Programme Specification

UNIVERSITY OF WESTMINSTER⌗

Course record information

Name and level of final award	• Bachelor of Science with Honours - Computer Science • Bachelor of Science with Honours - Computer Science with Industrial Experience The award is Bologna FQ-EHEA first cycle degree or diploma compatible
Name and level of intermediate awards	• Bachelor of Science (BSc) - Computer Science • Diploma of Higher Education (Dip HE) - Computer Science • Certificate of Higher Education (CertHE) - Computer Science
Awarding body/institution	University of Westminster
Teaching institution	University of Westminster
Status of awarding body/institution	Recognised Body
Location of delivery	Primary: Central London
Language of delivery and assessment	English
QAA subject benchmarking group(s)	QAA subject benchmark for Computing: https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/subject-benchmark-statement-computing.pdf?sfvrsn=ef2c881_10 British Computer Society guidelines on accreditation
Professional statutory or regulatory body	British Computer Society (BCS); This course is CITP and partial CEng accredited by the BCS.
Westminster course title, mode of attendance and standard length	• BSc Computer Science FT, Full-time, September start - 3 years standard length with an optional year placement
Valid for cohorts	From 2023/4

Admissions requirements

There are standard minimum entry requirements for all undergraduate courses. Students are advised to check the standard requirements for the most up-to-date information. For most courses a decision will be made on the basis of your application form alone. However, for some courses the selection process may include an interview to demonstrate your strengths in addition to any formal entry requirements. More information can be found here: https://www.westminster.ac.uk/study/undergraduate/how-to-apply

Recognition of Prior Learning

Applicants with prior certificated or experiential learning at the same level of the qualification for which they wish to apply are advised to visit the following page for further information:

https://www.westminster.ac.uk/current-students/guides-and-policies/student-matters/recognition-of-prior-learning

Aims of the programme

1. Provide students with knowledge and understanding of the fundamental principles, methods and technologies that underpin the discipline of computing;

2. Give students technical expertise in computer science and practical experience enabling them to be effective in a varied and fast-developing range of careers in computing;

3. Provide students with sound knowledge of software engineering principles across the whole software development lifecycle;

4. Provide students with the knowledge and practical use of industry tools and techniques to develop software applications and solutions;

5. Provide the ability to apply this knowledge and skills to a range of practical situations to resolve business and technical problems and to encourage a disciplined and professional attitude towards the development of such systems;

6. Provide a motivating and inclusive environment with the opportunity to develop themselves intellectually and socially and to encourage students to develop as independent and self-critical problem solvers;

7. Prepare students for continued study at an advanced level, either in formal postgraduate study or as continued professional development.

Employment and further study opportunities

University of Westminster graduates will be able to demonstrate the following five Graduate Attributes:

- Critical and creative thinkers
- Literate and effective communicator
- Entrepreneurial
- Global in outlook and engaged in communities
- Social, ethically and environmentally aware

University of Westminster courses capitalise on the benefits that London as a global city and as a major creative, intellectual and technology hub has to offer for the learning environment and experience of our students.

The course offers a short-term work-based learning experience by providing you with an opportunity to work on a real-life problem which is normally set by an external organisation as a small-scale project.

This project forms a part of the assessment in a designated module called 5COSC003W Software Development Group Project. This module provides the structure for your learning and receiving support from the module team. You will work on the project on your own and/or as part of a small team within and outside the class. During this time, you may also get a chance to interact with the organisation that has set the project. The quality of the work that you produce for the project get assessed as part of the module's assessment.

This experience will allow you to put theory into practice by applying your knowledge and skills gained from various modules to address a real-life situation, usually within the context of a business-related problem. Furthermore, this experience will help you develop subject-specific technical skills as well as certain employability skills such as leadership, organisation and commercial awareness.

In addition. this course gives you with the opportunity to take a year in industry (work placement) after completing the second year of your study and gain work experience, increasing your chances of employability after graduation. You will be offered help and support to find and secure placement opportunities through various workshops and events organised by the Career Development Centre and the course team. Typically, you will be assigned into roles involving tasks related to computer science.

