

## Programme Specification for BSc (Hons) Cyber Security

<b>This document applies to Academic Year 2023/24 onwards</b>
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*Table 1 programme specification for BSc (Hons)*

<b>1.</b>	<b>Awarding institution/body</b>	University of Worcester
<b>2.</b>	<b>Teaching institution</b>	University of Worcester
<b>3.</b>	<b>Programme accredited by</b>	N/A
<b>4.</b>	<b>Final award or awards</b>	BSc (Hons)
<b>5.</b>	<b>Programme title</b>	Cyber Security
<b>6.</b>	<b>Pathways available</b>	Single
<b>7.</b>	<b>Mode and/or site of delivery</b>	Standard taught programme
<b>8.</b>	<b>Mode of attendance and duration</b>	Full time, part time, optional work placement year
<b>9.</b>	<b>UCAS Code</b>	Cyber Security BSc (UCAS H651)
<b>10.</b>	<b>Subject Benchmark statement and/or professional body statement</b>	QAA Subject Benchmark Statement: Computing (2022) <a href="https://www.qaa.ac.uk/quality-code/subject-benchmark-statements/computing">https://www.qaa.ac.uk/quality-code/subject-benchmark-statements/computing</a>
<b>11.</b>	<b>Date of Programme Specification preparation/ revision</b>	Approved June 2023 July 2023 – annual updates

### 12. Educational aims of the programme

This programme is aimed at students planning a career in the Cyber Security sector. It provides opportunities to develop skills in a wide range of topics spanning the entire subject of Cyber Security such as:

- Ethical Hacking
- Cyber Risk Management
- Computer Forensics
- Operating Systems
- Distributed Systems
- Secure by Design
- Information vs. Physical Security
- Authentication and Encryption

The choice of topics is tailored to suit the specific needs and requirements of the domain of Cyber Security with a focus on both employable soft and hard skills. The programme uses a variety of methods to prepare students for various employment opportunities by developing work-related skills such as computing competencies, project management, and teamwork. It also aims to meet computing curriculum recommendations and aims developed by BCS (British Computer Society), IEEE (Institute of Electrical and Electronics Engineers) and ACM (Association of Computing Machinery). In particular, the purpose of the programme is to prepare graduates with the:

1. Skills and domain knowledge that are heavily sought after in the Cyber Security domain.
2. The capacity to develop and apply domain knowledge and skills to address real-world problems and an effective manner.
3. Ability to effectively capture, prepare, analyse Cyber Security risks and solutions.
4. Ability to effectively communicate information, arguments, and analysis in a variety of forms to a range of audiences.
5. The capability to contribute to industry needs across the sector including SME through to large enterprise.
6. Zeal for lifelong learning as self-directed learners able to acquire new skills as required.

### 13. Intended learning outcomes and learning, teaching and assessment methods

*Table 2 knowledge and understanding outcomes for module code/s*

<b>Knowledge and Understanding</b>		
<b>LO no.</b>	On successful completion of the named award, students will be able to:	<b>Module Code/s</b>
1.	Apply knowledge and understanding of fundamental concepts related to Cyber Security.	COMP2452 COMP2410 COMP2411 COMP3411
2.	Critically analyse challenges and risks associated with Cyber Security.	COMP2452 COMP3471 COMP3457
3.	Critically appraise information security policy including legal, social and ethical implications.	COMP2411 COMP3410 COMP3457

<b>Cognitive and Intellectual skills</b>		
<b>LO no.</b>	On successful completion of the named award, students will be able to:	<b>Module Code/s</b>
4.	Conduct and critically reflect upon evaluation and testing in producing secure systems.	COMP2452 COMP3410
5.	Critically appraise ethical hacking tools.	COMP3410
6.	Synthesise practical solutions for mitigating cyber threat, using best practices and industry standards.	COMP3457 COMP3474
7.	Critically evaluate maturity models of cyber secure systems development.	COMP3411

<b>Skills and capabilities related to employability</b>		
<b>LO no.</b>	On successful completion of the named award, students will be able to:	<b>Module Code/s</b>
8.	Produce digital forensic evidence in a manner that facilitates corporate and criminal investigation.	COMP2453
9.	Have a working knowledge of various roles in the field of Cyber Security.	COMP2453 COMP3471 COMP3410

