

# BSC (HONS) COMPUTER SCIENCE (WITH SANDWICH PLACEMENT)

Institute of Engineering, Computing and Advanced Manufacturing

Academic Level:	6	Credits:	480
UCAS Code:	B112		
Awarding Body:	University of Cumbria		
Delivery Site:	Barrow-In-Furness Campus Lancaster		
Programme Length:	4 Years full time 6 Years Maximum registration		
Mode of Delivery:	Face-to-face		
Pattern of Delivery:	Full time  This programme may also be made available on an infill part-time basis at the discretion of the academic programme leader. In such cases, you will study modules alongside the full-time cohort(s) that are running at the time		
	Total weeks of study:	24 weeks	
	Delivery pattern:	2x 12-week semesters	
	Standard semester dates:	Yes	
Placement:	12 months		
Programme Webpage:	<a href="https://www.cumbria.ac.uk/study/courses/undergraduate/bsc-hons-computer-science/with-sandwich-placement/">https://www.cumbria.ac.uk/study/courses/undergraduate/bsc-hons-computer-science/with-sandwich-placement/</a>		

## Entry Criteria

The University's standard criteria for admissions apply. Please refer to the [Applicant Information](#) pages of the University website for more information. For [APL](#), please refer to the University website. Detailed criteria for admission to this programme can be found on the programme webpage

## PROGRAMME AIMS AND OUTCOMES

### Programme Aims

By the end of this programme learners will be able to:

1. Play a meaningful role as an IT professional through a combination of technical competence and commercial and social awareness.
2. Apply a substantial grounding in the theoretical foundations of computer science such that they can create, test, and implement computing resourceful solutions solution of complex problems in a commercial environment.
3. Use creativity to innovate new technologies, processes or systems that meet a range of societal, business and user needs.
4. Operate in a responsible and ethical manner, helping to ensure the benefits of innovation and progress are sustainable, and shared equitably.
5. Have the ability and confidence to use a range of transferable skills, thereby opening up a wide range of career development opportunities, and thereby make a valuable contribution to society.

### Programme Outcomes – Knowledge and Understanding

The programme provides opportunities for you to develop and demonstrate the following:

**After 120 credits of study (CertHE) you will be able to demonstrate:**

- K1.** Knowledge and understanding of common facts, concepts, theories and principles of computer technology and the ability to apply them to the solution of well-defined problems.
- K2.** The use of such knowledge and understanding in simple modelling and design of computer-based systems for the purposes of comprehension and communication, and the understanding of constraints.
- K3.** Knowledge and understanding of selected tools, technologies, and methods, to produce solutions relevant to the domain of computer science to meet a set of agreed objectives in business contexts.
- K4.** Awareness of the systems architecture and basic security measures in relation to the design, development, and use of information systems.
- K5.** Recognition and analysis of criteria and specifications appropriate to well-defined problems, plan strategies for their solution and draw conclusions regarding the suitability of the resulting computer-based system.
- K6.** Knowledge of the legal, social, ethical, environmental, economic, commercial, and professional considerations that inform the activities of computer scientists.

**After 240 credits of study (DipHE) you will be able to demonstrate:**

- K7.** Knowledge and understanding of standard facts, concepts, theories and principles of computer technology and the ability to apply them to the solution of broadly defined problems that are subject to some constraints.