The BSc Computer Science course aims to create high quality graduates who have a strong focus on solving real-world problems, will have adaptability and maturity, and have a strong foundation of knowledge and the technical capability to be able to immediately contribute to their workplace environment. Graduates of the BSc Computer Science course will have been taught and utilised industrial tools and techniques and will be versed in all aspects of the software lifecycle. As well as having a solid background in computer science, graduates from the course shall also have one or more specialisms that open up career pathways during their early years as a computing professional. Graduates shall be independent thinkers, lifelong learners and be able to analyse, critically reflect, and be able to confidently and effectively communicate. Graduating from this accredited course where professional skills and practice are embedded, graduates shall be able to meet the required professional and ethical standards expected in the modern workplace. Graduates shall also be capable and prepared for the broadening their knowledge by undertaking Masters level study or higher.

What will you be expected to achieve?

Learning outcomes are statements on what successful students have achieved as the result of learning. These are threshold statements of achievement the learning outcomes broadly fall into four categories:

- The overall knowledge and understanding you will gain from your course (KU)
- Graduate attributes are characteristics that you will have developed during the duration of your course (GA)
- Professional and personal practice learning outcomes are specific skills that you will be expected to have gained on successful completion of the course (PPP)
- Key transferable skills that you will be expected to have gained on successful completion of the course. (KTS)

Level 4 course learning outcomes: upon completion of Level 4 you will be able to:

- L4.01 Use appropriately the client-server architecture with respect to client design and security implications (KU)
- L4.02 Apply core mathematical elements to solve algorithmic problems (KU)
- L4.03 Describe the structure of a computing system, the design of its basic components and explain the

interactions of hardware and software components (KU)

- L4.04 Analyse small scale problems and design their solutions by applying algorithmic and mathematical techniques (PPP)
- L4.05 Methodically capture user requirements and create a specification that meets them (PPP)
- L4.06 Describe, create and manipulate simple data collections through their underlying representation (PPP)
- L4.07 Apply programming principles and constructs to implement solutions to small scale problems (PPP)
- L4.08 Recognise and explain behaviour constraints of a professional code of conduct towards third parties in a Computer Science working environment (KTS)
- L4.09 Following guidance, review literature in Computer Science and present in written and oral form own work and learning, critically comparing, contrasting and evaluating the findings (KTS)

Level 5 course learning outcomes: upon completion of Level 5 you will be able to:

- L5.01 Employ a standard design language for the design, representation and formal specification of software (KU)
- L5.02 Identify and explain security risks and their implications for computer systems (KU)
- L5.03 Explain the basic principles of modern operating systems and how they serve operational needs (KU)
- L5.04 Demonstrate how information is modelled, persistently stored, manipulated and retrieved, as data, to serve scalable solutions to medium-scale object-oriented problems (PPP)
- L5.05 Demonstrate competency in object-oriented design and algorithmic and mathematical approaches to solve medium scale problems (PPP)
- L5.06 Identify, evaluate, and improve on interface issues between human users and computer systems using multiple platforms. (PPP)
- L5.07 Utilise, compare and contrast software frameworks and architectures and implement solutions using object-oriented programming (PPP)
- L5.08 Successfully plan and execute a medium-scale software project with appropriate software engineering principles (KTS)
- L5.09 Demonstrate professional responsibility in the development of quality computer science solutions in a global context and the presentation and defence of these in multiple communication forms, supported by methodical research (KTS)

Level 6 course learning outcomes: upon completion of Level 6 you will be able to:

- L6.01 Identify and appraise the main threats to computer systems and networks security and integrity. (KU)
- L6.02 Appropriately analyse and design large scale data systems to serve the retrieval and/or decision-making needs of computer systems and their clients (PPP)
- L6.03 Implement a comprehensive technical solution to an advanced problem using appropriate programming languages (PPP)
- L6.04 Methodically and independently develop requirements to a solution for a large-scale software problem using appropriate languages and tools (PPP)
- L6.05 Demonstrate complete handling of the full life-cycle of a computer science project underpinned by an entrepreneurial approach and a focus on the needs of real clients and the wider society (KTS)
- L6.06 Following guidance, review literature in Computer Science and present in written and oral form own work and learning, critically comparing, contrasting and evaluating the findings (KTS)
- L6.07 Apply appropriate research methodologies in carrying out independent research in computer science and produce a report demonstrating evidence of critical thinking (KTS)

How will you learn?