<b>Transferable/key skills</b>		
<b>LO no.</b>	On successful completion of the named award, students will be able to:	<b>Module Code/s</b>
10.	Demonstrate research skills such as planning research, gathering and analysis of primary data.	COMP2411 COMP2453 COMP3401
11.	Show ability to work as a member of a team, recognising different roles within the team, and various ways of organising teams.	COMP2411

<b>Transferable/key skills</b>		
12	Manage individual learning and development, including organization, time-management development and lifelong learning.	COMP3401

### **Learning, teaching and assessment**

As a result of a collaborative effort with colleagues across the Business School and in alignment with key factors relating to the University Learning and Teaching Strategy, the following strategic goals have been identified to shape the Business School's approach to learning and teaching such that the Cyber Security programme:

1. Is intellectually challenging with clear continuity across all levels.
2. Incorporates coherent continuous assessment through embedded formative and summative feedback approaches.
3. Ensure key skills relating to research, employability and digital literacy are embedded into learning and teaching.
4. Creates a sense of belonging and awareness among students through communication, towards shaping mind-sets and building a more cohesive culture.
5. Supports the student learning journey through personalised tutor-led mentoring.

The learning and teaching methods employed in this course will provide students with a range of opportunities to develop the skills necessary to apply cyber security principles and practice to a variety of situations.

### **Teaching**

Students are taught through a combination of interactive workshops, lectures, seminars, laboratory practical sessions, practical activities, etc. Some examples include:

Interactive workshops take a variety of formats and are intended to enable the application of learning through discussion and small group activities and can incorporate short lectures, worksheets and tutor supported activities.

Flipped lectures where lecture content and activities are provided prior to an interactive workshop to provide background and context to the sessions.

Seminars enable the discussion and development of understanding of topics covered in lectures, and laboratory practical sessions are focused on developing subject specific skills and applied individual and group project work.

We also make use of real-world case studies, oral presentations, mock examinations, hands-on experience working with contemporary data analytic tools and programming environments, guest speaker inputs, and self-directed research. Students do not merely learn in isolation and using the university Virtual Learning Environment allows for online collaborative activities to take place.

In addition, meetings with Personal Academic Tutors are scheduled on at least four occasions in the first year and three occasions in each of the other years of a course.

The University places emphasis on enabling students to develop the independent learning capabilities that will equip them for lifelong learning and future employment, as

well as academic achievement. A mixture of independent study, teaching and academic support from Student Services and Library Services, and the Personal Academic Tutoring system enables students to reflect on progress and build up a profile of skills, achievements and experiences that will help them to flourish and be successful.

### **Contact time**

In a typical week students will have 12 contact hours of timetabled teaching in lectures, seminars and small-group work. This is in the form of on campus face-face teaching in groups of around 30 students. In the final year there is normally slightly less contact time in order to do more independent study.

Typically, class contact time will be structured around:

- Information giving, facilitated discussions, small group work, presentations.
- Practical skills – the opportunity to practise group facilitation, presentation, communication and listening skills.
- Visiting speakers and opportunities to visit other settings are regular features of the course.
- Most teaching will take place in state-of-the-art PC labs using a variety of software specific to each module.

### **Independent self-study**

In addition to the contact time, full-time students are expected to undertake around 24 hours of personal self-study per week, plus additional preparation for assessments and examinations. Typically, this will involve meeting with individual tutors to discuss progress and feedback, completing activities, creating and testing artefacts, reading journal articles and books, working on individual and group projects, undertaking research in the library and online.

These activities, challenges and further reading are posed via the University Virtual Learning Environment. Students will also have access to software and other services required for independent studies available for use on University lab machines or for download for home use where possible.

In addition to this, students will spend time sharing ideas with fellow students, taking part in extra-curricular learning activities and engaging with external employers.

Independent learning is supported by a range of excellent learning facilities, including the Hive and library resources, the virtual learning environment, and extensive electronic learning resources as well as our network of employers and entrepreneurs.