- K8.** The use of such knowledge and understanding in the modelling and design of computer-based systems for the purposes of comprehension, communication, and prediction.
- K9.** Knowledge and understanding of a range of tools, technologies, and methods (including management techniques), to produce solutions relevant to the domain of computer science to meet a set of objectives in commercial and business contexts.
- K10.** Understanding of the systems architecture and security issues in relation to the design, development, use and maintenance of information systems.
- K11.** Recognition and analysis of criteria and specifications appropriate to broadly defined problems, plan strategies for their solution and draw conclusions regarding the current and future suitability of the resulting computer-based system.
- K12.** Knowledge of the legal, social, ethical, environmental, economic, commercial, and professional considerations that that impact on the use of computer technology.
- After 480 credits of study (BSc Hons) you will be able to demonstrate:**
- K13.** Knowledge and understanding of essential facts, concepts, theories and principles of computer technology and the ability to apply them to the solution of complex problems that are subject to some technical uncertainty.
- K14.** The use of such knowledge and understanding in the modelling and design of computer-based systems for the purposes of comprehension, communication, prediction, and the understanding of trade-offs.
- K15.** Knowledge and understanding of contemporary tools, technologies, and methods (including management techniques), to produce solutions relevant to the domain of computer science to meet a set of agreed objectives and requirements in commercial and business contexts.
- K16.** Understanding of the systems architecture and security issues in relation to the design, development, use and management of information systems.
- K17.** Recognition and analysis of criteria and specifications appropriate to complex problems, plan strategies for their solution and make reasoned judgements regarding the current and future suitability of the resulting computer-based system.
- K18.** Recognition of the legal, social, ethical, environmental, economic, commercial, and professional considerations that that impact on the exploitation of computer technology.

### **Programme Outcomes – Skills and other Attributes**

The programme provides opportunities for you to develop and demonstrate the following:

**After 120 credits of study (CertHE) you will be able to demonstrate:**

- S1.** The ability to construct computer-based systems to meet business needs.
- S2.** An appreciation of the general quality attributes and possible trade-offs presented within the given problem and recognise any risks that may be involved in the operation of computing systems within a well-defined context.

**S3.** The ability to deploy standard tools used for the specification, construction, design, implementation, documentation and maintenance of computer applications and information systems to meet business needs.

**S4.** For a well-defined problem, the ability to research its background, understand the social context, identify constraints, understand customer and user needs, identify cost drivers, and take steps to ensure fitness for purpose.

**S5.** The ability to work effectively, both as an individual and as a member of a development team.

**S6.** The development of transferable skills that will be of value in a wide range of situations including: problem solving, effective information retrieval, numeracy in understanding cases involving a quantitative dimension, communication skills in electronic as well as written and oral form and taking responsibility for your own learning.

**After 240 credits of study (DipHE) you will be able to demonstrate:**

**S7.** The ability to design and construct computer-based systems to meet business needs.

**S8.** The ability to evaluate the general quality attributes and possible trade-offs presented within the given problem and recognise any risks that may be involved in the operation of computing systems within a broadly defined context.

**S9.** The ability to deploy a range of tools used for the specification, construction, design, implementation, documentation and maintenance of computer applications and information systems to meet business needs.

**S10.** The ability to explore a broadly defined problem, research its background, understand the social context, identify constraints, understand customer and user needs, identify and manage cost drivers, ensure fitness for purpose and evaluate the outcomes.

**S11.** The ability to work as a member of a development team in a range of different roles and recognise different ways of organising teams.

**S12.** The development of transferable skills that will be of value in a wide range of situations including: problem solving, working with others, effective information management and information retrieval skills, numeracy in both understanding and presenting cases involving a quantitative dimension, communication skills in electronic as well as written and oral form and planning self-learning as the foundation for on-going professional development.

**After 480 credits of study (BA/BSc Hons) you will be able to demonstrate:**

**S13.** The ability to specify, design and construct computer-based systems to meet business needs.

**S14.** The ability to evaluate systems in terms of general quality attributes and possible trade-offs presented within the given problem and recognise any risks that may be involved in the operation of computing systems within a given context.

**S15.** The ability to effectively select and deploy the tools used for the specification, construction, design, implementation, documentation and maintenance of computer applications and information systems, with particular emphasis on understanding the whole process involved in the effective deployment of computers to meet business needs.

**S16.** The ability to define a problem, research its background, understand the social context, identify constraints, understand customer and user needs, identify and manage cost drivers, ensure fitness for purpose and manage the design process and evaluate the outcomes.

**S17.** Confidence in working as a member of a development team, recognising the different roles within a team and different ways of organising teams.

**S18.** Your development of transferable skills that will be of value in a wide range of situations including: problem solving, working with others, effective information management and information retrieval skills, numeracy in both understanding and presenting cases involving a quantitative dimension, communication skills in electronic as well as written and oral form to a range of audiences and planning self-learning and improving performance as the foundation for on-going professional development.

