

Course record information

Name and level of final award	<ul style="list-style-type: none"> Bachelor of Engineering with Honours - Software Engineering Bachelor of Engineering with Honours - BEng Software Engineering with Industrial Experience FT <p>The award is Bologna FQ-EHEA first cycle degree or diploma compatible</p>
Name and level of intermediate awards	<ul style="list-style-type: none"> Bachelor of Engineering (BEng) - Software Engineering Diploma of Higher Education (Dip HE) - Software Engineering Certificate of Higher Education (CerHE) - Software Engineering
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)	<p>QAA subject benchmark for Computing https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/subject-benchmark-statement-computing.pdf?sfvrsn=ef2c881_10</p> <p>British Computer Society guidelines on accreditation</p>
Professional statutory or regulatory body	<p>British Computer Society (BCS)</p> <p>Re-accreditation is pending</p>
Westminster course title, mode of attendance and standard length	<ul style="list-style-type: none"> BEng Software Engineering FT, Full-time, September start - 3 years standard length with an optional year placement
Valid for cohorts	From 2022/3

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

A software engineer is responsible for creating and maintaining secure and robust software applications. This involves applying a wide range of technologies and skills to formally design, develop and test software to ensure that it satisfies the client's or stake holders' requirements. Students completing the course will have sufficient expertise to enter the highly dynamic and rapidly developing software industry productively, with a minimum of training. They will be able to operate effectively in a professional environment; they will learn quickly and will be ready to use new technologies. Moreover, they will be creative and based on the software engineering practice, will be able to produce ideas and solutions to make existing technologies more efficient, or to develop new technologies. These are only a few, but fundamental, features of the exciting modern software industry which, to a large extent, drives our society and which you, as a graduate from BEng Software Engineering, will enter.

The BEng Software Engineering has been designed to:

- provide students with knowledge and understanding of the fundamental principles and technologies of software engineering and general computer science;
- give students practical skills in the application of existing tools and techniques for the design and development of software;
- give students substantial experience of applying a systematic approach to software development and evaluation individually, or as members of a software team;
- make students aware of professional, ethical and legal issues that might arise in a software development environment;
- enable students to develop as independent and self-critical problem solvers;
- 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 software engineering.

The *BEng Software Engineering* 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 course will have been taught and utilised industrial tools and techniques and will be versed in all aspects of software engineering. As well as having a solid background in software development, graduates from the course shall also have multiple specialism in various areas of software engineering related fields 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 software development industry. Graduates shall also be capable and prepared for the broadening their knowledge by undertaking Masters level study or higher.

Upon completion of the course you will be expected to gain an industrial software engineering role. Due to the complexity of the contemporary software, much of software engineering work relies on the teamwork of multidisciplinary groups. To reflect this, a range of design, implementation and management modules is embedded across the course.

Graduating from this accredited course where professional skills and practice are embedded, the BEng Software Engineering graduates shall be able to meet the required professional and ethical standards expected in the sophisticated modern workplace. Graduates shall also be capable and prepared for the broadening their knowledge by undertaking further study towards Masters and PhD levels.

Graduates would typically be part of a software development team designing, implementing and or maintaining sophisticated applications, very likely to be distributed. The actual role within the team may be to grow to the role of a senior or lead software engineer, software designer, advanced programmer, systems administrator or systems analyst. Other types of roles possible are in a wider computer science research in a commercial company or academic institution. Being equipped with the knowledge and skills relevant to emerging areas such as AI, our graduates will be highly competitive in the contemporary job market.

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

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

- L6.01 Methodically and independently develop requirements to a solution for a large scale software problem using appropriate languages and tools (PPP)
- L6.02 Design large scale data systems to discover hidden relationships and automate and/or inform decision making (PPP)
- L6.03 Identify and appraise the main threats to computer systems and networks security and integrity (KU)
- L6.04 Demonstrate complete handling of the full life-cycle of a software engineering project underpinned by an

entrepreneurial approach and a focus on the needs of real clients and the wider society (KTS)

- L6.05 Apply appropriate methodologies in carrying out independent research in software engineering and produce a report demonstrating evidence of critical thinking (KU)

How will you learn?

Learning methods

In your course you will have a wide selection of learning and using them 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 further 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 scheduled class. Your learning will use several 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.
- **Work placement**, if you choose the option to do a year-long placement as part of your degree, will give you the opportunity to practice and enhance your learning from course.

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 Software Engineering complemented with the foundations of your specific course or pathway. 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 Software Engineering 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.

Your third 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

In your course, assessment and feedback are the key elements in measuring learning. The assessment strategy of the course supports to foster the highly skilled and professional software engineer of the future.

You will undertake a **wide variety of assessment tasks** as their progress through your degree course on both practical

and theoretical elements via a mix of formative and summative with project based synoptic assessment. Their nature will vary according to your level and the nature of the task. The benefit is that this provides a range of activities to support and encourage the blended learning and allows you to demonstrate your skills and understanding in a variety of ways. The formative assessment helps 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.

the formative assessment plays an important role to provide feedback to you as this serves to indicate your progress and helps identify strengths and weaknesses. The major feedback is given throughout modules in tutorials, and group discussions, and in the final demonstrations and vivas in practical modules. A wider range of feedback can be further achieved through student participations of national and international programming and software development competitions and your involvement of community events. This allows you to identify areas for improvement while demonstrating your skills and knowledge to software industry and society.