### **Teaching staff**

Students will be taught by a teaching team whose expertise and knowledge are closely matched to the content of the modules on the course. The team includes senior academics and professional practitioners with industry experience.

Teaching is informed by research and consultancy, and 8 lecturers on the course have a higher education teaching qualification or are Fellows of the Higher Education Academy. Teaching is informed by the research and consultancy work carried out by staff and staff profiles can be view at the [WBS Staff Profile Page](#).

### **Assessment**

The course provides opportunities to test understanding and learning informally through the completion of practice or 'formative' assignments. Each module has one or more formal or 'summative' assessment which is graded and counts towards the overall module grade.

Across each individual year and cumulatively across all three years the concept of continuous assessment and/or building up expertise in different assessment types applies. This includes expanding upon and enhancing previous artifacts culminating in a final year project.

Different types of employability skills are embedded in all modules including technical presentation, problem decomposition and design, build and test skills. A variety of assessment types (reports, portfolios, presentations, essays and a final year research or consultancy project) are designed to suit different learning styles.

The summative assessment pattern for the course is:

Module	Essay	Practical Assessment	Report	Presentation	Exam	Project	Portfolio of Practice	Case Study
	Percentage weighting of assessment							
COMP1421	20	25		30	25			
COMP1441		100						
COMP1447		15				35	50	
COMP1457					100			
COMP1482			75	25				
COMP2411						50	50	
COMP2421						70		30
COMP2452			60		40			
COMP2453			60	40				
COMP2461				25			75	
COMP2462							100	
COMP3410			50	50				
COMP3411			60	40				
COMP3409				20			80	
COMP3457			50	50				
COMP3471			50	50				
COMP3401						100		

#### 14. Assessment strategy

The Assessment strategy has been designed to provide a variety of challenges appropriate to students studying on an academic undergraduate programme in a STEM subject that has high variability in terms of application domain. Modules include assessments which encourage the development of academic and employability skills, wider reading and research and advanced scholarship.

Assessments are heavily focussed on practical applications related to real-world problems. Examples include:

- Portfolios of practice contain artefacts such a software code or design of system architectures alongside reflective commentary and discussion.
- Practical assessment of problem solving related to an artifact within a time restricted, classroom or case study setting.
- Reporting or presenting an artifact or finding related to an artifact to a variety of audiences.

An appropriate balance of formative and summative assessments is included. The assessment structure has been developed to support student learning by providing assessment procedures that reflect the nature of the learning experience of each module, and by ensuring that the students are able to demonstrate ability in a wide range of qualities and skills appropriate to the course. The assessment pattern is continuous in many cases allowing student to build upon and enhance their previous work. This structure is under continuous review via WBS quality enhancement procedures including student feedback, comments from the external examiner and other review processes.

Study and assessment at Level 4 is seen as being a formative process in preparation for Levels 5 and 6 when grades count towards the final degree classification. Most assessment methods that are used at Levels 5 and 6 will be initially encountered by students at Level 4. As a student progresses through the levels there is a stronger emphasis on critical synthesis and evaluation.

Marking of student work is internally and externally verified. Typically work is anonymously marked, except where this is impracticable (e.g., oral presentations). Student work is graded according to the University's Generic Grade Descriptors Levels 4–6. Specific assessment criteria, which reflect the Intended Learning Outcomes are also published for each assessment. Constructive, timely and relevant feedback is an integral part of the assessment process.

## 15. Programme structures and requirements

<b>Course Title: BSc (Hons) Cyber Security</b>
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### Level 4

<b>Module Code</b>	<b>Module Title</b>	<b>Credits (Number)</b>	<b>Status (Mandatory (M) or Optional (O))</b>
COMP1421	Foundations of Computing	30	M
COMP1441	Web Technologies	30	M
COMP1447	Introduction to OO Programming	30	M
COMP1482	IT Systems Fundamental	15	M
COMP1457	Introduction Cyber Security	15	M

#### Single Honours Requirements at Level 4

Single Honours students must take 120 credits in total drawn from the table above to include all mandatory modules COMP1421, COMP1441, COMP1447. COMP1482, COMP1457.