## PROGRAMME FEATURES

### Programme Overview

The BSc (Hons) Computer Science degree is a fresh and modern course that blends the technical focus of computer science with social and environmental awareness. Your study will encompass a wide range of topics in data science, artificial intelligence, and cyber security. As a computer architect, you will use this specialist knowledge to solve problems and create innovative systems.

Computer Science is a fast-paced and constantly developing global industry. To ensure that your degree is future-proof, we have developed the course to meet the British Computer Society's (BCS) accreditation requirement so that you can become professionally recognised as a Chartered IT Professional. Your degree was also designed in collaboration with BAE Systems to embed all the employability skills and commercial awareness you will need to launch a successful career.

This programme aims to incrementally increase your subject knowledge alongside your academic development through active learning. Your tutors will mentor and support you in applying your new skills in problem- and project-based modules. The new concepts and methods you will learn at each level of study will be linked by an 'architected' approach, which is the creative integration of theories, tools, technologies, and methods (including management techniques), to produce solutions relevant to the domain of computer science.

- At Level 4, the emphasis is on helping you become independent in your learning. You will study the fundamental concepts of computer science, including computer programming, data structures and algorithms and computer architecture, and apply these techniques to solve well-defined problems.
- At Level 5, the emphasis is on building your confidence. Problems become more broadly defined and can involve various technical and commercial factors and constraints. In performing your analysis, and developing your solutions, you will draw on your new knowledge from across 5 in more advanced topics such as computer networks, information systems, business studies and programming.
- At Level 6, you will engage with complex problems that are subject to some technical uncertainty. You will be creative and resourceful in applying a range of tools, theories and methods in a broad range of contexts. You will deepen your knowledge by studying specialised subjects including artificial intelligence, data science and cyber security. You will work on real-world projects, and your solutions will have immediate commercial value.

This course also includes the opportunity (which we highly recommend) for you to take a sandwich year between your second and third year of study. This is a year-long period of paid industrial training in the UK. In taking up this opportunity, you will hone your expertise, try out a potential career path, get relevant workplace experience that is valued by many employers and boost your CV. In addition, many high-performing students return from their placement year with the offer of a sponsored Professional Project and a graduate role within their organisation.

The University of Cumbria has a mission to foster the social and economic development of the communities to which we belong. To support the advanced manufacturing cluster of engineering industries located around Morecambe Bay, the University and BAE Systems signed a strategic

partnership which includes the development of this Computer Science degree. Students based in Barrow will study in a new, purpose built 22 500 square feet building in the Barrow Learning Quarter Campus, just next-door to BAE's laboratories and test facilities where the Institute conducts research and student projects. Students based in Lancaster will be part of a vibrant city centre Campus and have easy access to a full range of academic, social and sporting facilities alongside other students from a diverse range of subjects. Regardless of location, the research activities based at the Barrow Campus will enrich and influence curriculum development and provide opportunities for you to co-create new knowledge alongside your tutors.

The involvement of regional, national, and international businesses runs throughout the course via a series of industry touchpoints where you will gain practical experience of computer science whilst learning how the taught content of your degree is applied in the real world. Touchpoints are embedded into every module to keep you updated with current and developing trends in the industry. Our approach means that this programme also provides a suitable platform for you to enter employment within other areas of engineering, manufacturing, or business, or to proceed to specialised postgraduate programmes including MSc and PhD

## Learning and Teaching

### Teaching

As a student at the University of Cumbria, you are part of an inclusive learning community that recognises diversity. You will have opportunities to learn by interacting with others in a collegiate, facilitative, and dynamic learning environment. Teaching, assessment, and student support will allow equal and equitable opportunities for you to optimise your potential and develop autonomy.

We seek to create a stimulating and innovative community of learning, whether encountered on campus or at a distance, on placement or in the workplace. Facilitated by our expert practitioner staff, you will experience a learning environment that is well equipped, flexible, and stimulating.

