15	E	Y	6
Cloud Computing	IN3046	15	E	Y	6
Information Security Fundamentals	IN3049	15	E	Y	6
Computer Vision	IN3060	15	E	Y	6
Introduction to Artificial Intelligence	IN3062	15	E	Y	6
Programming and Mathematics for AI	IN3063	15	E	Y	6
Agents and Multi Agents Systems	IN3064	15	E	Y	6
User Centred Systems Design	IN3065	15	E	Y	6
Semantic Web Technologies and Knowledge Graphs	IN3067	15	E	Y	6
Cloud Technology for Business Transformation	IN3029	15	E	Y	6
Natural Language Processing	IN3045	15	E	Y	6

TO WHAT KIND OF CAREER MIGHT I GO ON?

Graduates from our Undergraduate Programme start their career in professional roles such as;

- Software developer
- Business analyst
- Web developer
- Technical architect
- User experience designer
- Helpdesk engineer

Employers of our graduates include;

- Accenture
- BP
- the BBC
- FDM
- Wipro
- Reuters
- Menzies Aviation

Our graduates have gone on to further study on courses such as;

- MSc in Computer Games Technology
- MSc in Cyber Security
- MSc in Computer Science
- Masters of Business Administration

WHAT PLACEMENT OPPORTUNITIES ARE AVAILABLE?

Students have the opportunity to undertake a placement in a diverse range of companies and roles working at blue-chip multinational corporations or dynamic start up ventures both in the UK and internationally. The broad spectrum of roles available will represent the developing nature of the Computer Science and Information Technology industry allowing students to focus on their interests whilst being exposed to new experiences and challenges.

Students have the opportunity to follow two placement routes whilst completing their study at City University; a one year placement or the Professional Pathway scheme.

The one year placement can be undertaken following successful completion of Programme Stage 2 and will be required to last for a minimum of 9 months.

Students can join the Professional Pathway scheme after successful completion of Programme Stage 1 (early entry) or after successful completion of Programme Stage 2 or a one year placement (late entry). On this scheme students will attend university for one day a week whilst under contract to their placement provider with the placement lasting for two or more years.

The following criteria apply to both placement routes.

In order to join a placement route, students must successfully complete the preceding academic year.

Students will need to source and apply for any placement opportunities independently however support and guidance will be provided throughout the application process by the Professional Liaison Unit.

In order to receive credit and successfully complete the placement, students will be required to submit deliverables for and pass a Professional Placement & Career Development module. Further information on this module and the associated deliverables can be found in the module guidance notes.

Students undertaking a placement must adhere to specific rules and regulations regarding placement conduct and other obligations as set out by the Professional Liaison Unit.

For further information on placement opportunities please go to the Professional Liaison webpage at <https://www.city.ac.uk/mathematics-computer-science-engineering/placements-and-internships/about-professional-liaison-unit>

WILL I GET ANY PROFESSIONAL RECOGNITION?

Accrediting Body: British Computer Society

Nature of Accreditation

Partial CEng accreditation

Certificate

Diploma

Professional Graduate Diploma

PGD Project (on condition that students pass at the first attempt a practical problem-solving project)

HOW DO I ENTER THE PROGRAMME?

We operate a policy of common entrance requirements for all computing undergraduate courses. Applications must be made through the UCAS system.

We rarely interview applicants, usually only students offering substantive relevant work experience when we need to investigate further whether they have the appropriate skills to enable them to succeed on our courses.

Students who have not yet finished their pre-university education and meet the requirement set out below will be made a conditional offer, typically based on the UCAS tariff point system.

Consideration will be given to the whole UCAS form, including reference and personal statement. Students who have already finished their pre-university education will also be judged on the requirements below.

If we are satisfied that they meet our requirements, they will be offered an unconditional place.

Standard Requirements

These requirements are set out in terms of our standard A-level requirements. Other qualifications are benchmarked against this, using the notional learning hours, breadth and depth of the qualification taken. We have standard policies for most common qualifications such as the BTEC National and International Baccalaureate.

We require that applicants be studying for the equivalent of (at least) 3 A-levels. At least one of these should be in a mathematical, scientific, or technical subject. Foreign language qualifications where the student is a native speaker are excluded. GCE General Studies is also excluded from consideration.

Students are required to have a GCSE Grade C in English Language and Mathematics (or equivalent). The conditional offers that we make to students are made using the UCAS tariff, excluding key skills (i.e. 360 Tariff Points excluding Key Skills).

The Advanced Diploma is welcomed on par with A-levels according to the Tariff as are the BTEC and OCR Nationals.

Exceptions to these requirements may be made in the event that a candidate appears suitable due to other evidence, whilst not meeting the usual requirements.

Overseas Applicants

Overseas applicants are considered on an individual basis, with their qualifications being benchmarked against the standard entry route as far as possible (using information sources such as UK NARIC). Overseas students are required to have passed an Approved English Test, at the equivalent of IELTS 6.0 or over.

Version: 6.2

Version date: March 2022

For use from: 2022-23