## Level 5

Module Code	Module Title	Credits (Number)	Status (Mandatory (M) or Optional (O))
COMP2411	Systems Analysis & Design	30	M
COMP2421	Distributed Systems	30	M
COMP2452	Operating Systems	15	M
COMP2453	Computer Forensics	15	M
COMP2461	Mobile Application Development	15	M
COMP2462	Interaction Design	15	M

### Single Honours Requirements at Level 5

Single Honours students must take 120 credits in total drawn from the table above to include all mandatory modules COMP2411, COMP2421, COMP2452, COMP2453, COMP2461, COMP2462.

## Level 6

Module Code	Module Title	Credits (Number)	Status (Mandatory (M) or Optional (O))
COMP3401	Computing Project ( <i>Dissertation-equivalent module</i> )	30	M
COMP3410	Ethical Hacking	30	M
COMP3411	Secure by Design	15	M
COMP3457	Managing Cyber Risks	15	M
COMP3471	Cyber Security	15	M
COMP3409	Internet of Things	15	M

### Single Honours Requirements at Level 6

Single Honours students must take 120 credits from the table above to include all mandatory modules COMP3401, COMP3410, COMP3411, COMP3457, COMP3471, COMP3409

## 16. QAA and professional academic standards and quality

The academic standards for the programme have been set and are maintained in accordance sector recognised standards (B5, OfS, 2022) drawn from 'The Frameworks for Higher Education Qualifications of UK Degree Awarding Bodies' published in October 2014

The QAA (2022) Subject Benchmark Statement Computing articulates the knowledge, skills and categories of achievement to be expected of successful honours graduates in the field. These have been used to craft module learning outcomes and content as well as learning, teaching and assessment strategies of all modules.

This award is located at Level 6 of the [OfS sector recognised standards](#).

### Professional Bodies

Computing related modules have been mapped to take advantage of curriculum recommendations and aims developed by three professional bodies (BCS, (British

## 17. Support for students

### General approaches to student support

The fundamental approach of Worcester Business School to student support is centred on the need to motivate and inspire our students. Given the nature of the subject material, the need for *active learning* is emphasised through the award.

Students are supported during in-class activities with verbal formative feedback on their progress during seminar activities. They are also supported on a one-to-one basis, as required, outside the classroom through individual tutorials. Tutors allocate timetabled office hours to support student learning.

### Student induction

Worcester Business School runs a week of induction events at the start of the academic year. This varies in detail from year to year but includes the following elements: Introduction to the course, introduction to fellow students, introduction to UW support services, meetings with academic tutors, introduction to key IT systems and services and library resources, introduction to study skills.

Support is available beyond Induction Week to ensure that students receive appropriate support at the point of need through the WBS Professional Administrative Services and Personal Academic Tutoring.

### Personal Academic Tutoring

Each student has a nominated Personal Academic Tutor (PAT) to provide academic advice and guidance, personal development planning and pastoral support as appropriate throughout their programme of study. In most cases a student will be allocated the same tutor throughout their studies. Key aspects of the role include:

- To support the academic development of students throughout their studies.
- To act as the first point of call for any tutees experiencing issues or problems arising whilst at University.
- To provide the official University reference for tutees
- To advise students on individual course options, module selection and academic planning.
- To identify when a student is 'at-risk' due to lack of engagement or poor performance and implement a suitable intervention.

Whilst students can make an appointment to meet with their PAT at any point there are additionally four specific meetings held each year to review and reflect on progress and to provide support for future planning such as careers, time management, module selection and assignment support. In each semester:

- An initial group meeting is held at the beginning of the semester to provide an opportunity to share and reflect on their expectations for the coming semester.
- A follow-up one-one meeting is held around mid-semester to review progress and identify potential challenges with modules, workload management and assignments.