### Learning and Teaching

This programme's underlying philosophy is for you to be an active participant in your learning, so we deliver much of our teaching in flipped-classroom mode, which can be thought of as doing the lecture at home and your academic work in class. You study the taught material in the Virtual Learning Environment (VLE) in your own time and at your own pace before attending in-person learning activities. These include classroom sessions that are based around problem-solving tutorials and seminar discussions to develop your knowledge. Workshops and laboratories sessions are also used to develop your skills, which includes study skills, research methods, critical and analytical abilities, and your ability to manage your time and plan your work. Your tutors are all active researchers and use their experience in working on leading edge projects to make sure that you are up-to-date with the latest developments in computer science.

To integrate your new knowledge and skills, you will undertake a series of projects throughout your degree. These modules use an inquiry-based learning method, and are conducted in a simulated professional environment to help you develop your employability skills. At levels 4 and 5, you will undertake a series of short and focused projects, where you will work as part of a team under the

guidance of a tutor. At level 6 you will undertake the capstone Professional Project, which is a significant and independent work where you will investigate a topic of your choice. You will need to be both creative and analytical in developing a computing solution to real-world needs.

Tutors will support your learning in person, via email, and through other communication channels as appropriate. At first, your tutors will act as guides and mentors, but over time, you will become more independent in how you direct your learning and your approach to problem-solving. So that teaching can be inclusive, accessible, practical, relevant, contextualised, and innovative, several different learning and teaching methods are used:

**Lectures** convey knowledge and concepts. You will learn from the lecture content and from different approaches to the organisation and presentation of material. Lectures are typically first presented on the VLE so you can review the material at your own pace. They can be textual, can include video and audio material, screencasts, or presentations with voice-over. You are expected to engage with this content before attending other scheduled teaching activities. Some traditional format lectures will be used when they are delivered by a guest speaker or else deal with administrative matters.

**Tutorials** represent most of your contact time and are always delivered face-to-face. Tutorial classes usually involve small groups but could be given on an individual basis. The critical element is the interaction between you, your tutor, and your peers as you solve problems and test your knowledge. Tutorials will help you to identify and articulate problems in your understanding, seek help and receive formative feedback on your work. Tutorials are interactive and you should be prepared to contribute to the discussion.

**Laboratories** are practical activities which can involve equipment, the computer, or both. They allow you to explore the theory described in lectures, develop hands-on skills, and to test your understanding of computing concepts. You will also gain experience in using specialist equipment.

**Computing Workshops** are supervised workshops held in the computer lab to give you practical experience using specialist software in design, development or analysis work. You will also be able to develop your ICT skills using your own devices, but the University will provide any software you need. You will also have access to computer laboratories outside of scheduled teaching activities.

**Practical Workshops** could be used for practically orientated modules and seek to develop specific hands-on abilities. You will learn to be self-critical and to reflect on your work. Due to the potentially hazardous nature of the workshop, your work will be supervised until you reach a defined level of competence.

**Seminars** tend to be student-led and are used to explore concepts in greater depth. These provide inclusive opportunities for collaborative learning without prejudice or judgement. You will be required to engage in background reading and other forms of research, then to present and discuss your findings with your peers. You will develop a wide range of transferable skills in finding and evaluating information and communicating an idea.

**Group Work** is crucial to a successful career in computing, so your degree provides many teamwork opportunities that simulate a professional workplace. You will learn how to organise and structure collective or cooperative work processes and how to work in different roles, including leadership.



**Industry Touchpoints** are included within every module and are intended to give you practical experience of how taught content relates to the real-world. In some modules, guest speakers will deliver some part of the content where they have expertise. In other modules, local businesses will host a field trip, provide a project topic, a case study, a masterclass, a boot camp, or help to judge a student competition. Touchpoints can also include opportunities for you to gain professional certification, micro credentials, and badges alongside your degree.

### **Independent Learning**

Independent study is a vital extension of formal teaching methods and an essential and substantial part of your degree. You will be expected to underpin the taught content by private study and to utilise all available resources. At first, you will be mentored and supported in learning how to learn. As you progress through your degree, you will become more independent and increasingly expected to source new information to supplement the teaching materials provided by your tutor.