Learning methods

Your course is a collection of learning opportunities. Using these opportunities will help you mature in attitude and competence, preparing you for your future career and life in general. Learning in your course is a partnership: expert University staff will guide you through the necessary core knowledge of your subject and help you develop an understanding, while you, increasingly, take the leading role in pursuing the learning that meets your specific needs.

Your course is organised into a number of **modules** at each level. These are the building blocks of your course. Each module consists of a number of learning activities over a number of weeks designed to help you achieve the knowledge and skills related to a particular area within your subject.

The principal aim of your course is to equip you for professional life, or higher study, relevant to your current programme of study.

To prepare you for this, the learning in your course will not take place only in the class. Your learning will use five methods, each supporting the others:

- **Lectures** will give you access to expertise and present you with the knowledge you need in your subject.
- **Practical tutorial or laboratory sessions** will allow you to understand, apply and strengthen your skills under the guidance of a tutor.
- **Independent study time** will let you take more control of your own learning and give you the framework that will help you to keep on learning without supervision.
- **Personal development** will allow you to complement your knowledge with the specific specialised skills that meet your individual needs.
- **Real-life project briefs or case studies,** normally provided by an organisation, will give you the opportunity to engage with employers and use your knowledge and skills to solve a real-life or a business-related problem.

In your first year of study (called **Level 4**) you will make the full transition into Higher Education. You will develop the key core skills for Computer Science complemented with the foundations of your specific course or cognate area. To help this transition your course has additional classes and support sessions at this level that you will need to fully engage with so you can prepare for the advanced study that follows.

Your second year of study (**Level 5**) will help you develop some autonomy. At this level, you will develop detailed knowledge in Computer Science and will be able to deal with more areas by yourself and in teams, reflecting on your own strengths and identifying areas to specialise in.

Following that level, you may choose to have a year in industry (**a placement year**) to strengthen your understanding of industry needs through direct application of your evolving skills.

In your final year of study (**Level 6**) you will have learned to work autonomously with your lecturers increasingly being there to support you and challenge your thinking; this is the level that completes your preparation for going into industry and further study, with an ability to handle the complexity of large-scale systems and environments and with full control of your further development needs.

Throughout all levels of your course you will also develop necessary, distinct, attributes that will help you compete effectively in a global changing environment.

The Graduate Attributes (GA) are developed throughout the course through the knowledge and professional skills modules, and are intended to ensure that you have a deep knowledge of the subject area, you are critical and creative thinkers, are professional, socially, ethically and environmentally aware, global in outlook and community engaged, and a literate and effective communicator.

Assessment methods

As your learning continues it is important to stop every now and then and take stock of how much you learn so that you know where you are and how much more you still need to cover. In your course, assessment and feedback are the key elements in measuring learning. Assessment in your course has two functions: formative assessment is assessment that lets you see where you are in your learning and what you have learned so far, while summative assessment measures how much you have learned in a way that contributes to your overall grades.

You will undertake **a wide variety of assessment tasks** as you progress through your degree course. Their nature will vary according to your level and the nature of the task. Some, such as group work, will help you to develop practical skills alongside the more specific skills that are being assessed. You will write essays and research reports, and learn to write in a style suitable to a piece of academic work, and to make proper use of references and bibliographies.

Other forms of assessment will include practical exercises ranging from small tasks that might be completed in a tutorial, to something more complex like designing and writing a larger computer program. There will be some formal examinations (usually at the end of each academic year). Some of the work will be completed individually, and sometimes you will work with other students as part of a team, emulating as close as possible the environment you will face in your later life in industry.

Many assessments will be based on real-life scenarios typically found in the software industry. This might include client requirement elicitation, extracting hard software requirements from given business requirements, then designing and implementing a solution.