In addition, to the above, the following activities and documents have been put in place to provide development and support for undergraduate students at Worcester Business School:



- Student Handbooks are provided for the Course.
- Module outlines which include module code, module title, level, planned teaching activities, attendance requirements, assessment briefs, assessment criteria and reading lists.
- Learning and study guides, including bespoke guides for Work Placements and assessed projects.
- A Virtual Learning Environment to provide module-specific material, documents, activities and networking, as well as more general announcements and updates.
- Course Leaders to advise on curriculum and other course-related issues.
- A Placements Coordinator who runs a programme of workshops and other support arrangements and activities to prepare students for the placement year and other work experience opportunities. Placement students will be further supported by a dedicated tutor during their placement experience.

<https://www2.worc.ac.uk/firstpoint/>

<https://www.worcester.ac.uk/life/help-and-support/services-for-students/home.aspx>

<https://www2.worc.ac.uk/disabilityanddyslexia/>

## 18. Admissions

### Admissions policy

The University aims to be accessible; it is committed to widening participation and encouraging diversity in the student population. Worcester Business School works closely with central student support services including the Admissions Office, the Disability & Dyslexia Service and the International Recruitment Team to support students from a variety of different backgrounds. We actively encourage and welcome applications from people from the widest range of economic and cultural backgrounds and value the contribution of mature learners.

### Entry requirements

The normal minimum entry requirement for undergraduate degree courses is the possession of 4 GCSEs (Grade C/4 or above and including English and Maths) and a minimum of 2 A Levels (or equivalent Level 3 qualifications).

The current UCAS Tariff requirements for entry to this course are published in the prospectus and on the UW website <https://www.worc.ac.uk/journey/a-z-of-courses.html>

See [Admissions Policy](#) for other acceptable qualifications.

### Recognition of Prior Learning

Details of acceptable Level 3 qualifications, policy in relation to mature students or applicants with few or no formal qualifications can be found in the prospectus or on the University webpages. Information on eligibility for recognition of prior learning for the purposes of entry or advanced standing is also available from the University webpages or from the Registry Admissions Office (01905 855111).

Further information on Recognition of Prior Learning can be found at <http://www.worcester.ac.uk/registryservices/941.htm>

### Admissions procedures

Full-time applicants apply through UCAS (H651)

Part-time applicants apply directly to University of Worcester (UW)

### Admissions/selection criteria

Offers will be conditional against successful meeting of entry requirements. Evidence from personal statements and/or references included with the application form will be considered in order to ascertain a candidate's ability to demonstrate enthusiasm for the subject, commitment to study and the academic capability to succeed on the BSc (Hons) Cyber Security course.

## **19. Regulation of assessment**

### **The course operates under the University's Taught Courses Regulatory Framework**

#### **Requirements to pass modules**

- Modules are assessed using a variety of assessment activities which are detailed in module specifications.
- The minimum pass mark is D- for each module.
- A student is required to submit all items of assessment in order to pass a module, and in some modules, a pass mark in each item of assessment may be required.
- Full details of the assessment requirements for a module, including the assessment criteria, are published in the module outline.

#### **Submission of assessment items**

- A student who submits course work late but within 7 days (one week) of the due date will have work marked, but the grade will be capped at D- unless an application for mitigating circumstances is accepted.
- A student who submits work later than 7 days (one week) will not have work marked unless they have submitted a valid claim of mitigating circumstances.
- For full details of submission regulations please see the Taught Courses Regulatory Framework.

#### **Retrieval of failure**

- A student is entitled to resit failed assessment items for any module that is awarded a fail grade.
- Reassessment items that are passed are capped at D-.
- If a student is unsuccessful in the reassessment, they have the right to retake the module (or, in some circumstances, take an alternative module); the module grade for a re-taken module is capped at D-.
- A student will be notified of the reassessment opportunities in the results notification issued via the secure student portal (SOLE). It is the student's responsibility to be aware of and comply with any reassessments.

#### **Requirements for Progression**

- A student will be permitted to progress from Level 4 to Level 5 if, by the time of the reassessment Board of Examiners, they have passed at least 90 credits at Level 4. Outstanding Level 4 credits must normally be studied in the following academic year.
- A student will be permitted to progress from Level 5 to Level 6 if, by the time of the reassessment Board of Examiners, they have passed at least 210 credits, including 90 credits at Level 5. Outstanding Level 5 credits must normally be studied in the following academic year.