## **Assessment**

### **Summative and Formative Assessment**

A variety of assessment methods have been built into this programme to support different learning styles and preferences. Assessment is either formative or summative. Formative assessment relates to your developing work and offers feedback on your progress. Summative assessment relates to your finished work and contributes to your module grade. Assessment deadlines are spread throughout the academic year to help you manage your workload.

Summative assessment is via coursework or exam, and many modules use a combination of both. The types of coursework you will complete reflect the tasks you will perform in employment, such as written reports, oral and graphical presentations, demonstration of computing artefacts and computer-based assignments. Where a group submits coursework, the tutor will modify the overall mark to reflect your contribution. This can be done by identifying your work within the report, or by peer assessment where team members grade each other. Examinations are always unseen and performed under time-controlled conditions. The question type can be multiple choice, problem-solving or essay-style. Your tutor will explain the exact details of your assessment and provide copies of the marking scheme, so you will know what is expected. As a rule of thumb, you should allocate 20% of your independent learning time to preparing for assessments.

All modules include formative assessment to support your academic development as an independent learner. The exact type will depend on the module and will be explained to you by your tutor. In general formative assessment is based on an ongoing dialogue between you and your tutors. You will be encouraged to set personal goals and to reflect on your progress. Most modules will provide supplementary material on the VLE such as quizzes and tests, which you can use to gauge your knowledge and understanding of the module material.

### **Feedback**

You will receive feedback on your completed assessments explaining what you did well and what you need to improve. Feedback will always include 'feedforward'. At levels 4 and 5, feedforward will

explain where you will next encounter the subject matter or assessment type. At level 6, feedforward will link your work to your future professional practice.

### Graduate Prospects

This degree programme was developed in conjunction with a cluster of high-tech advanced manufacturing businesses in southern Cumbria. Collectively, these industries represent 25% of Cumbria's economy and employs 13% of the regional workforce. With increases in automation and the integration of computer technologies, demand for highly skilled IT professionals is increasing.

A degree in Computer Science will open up a wide range of careers. Your career path will depend on what area you specialise in, but jobs directly related to your degree would include application, data or systems analyst, software development, web design and cyber security. The starting salaries are as varied as the roles, but typically graduates will earn around £25,000. It's worth noting that Computer Science graduates across the UK have reported receiving anything from £17,000 – £70,000 in IT roles.

Computer Scientists are both analytical and creative thinkers who can operate on their own initiative and work as part of a team. You will be able to use your high levels of technical expertise to design, construct, deploy, manage, and maintain computer systems effectively, while maintaining the highest ethical standards in your approach to equality, diversity, inclusion, and sustainability. You will also develop a broad range of transferable skills that will be sought after in nearly all other numerate and analytical professions. You will also be sufficiently qualified to enter a programme of higher study such as MSc or PhD.

## MODULES

Year 1			
Code	Title	Credits	Status
CSDD4101	Fundamentals of Computer Science & Programming	20	Compulsory
CSDD4002	Computing Platforms and Networking	20	Compulsory
CSDD4003	Problem Solving and Computational Thinking	20	Compulsory
CSDD4004	Information Systems Design	20	Compulsory
CSDD4005	Designing Computing Solutions	20	Compulsory
CSDD4006	Web Development	20	Compulsory
Students exiting at this point with 120 credits would receive a CertHE Computer Science			

Year 2			
Code	Title	Credits	Status
CSDD5001	Networks	20	Compulsory
CSDD5002	Data Collection, Storage and Analysis	20	Compulsory
CSDD5003	Enterprise Systems	20	Compulsory
CSDD5004	Managing Business Operations and Technology Strategy	20	Compulsory
CSDD5005	Programming and Developing Software Solutions	20	Compulsory
CSDD5006	Technology Project 2	20	Compulsory
Students exiting at this point with 240 credits would receive a DipHE Computer Science			

Year 3			
Code	Title	Credits	Status
CSDD5007	Sandwich Placement	120	Optional
Students exiting at this point with 360 credits would receive a DipHE Computer Science (with sandwich placement)			

Year 4			
Code	Title	Credits	Status
CSDD6001	Professional Project	40	Core

CSDD6002	Data Science	20	Compulsory
CSDD6003	Artificial Intelligence	20	Compulsory
CSDD6004	Cybersecurity	20	Compulsory
CSDD6005	Emerging Technologies and Innovation	20	Compulsory
<p><b>Students exiting at this point with 420 credits would receive an Ordinary BSc Computer Science (with sandwich placement)</b></p> <p><b>Students exiting at this point with 480 credits would receive a BSc (Hons) Computer Science (with sandwich placement)</b></p>			

### Additional Module Information

Where a student has not succeeded in their programme, they will not be permitted to re-register on the same programme.