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. For example, *part-written practical reports* and *Lab-controlled assessments/ work-based lab engagement* will be used to test your ability to analyse and interpret data, and/or build and reflect on real-world cases during computer lab sessions.

There will be some formal *examinations* (usually at the end of each term). Some of the work will be completed individually through *closed-book exams* or *in-class tests*, 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. *Group coursework* and *team projects*, which are essential for software engineering related careers, will help you to develop practical skills alongside the more specific skills that are being assessed. For example, you will be working as part of a team on a typical industry case study and will be assessed on your ability to appreciate the importance of business logistic operations and their interaction. Each group member will be in charge of specific task(s) (role), and all together will have to collaborate and exchange relevant information to satisfy the organisation objectives. Such a group work will be a simulation of a real-life working environment with shared goals but individual accountability and codes of conduct. Clear Assessment Criteria are stated in module documents, and these are linked to the module Learning Outcomes. you will receive written feedback from all assessments, and this directly relates to the assessment criteria for each module.

Other methods of assessments to evaluate various graduate skills will include portfolios& interviews where you will be designing and presenting an artefact.

All assessments that contribute to the 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 will become longer, and more self-managed, as you get into the second year and the final year of the course and you will have more freedom to focus on specialist areas to innovate through your own decisions informed by your own research. **Assessment is designed to be a learning experience in itself** and will help students make that transition from small practical exercises to more complex piece of work towards the substantial, year-long, project of the 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**. These assignments allow combining elements of learning from different modules and show the accumulated knowledge and understanding of software development approach and technology, especially supporting the linkage of principle and practice. It also helps to reduce formal assessment and so ensure that you have as much time and opportunity as possible to develop practical skills alongside the more specific skills that are being assessed. Contemporary Software Engineering requires design and implementation by a team or even multiple teams working together each responsible for specific phases of software development. It also requires skills of software documentation. Therefore, you will write essays and research reports, and learn how to write in a style suitable to a piece of academic work, and to make proper use of references and bibliographies. Project and ideas are driven from course partners which may be alumni and/or collaborators of the School of Computer Science and Engineering research groups.

Overall guidance through the personal tutoring system will help you continuously reflect on where you are of your learning, so you can make informed decisions on the pace and focus of your own independent learning.

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. This is possible if you choose to undertake an industrial placement year and/or through participation in national and international competitions. 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	L4.02, L4.04, L4.05, L4.06, L4.07, L5.01, L5.02, L5.03, L5.04, L5.05, L6.01, L6.02
Literate and effective communicator	L4.09, L5.09, L6.05
Entrepreneurial	L6.04
Global in outlook and engaged in communities	L4.01, L4.03, L5.06, L5.07, L5.08, L6.03
Socially, ethically and environmentally aware	L4.01, L4.03, L4.08, L5.06, L5.07, L5.08, L5.09, L6.03, L6.04

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
4MMCS003W	Web Design and Development	Core	20	10

Level 5

Module Code	Module Title	Status	UK credit	ECTS
5SENG003W	Algorithms: Theory, Design and Implementation	Core	20	10
5COSC020W	Database Systems	Core	20	10
5DATA002W	Machine Learning and Data Mining	Core	20	10
5COSC019W	Object Oriented Programming	Core	20	10
5COSC021W	Software Development Group Project	Core	20	10
5BUIS019W	Business Analytics	Option	20	10
5COSC023W	Mobile Application Development	Option	20	10

Module Code	Module Title	Status	UK credit	ECTS
5ELEN016W	Operating Systems	Option	20	10
5ELEN018W	Robotic Principles	Option	20	10
5COSC024W	Server-Side Web Development	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

Module Code	Module Title	Status	UK credit	ECTS
6COSC023W	Computer Science Final Project	Core	40	20
6SENG006W	Concurrent Programming	Core	20	10
6COSC019W	Cyber Security	Core	20	10
6SENG005W	Formal Methods	Core	20	10
6DATA005W	Advanced Analytics	Option	20	10
6COSC022W	Advanced Server-Side Web Programming	Option	20	10
6NTCM005W	Applied Distributed System Programming	Option	20	10
6ELEN018W	Applied Robotics	Option	20	10
6NTCM009W	Internet of Things	Option	20	10
6COSC021W	Mobile Native Application Development	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

The course is intended to fulfil the educational requirements of the British Computer Society (BCS) to fulfil the educational requirements registration as a Chartered IT Professional (CITP) and partial Chartered Engineer (CEng). Re-accreditation from Professional Body is pending.

Reference points for the course

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.

Professional body accreditation

British Computer Society (BCS) Criteria.

Course management

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

- Dr Alexander Bolotov, Course Leader is responsible for day to day running and overall management of the course and development of the curriculum.
- Dr Philip Trwoga, Head of School, holds academic responsibility for the course and other courses within the School Professor.
- Jonathan Stockdale, 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. Students 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 – 2021©