
BSc (Hons) Top-Up Computing and Digital Technologies

Programme Quality Handbook

Last validated in July 2024

Date of Last Review: August 2024

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Programme specification

1. Overview / factual information

Programme/award title(s)	Programme: BSc (Hons) Computing and Digital Technologies Top-up Award: BSc (Hons) Computing and Digital Technologies
Teaching Institution	University Centre Somerset, part of Bridgwater and Taunton College
Awarding Institution	The Open University (OU)
Date of first OU validation	March 2019; Major Change Nov 2021
Date of latest OU (re)validation	February 2024
Next revalidation	2028/2029
Credit points for the award	120 credits Level 6 Total - 120 credits – BSc (Hons)
UCAS Code	I161
HECoS Code	100367 Computing and Information Technology
LDCS Code (FE Colleges)	N/A
Programme start date and cycle of starts if appropriate.	September 2024
Underpinning QAA subject benchmark(s)	QAA Subject Benchmark Statement for Computing March 2022
Other external and internal reference points used to inform programme outcomes. For apprenticeships, the standard or framework against which it will be delivered.	Framework for Higher Education Qualifications (FHEQ) 2014 Foundation Degree Characteristics Statements 2020 SEEC Credit Level Descriptors 2021 NCSC The Cyber Assessment Framework (CAF) Version 3.1 Higher Apprenticeship Software Developer (ST0116) Degree Apprenticeship Digital and Technology Solutions Professional (ST0119)
Professional/statutory recognition	N/A

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 they take 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 student module guide(s) and the students handbook.

The accuracy of the information contained in this document is reviewed by the University and may be verified by the Quality Assurance Agency for Higher Education.

For apprenticeships fully or partially integrated Assessment.	N/A
Mode(s) of Study (PT, FT, DL, Mix of DL & Face-to-Face) Apprenticeship	Full-Time Face-to-Face and Part-Time Face-to-Face
Duration of the programme for each mode of study	1 year Full-Time 2 years Part-Time
Dual accreditation (if applicable)	N/A
Date of production/revision of this specification	February 2024

2. Programme overview

2.1 Educational aims and objectives

- To provide a comprehensive study of the theory and principles underlying computing and digital technologies, with a strong focus on industry standard skills and practices.*
- To cultivate a high level of expertise in students through the application, integration, and critical evaluation of a diverse range of innovative computing and digital technologies.*

- *To foster the ability to use, compare, and critically assess various formal and informal techniques, theories, and methods applied to software development, web application development, networking, and cybersecurity.*
- *To provide opportunities for graduates to apply existing and emerging technologies to a range of novel applications.*
- *To develop understanding of cutting-edge technologies including machine learning, artificial intelligence, extended reality and Internet of Things and how they can be applied to a range of purposes across all areas of computing.*
- *To offer insights into the ethical, social, and sustainability implications of the computing and digital industries, preparing students for responsible professional practice.*
- *To provide opportunities for real-world experience and innovative problem-solving in the computing and digital industry through industry placements, team projects, and partnerships with regional, national, or international employers.*
- *To develop in students the ability to undertake complex projects with minimal supervision, effectively managing their time and workload.*
- *To enhance interpersonal skills, enabling students to take responsibility for their own professional development and innovation skills.*
- *To produce graduates who are well-equipped to make significant and innovative contributions to the computing and digital sector.*
- *To cultivate professional knowledge and skills that empower students to analyse problems, synthesise innovative solutions, collaborate effectively, and adapt to a rapidly evolving technological landscape.*
- *To align the programme with industry standards and occupational benchmarks, thereby enhancing the employability and professional standing of graduates, with a focus on innovative practices.*
- *To nurture and develop the next wave of digital innovators who are well-equipped to lead and contribute to advancements in the computing and digital sector.*

2.2 Relationship to other programmes and awards

(Where the award is part of a hierarchy of awards/programmes, this section describes the articulation between them, opportunities for progression upon completion of the programme, and arrangements for bridging modules or induction)

The programme is accessible as a progression route to students with various relevant qualification pathways within the subject area, including Foundation Degree or HND.

On successful completion of the BSc (Hons) Computing and Digital Technologies Top-up students can elect to continue onto post-graduate study (subject to meeting course entry requirements at their chosen institution), seek employment in the computing industry or enter teaching.

The course content (Levels 6) mirrors year 3 of the full BSc (Hons) Computing and Digital Technologies qualification.

2.3 For Foundation Degrees, please list where the 60-credit work-related learning takes place. For apprenticeships an articulation of how the work based learning and academic content are organised with the award.

N/A

2.4 List of all exit awards

- *BSc Computing and Digital Technologies. (Ordinary Degree) - Requires 60 credits at Level 6.*

3. Programme structure and learning outcomes

Programme Structure - LEVEL 6 Full Time					
Compulsory modules	Credit points	Optional modules	Credit points	Is module compensatable?	Semester runs in
SCDV61 Secure Software Design	20			Yes	A, B
SCDV62 Human Computer Interaction	20			Yes	A, B
SCDV63 Ethical Hacking	20			Yes	A, B
SCDV64 Cloud Infrastructure Design and Deployment	20			Yes	A, B
SCDV65 Individual Capstone Project	40			No	A, B

Level 6 Exit Awards:

BSc Computing and Digital Technologies (Ordinary Degree). Requires 60 credits at Level 6.

Programme Structure - LEVEL 6 Part-time Yr. 1					
Compulsory modules	Credit points	Optional modules	Credit points	Is module compensatable?	Semester runs in
SCDV61 Secure Software Design	20			Yes	A, B
SCDV62 Human Computer Interaction	20			Yes	A, B
SCDV63 Ethical Hacking	20			Yes	A, B

Level 6 Exit Award:

BSc Computing and Digital Technologies (Ordinary Degree). Requires minimum 60 credits at Level 6.