### Key to Module Statuses

Core modules	Must be taken and must be successfully passed.
Compulsory modules	Must be taken although it may possible to condone/compensate as a marginal fail (within the limits set out in the Academic Regulations and provided that all core or pass/fail elements of module assessment have been passed).

### Timetables

Timetables are normally available no less than four weeks before the start of Semester 1. Please note that while we make every effort to ensure timetables are as student-friendly as possible, scheduled learning can take place on any day of the week.

This programme may also be made available on an infill part-time basis at the discretion of the academic programme leader. In such cases, you will study modules alongside the full-time cohort(s) that are running at the time

## ADDITIONAL INFORMATION

### Student Support

The [Student Enquiry Point](#) is a simple way to contact Student Services. Using the Student Enquiry Point tile on the Student Hub you can submit an enquiry to any of the Student Services teams, which includes:

- [Careers and Employability](#)
- [Chaplaincy](#) for faith and spiritual wellbeing
- [Mental Health and Wellbeing](#)
- [Digital Skills](#)
- [Disability and Specific Learning Difficulty \(SpLD\)](#)
- [International Student Support](#)
- [Library](#)
- [Money Matters](#)
- [Safeguarding](#)
- [Skills@Cumbria](#)
- [Sports and Fitness Facilities](#)
- [University Student Accommodation](#)

As a student at the University of Cumbria you automatically become a member of the Students' Union. The Students' Union represents the views and interests of students within the University.

The Students' Union is led by a group of Student Representatives who are elected by students in annual elections. They also support approximately 400 Student Academic Reps within each cohort across the entire University. The Students' Union represent the views of their cohort and work with academic staff to continuously develop and improve the experience for all University of Cumbria students. You can find out more about who represents you at [www.ucsu.me](http://www.ucsu.me).

You can email at any time on [studentvoice@cumbria.ac.uk](mailto:studentvoice@cumbria.ac.uk).

### Course Costs

#### Tuition Fees

Course fees can be found [course fees](#).

The following course-related costs are included in the fees:

- Field trips, bootcamps, hackathons and master camps that are included in a module as an industry touchpoint
- Specialist software

#### Additional Costs

The following course-related costs are not included in the fees:

None

### Exceptions to the Academic Regulations

This programme operates in accordance with the University's Academic Regulations and Academic Procedures and Processes with the following permitted exception due to the requirements of the BCS The Chartered Institute for IT.

To meet BCS criteria the maximum period for completion is six years to ensure currency within the Computer Science industry. this is an exception to the University Academic regulations which state the maximum registration period for a Batchelor Degree is 7 years.

### External and Internal Benchmarks

- [QAA Benchmark Statement: Computing \(2022\)](#)
- [BCS Accreditation Guidelines](#)
- [UoC Academic Regulations and Academic Procedures and Processes](#)
- [UoC Strategic Plan](#)
- [UoC Learning, Teaching and Assessment Strategy](#)
- UoC Institutional Business Plans
- [UoC Academic Regulations and Academic Procedures and Processes](#)

### Disclaimer

This programme has been approved (validated) by the University of Cumbria as suitable for a range of delivery modes, delivery patterns, and delivery sites. This level of potential flexibility does not reflect a commitment on behalf of the University to offer the programme by all modes/patterns and at all locations in every academic cycle. The details of the programme offered for a particular intake year will be as detailed on the programme webpage:

<https://www.cumbria.ac.uk/study/courses/undergraduate/bsc-hons-computer-science/with-sandwich-placement/>