All assessments that contribute to your final grades will be assessed against set criteria, following rigorous quality mechanisms that ensure our academic judgement remains fair and consistent with the wider educational sector. Typically, assessment tasks will become longer, and more self-managed, as you get into the second year and the final year of your course and they will have less detail in guidance and more room for you to innovate through your own decisions informed by your own research in your specialist areas. **Assessment is designed to be a learning experience in itself** and will help you make that transition from small practical exercises to more complex piece of work towards the substantial, year-long, project of your final year.

To help you see how different areas connect with each other you will have in some cases tasks that assess the outcomes from different modules in one complex piece of work. These are called **synoptic assessments**. Examples of synoptic assessment for your course include the Group Project at level 5 and the individual project at level 6.

Throughout your learning, you will get feedback. **Feedback** will help you reflect on what you have learned so you can identify the areas in which you are strong and the areas in which you need to learn more. Feedback will be given to you in response to assessment, in response to questions in lectures, seminars and tutorials, and in guidance you get during supervision. But feedback will also come from your interactions with other students and with industry. All feedback will be useful to help you guide your learning so that you develop the rights skills faster.

Graduate Attribute	Evident in Course Outcomes
Critical and creative thinker	L4.01, L4.02, L4.03, L4.04, L4.05, L4.06, L4.07, L5.01, L5.02, L5.03, L5.04, L5.05, L5.06, L5.07, L6.01, L6.02, L6.03, L6.04
Literate and effective communicator	L4.09
Entrepreneurial	L6.05
Global in outlook and engaged in communities	
Socially, ethically and environmentally aware	L4.08, L5.08, L5.09, L6.06, L6.07

Course Structure

This section shows the core and option modules available as part of the course and their credit value. Full-time Undergraduate students study 120 credits per year. Course structures can be subject to change each academic year following feedback from a variety of sources.

Modules are described as:

- **Core** modules are compulsory and must be undertaken by all students on the course.

- **Option** modules give you a choice of modules and are normally related to your subject area.
- **Electives**: are modules from across the either the whole University or your College. Such modules allow you to broaden your academic experience. For example, where electives are indicated you may choose to commence the study of a foreign language alongside your course modules (and take this through to the final year), thereby adding further value to your degree.
- Additional information may also be included above each level for example where you must choose one of two specific modules.

Modules

Level 4

Module Code	Module Title	Status	UK credit	ECTS
4COSC004W	Computer Systems Fundamentals	Core	20	10
4COSC002W	Mathematics for Computing	Core	20	10
4COSC001W	Software Development I	Core	20	10
4COSC005W	Software Development II	Core	20	10
4COSC003W	Trends in Computer Science	Core	20	10
4COSC011W	Web Design and Development	Core	20	10

Level 5

Level 5 option modules are organised according to the following themes:

Mobile and Web Computing Theme

- Mobile Application Development
- Server-side Web Development
- Advanced Client-side Development

Usability and Interaction Theme

- Human Computer Interaction and User Experience
- XR & Multimodal Interaction
- 3D Interactive Media Development

BIS Theme

- Information Technology Security

Data Science Theme

- Machine Learning and Data mining

Games and Computer Graphics Development Theme

- Maths and Physics for Games
- Game Engine Architecture
- XR Multimodal Interaction

Computer Engineering Theme

- Robotic Principles
- Sensors & Interfaces

- Algorithms: Theory Design and Implementation

Module Code	Module Title	Status	UK credit	ECTS
5COSC022W	Client-Server Architectures	Core	20	10
5COSC020W	Database Systems	Core	20	10
5COSC019W	Object Oriented Programming	Core	20	10
5COSC021W	Software Development Group Project	Core	20	10
5MMCS007W	3D Interactive Media Development	Option	20	10
5COSC026W	Advanced Client-Side Development	Option	20	10
5SENG003W	Algorithms: Theory, Design and Implementation	Option	20	10
5CCGD011W	Game Engine Architecture	Option	20	10
5COSC025W	Human Computer Interaction and User Experience	Option	20	10
5BUIS020W	Information Technology Security	Option	20	10
5DATA002W	Machine Learning and Data Mining	Option	20	10
5CCGD010W	Maths and Physics for Games	Option	20	10
5COSC023W	Mobile Application Development	Option	20	10
5ELEN018W	Robotic Principles	Option	20	10
5ELEN019W	Sensors and Interfaces	Option	20	10
5COSC024W	Server-Side Web Development	Option	20	10
5CCGD013W	XR Multimodal Interaction	Option	20	10