- A student who, by the time of the reassessment Board of Examiners, has failed 90 credits or more (after exhausting all reassessment opportunities) during the academic year, will have their registration with the University terminated
- If a student has not passed at least 90 credits by the reassessment Board of Examiners, the student is not permitted to progress to the next level and will be required to either complete outstanding reassessment or retake the failed modules the following academic year. Students will be able to carry forward any passed modules.

### Requirements for Awards

Award	Requirement
Certificate of Higher Education Cert HE Cyber Security	In order to be eligible for the exit award of Certificate in Higher Education in the named subject/area of study, a student must have passed at least 120 credits in total including the mandatory modules for Level 4 of the award as specified on the award map.
Diploma of Higher Education DipHE Cyber Security	In order to be eligible for the exit award of Diploma in Higher Education in the named subject/area of study, a student must have passed at least 240 credits in total including the mandatory modules for Level 4 and Level 5 of the award as specified on the award map.
Degree (non-honours)	Passed a minimum of 300 credits with at least 90 credits at Level 5 or higher and a minimum of 60 credits at Level 6, including the mandatory modules for Level 5 and Level 6 of the award (not the Dissertation/Project module) as specified on the award map.
Degree with honours	Passed a minimum of 360 credits with at least 90 credits at Level 5 or higher and a minimum of 120 credits at Level 6, as specified on the award map.

### Classification

The honours classification will be determined by whichever of the following two methods results in the higher classification.

- Classification determined on the profile of the 120 credits attained at Level 5 and 120 credits at Level 6. Level 5 and Level 6 grades are weighted on a ratio of 1:2. OR
- Classification will be based on the weighted average grade together with a requirement for at least half of the Level 6 grades to be in the higher class.

For further information on honours degree classification, see the [Taught Courses Regulatory Framework](#).

## 20. Graduate destinations, employability and links with employers

### Graduate destinations

The degree prepares students for a range of interesting and challenging careers in the cyber security sector, both in the UK and overseas. Employment may be gained with a wide variety of industries due to the ubiquitous requirements for information security.

Typical roles within the Cyber Security sector might include: Security Architect, Cybersecurity Engineer, Penetration Tester, Computer Forensics Analyst.

Some organisations that Worcester Business School graduates have worked for include such prestigious firms as:

- Amazon UK
- Cisco Systems
- DHL
- Enterprise
- HSBC
- Mazda
- Sainsburys
- Vodafone
- Worcester Bosch

### **Student employability**

Students studying BSc (Hons) Cyber Security have the opportunity to take a 4-year sandwich degree with a UK or international placement year, normally in the third year of the programme. Students can apply for opportunities in the UK at a large number of well-known organisations across a wide range of industry sectors with support offered by the Worcester Business School placements office.

A range of opportunities are provided to enhance students' employability. Students will benefit from the close links that have been developed with local and national employers. This includes guest speakers, industry visit days and a final project showcase event. Further careers guidance is available through the University of Worcester Career Advisory Service and periodic Career Fairs are organised by Student Services.

Strategies used to embed employability into the curriculum and enhance graduate employability within the Cyber Security sector include:

- the option of a paid placement year
- the integration of learning outcomes that meet key Graduate Attributes.
- access to a broad network of business managers and employers
- employment preparation includes mock interviews and meetings with employers
- final projects defined in collaboration with industry partners
- a final year project showcase attended by industry partners
- opportunities to engage in real-world and practical activities throughout your course.

### **Links with employers**

Worcester Business School aims to promote closer links with employers has worked with a number of business clients in developing and delivering its programmes. This is supported by its Industry Advisory Group, which meets on a regular basis to inform the design and development of all Computing courses.

Industry partners also engage with our course at a more fine-grained level by providing guest speaker, industry visit days and contributions to final year projects.

These professional and business networks also involve external events, many of which are open to students, as well as employers. The school liaises with external agencies, such as the Institute of Directors, Federation of Small Businesses, Chamber of Commerce and Confederation of British Industry.

**Please note:** This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in associated course documentation e.g., course handbooks, module outlines and module specifications.