Additional Year

Students who undertake the 4 year course must pass module 6COSC018W to achieve the award "with Industrial Experience".

Module Code	Module Title	Status	UK credit	ECTS
6COSC018W	Industrial Placement	Core	120	60

Level 6

Level 6 Option Modules are organised according to the following themes:

Mobile and Web Computing Theme

- Mobile Native Application Development
- Advanced Server-side web Programming

Usability and Interaction Theme

- Usability Testing
- Digital marketing, Social Media and Web Analytics
- Advanced Interactive Media Development

BIS Theme

- Information Driven Entrepreneurship and Enterprise
- Strategic management of IS (IT)

Data Science Theme

- Operational Research and Optimisation
- Visualisation and dash boarding

Games and Computer Graphics Development Theme

- Game AI
- Games Networking and Security
- Interactive 3D Visualisation

Computer Engineering Theme

- Internet-of-Things
- Applied Robotics

Module Code	Module Title	Status	UK credit	ECTS
6COSC020W	Applied AI	Core	20	10
6COSC023W	Computer Science Final Project	Core	40	20
6COSC019W	Cyber Security	Core	20	10
6MMCS008W	Advanced Interactive Media Development	Option	20	10
6COSC022W	Advanced Server-Side Web Programming	Option	20	10
6ELEN018W	Applied Robotics	Option	20	10
6DATA004W	Data Visualisation and Dashboarding	Option	20	10
6MARK017W	Digital Marketing, Social Media and Web Analytics	Option	20	10
6CCGD007W	Game AI	Option	20	10
6CCGD008W	Games Networking and Security	Option	20	10
6BUIS018W	Information Driven Entrepreneurship and Enterprise	Option	20	10
6CCGD010W	Interactive 3D Visualisation	Option	20	10
6NTCM009W	Internet of Things	Option	20	10
6COSC021W	Mobile Native Application Development	Option	20	10
6DATA005W	Operational Research and Optimisation	Option	20	10
6BUIS019W	Strategic Management of Information Systems	Option	20	10
6MMCS009W	Usability Testing and Evaluation	Option	20	10
		Elective	20	10

Please note: Not all option modules will necessarily be offered in any one year. In addition, timetabling and limited spaces may mean you cannot register for your first choice of option modules.

Professional body accreditation or other external references

Reference points for the course

Professional body accreditation

The British Computer Society (BCS) professional accreditation ensures independent validation that the course meets high standards set by the profession. It also benchmarks the course against those of other institutions both nationally and internationally and supports the continued improvement of the course, highlighting areas of best practice across institutions. Being a student on an accredited course provides a pathway to professional registrations such as Chartered IT Professional (CITP), Chartered or Incorporated Engineer (CEng/IEng) and Registered IT Technician (RITTech).

BSc (Honours) Computer Science fulfils the educational requirements of BCS for the CITP and partial CEng accreditation.

Internally

University Teaching and Learning policy statements, University Quality Assurance Handbook and Modular Frameworks, staff research.

Externally

QAA Subject Benchmark statements, Professional, Statutory, Regulatory Body requirements/guidance, University and SEEC (credit consortium) level descriptors.

Course management

The BSc (Honours) Computer Science course is under the School of Computer Science & Engineering and the management structure supporting the course is as follows:

- The Course Leader is responsible for day to day running and overall management of the course and development of the curriculum
- The Head of School, holds academic responsibility for the course and other courses within the School
- The Pro Vice-Chancellor and Head of the College of Design, Creative and Digital Industries, holds overall responsibility for the course, and for the other courses run by the College.

Academic regulations

The current Handbook of Academic Regulations is available at westminster.ac.uk/academic-regulations.

Course specific regulations apply to some courses.

Academic Support

Upon arrival, an induction programme will introduce you to the staff responsible for the course, the campus on which you will be studying, the Library and IT facilities, additional support available and to your Campus Registry. You will be provided with the Course Handbook, which provides detailed information about the course. Each course has a course leader or Director of Studies. All students enrolled on a full-time course and part time students registered for more than 60 credits a year have a personal tutor, who provides advice and guidance on academic matters. The University uses a Virtual Learning Environment called Blackboard where students access their course materials, and can communicate and collaborate with staff and other students. Further information on Blackboard can be found at https://www.westminster.ac.uk/current-students/studies/your-student-journey/when-you-arrive/blackboard

The Academic Learning Development Centre supports students in developing the skills required for higher education. As well as online resources in Blackboard, students have the opportunity to attend Study Skills workshops and one to one appointments. Further information on the Academic Learning Development Centre can be found at westminster.ac.uk/academic-learning-development.

Learning support includes four libraries, each holding a collection of resources related to the subjects taught at that site. Students1 can search the entire library collection online through the Library Search service to find and reserve printed books, and access electronic resources (databases, e-journals, e-books). Students can choose to study in the libraries, which have areas for silent and group study, desktop computers, laptops for loan, photocopying and printing services. They can also choose from several computer rooms at each campus where desktop computers are available with the general and specialist software that supports the courses taught in their College. Students can also securely connect their

own laptops and mobile devices to the University wireless network.

Support Services

The University of Westminster Student and Academic Services department provide advice and guidance on accommodation, financial and legal matters, personal counselling, health and disability issues, careers, specialist advice for international students and the chaplaincy providing multi-faith guidance. Further information on the advice available to students can be found at https://www.westminster.ac.uk/student-advice

The University of Westminster Students' Union also provides a range of facilities to support students during their time at the University. Further information on UWSU can be found at https://www.westminster.ac.uk/students-union

How do we ensure the quality of our courses and continuous improvement?

The course was initially approved by a University Validation Panel. University Panels normally include internal peers from the University, academic(s) from another university. a representative from industry and a Student Advisor.

The course is also monitored each year by the College to ensure it is running effectively and that issues which might affect the student experience have been appropriately addressed. Staff will consider evidence about the course, including the evidence of student surveys, student progression and achievement and reports from external examiners, in order to evaluate the effectiveness of the course and make changes where necessary.

A Course revalidation takes place periodically to ensure that the curriculum is up-to-date and that the skills gained on the course continue to be relevant to employers. Students meet with revalidation panels to provide feedback on their experiences. Student feedback from previous years is also part of the evidence used to assess how the course has been running.

How do we act on student feedback?

Student feedback is important to the University and student views are taken seriously. Student feedback is gathered in a variety of ways.

- Through student engagement activities at Course/Module level, students have the opportunity to express their voice in the running of their course. Course representatives are elected to expressly represent the views of their peers. The University and the Students' Union work together to provide a full induction to the role of the course representatives.

- There are also School Representatives appointed jointly by the University and the Students' Union who meet with senior School staff to discuss wider issues affecting student experience across the School. Student representatives are also represented on key College and University committees.;

- All students are invited to complete a questionnaire before the end of each module. The feedback from this will inform the module leader on the effectiveness of the module and highlight areas that could be enhanced.

- Final year Undergraduate students will be asked to complete the National Student Survey which helps to inform the national university league tables.

This programme specification provides a concise summary of the main features of the course and the learning outcomes that a student might reasonably be expected to achieve and demonstrate, if they take full advantage of the learning opportunities that are provided. This specification is supplemented by the Course Handbook, Module proforma and Module Handbooks provided to students. Copyright in this document belongs to the University of Westminster. All rights are reserved. This document is for personal use only and may not be reproduced or used for any other purpose, either in whole or in part, without the prior written consent of the University of Westminster. All copies of this document must incorporate this Copyright Notice – 2022©