Programme Structure - LEVEL 6 Part-time Yr. 2					
Compulsory modules	Credit points	Optional modules	Credit points	Is module compensatable?	Semester runs in
SCDV64 Cloud Infrastructure Design and Deployment	20			Yes	A, B
SCDV65 Individual Capstone Project	40			No	A, B

Level 6 Exit Award:

BSc Computing and Digital Technologies (Ordinary Degree). Requires minimum 60 credits at Level 6.

Intended learning outcomes at Level 6 are listed below:

<u>Learning Outcomes – LEVEL 6</u>	
3A. Knowledge and understanding	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>PA5 Demonstrate a comprehensive understanding of the main body of knowledge in computing and digital innovation including core principles, practices, concepts including the stages of developing digital solutions, and the relationships between them.</p> <p>PA6 Demonstrate a comprehensive understanding of the professional, economic, social, environmental, moral and ethical issues involved in the development, innovation and management of computing and digital solutions.</p>	<p>At Level 6, students are expected to consolidate their critical knowledge and understanding of new material and to take greater responsibility for the selection of concepts, principles and methodology needed to analyse, synthesise and evaluate particular systems, processes and products in a range of contexts.</p> <p>Students undertake a major individual project addressing the development of PA5 and PA6 in focussing on aspects of the project life cycle of a specific computer system. The project is designed to allow students to integrate and contextualise their understanding skills and abilities in a supportive and semi-structured environment.</p>

<u>Learning Outcomes – LEVEL 6</u>	
3A. Knowledge and understanding	
	<p>Assessment</p> <p>Formal assessment of knowledge and understanding is through coursework which will include practical work, case study reports and project work and documentation.</p>
3B. Cognitive skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>PB5 Creatively and innovatively solve complex problems through applying appropriate principles, practices and concepts; and through exercising critical and refined judgement in the selection of tools for the specification, design, implementation, testing and evaluation of computing and digital solutions.</p>	<p>At Level 6 individual project work addresses PB5 and PB6, in which student learning includes an appreciation of the open-endedness and incompleteness of knowledge in practical computer problems.</p> <p>Throughout Level 6, the learner is encouraged to undertake independent study both to supplement and consolidate what is being taught/learnt</p>

3B. Cognitive skills	
<p>PB6 Critically evaluate technical and specialist information, concepts, arguments, assumptions and evidence derived from a wide variety of sources to devise an innovative digital solution to a complex computer-based problem.</p>	<p>and to broaden their individual cognitive skills and understanding of the subject.</p> <p>Some material will be presented via lectures and tutorials, but a significant component will be gained through self-study, some of it unguided.</p> <p>Assessment</p> <p>Formal assessment of cognitive skills is through coursework which will include presentations, case study reports, practical and project work.</p>

3C. Practical and professional skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>PC5 Manage learning with confidence and autonomy adhering to professional codes of conduct, legal and ethical frameworks; and industry standard practices required in the computing and digital sector.</p> <p>PC6 Propose, research, and undertake innovative project activity through proficient communication and planning; and report a devised solution for a complex computer-related problem in a structured manner, under minimal supervision.</p>	<p>At Level 6 practical and professional skills are acquired mainly through the implementation of a major computing project, in which the students will need to independently undertake technical research conducted professionally and following the scientific method. Coursework and practical laboratories are also used to deliver practical and professional skills.</p> <p>The self-defined and individually managed major project offers enhanced opportunities for developing either a wider range of professional skills, or developing specific practical skills to higher levels of proficiency.</p> <p>Throughout Level 6, the learner is encouraged to develop practical skills further by undertaking independent study.</p> <p>Assessment</p> <p>Formal assessment of practical and professional skills is through coursework which will include practical work, written reports and team</p>

3C. Practical and professional skills	
	project work. In addition, all Level 6 learning outcomes are assessed within the major computing project SCDV65 Individual Capstone Project.

3D. Key/transferrable skills	
Learning outcomes:	Learning and teaching strategy/ assessment methods
<p>PD5 Conduct research effectively, drawing on a wide variety of sources under minimal direction, and be proficient in the use of referencing sources of information, complying with best-of-kind practices within a professional, legal and ethical framework.</p> <p>PD6 Apply sophisticated judgement, critical thinking and research design when problem solving to create effective computational systems for complex problems and situations, with a high degree of autonomy.</p>	<p>At Level 6 transferrable skills will be addressed using lectures and tutorials for the presentation of instructional material, with practical, independent study and project work offering the opportunity to practice the skills in a supportive environment.</p> <p>The students are being expected to take an increased responsibility for developing their own transferrable skills and identifying resources to support this development. Throughout, the learner is encouraged to develop key transferrable skills further by undertaking independent study and research.</p>

3D. Key/transferable skills	
	<p>Assessment</p> <p>Formal assessment of key transferable skills will be undertaken via a combination of presentations, case studies reports, practical and project work.</p>

4. Distinctive features of the programme structure

- **Where applicable, this section provides details on distinctive features such as:**
 - where in the structure above a professional / placement year fits in and how it may affect progression
 - any restrictions regarding the availability of elective modules
 - where in the programme structure students must make a choice of pathway/route
- **Additional considerations for apprenticeships:**
 - how the delivery of the academic award fits in with the wider apprenticeship
 - the integration of the 'on the job' and 'off the job' training
 - how the academic award fits within the assessment of the apprenticeship

Overall Programme:

- *The programme covers an expansive range of computing topics such as software development, web application development, networking and cyber security, plus the applications of machine learning, artificial intelligence, extended reality, IoT and other cutting-edge technologies to those topics, ensuring a well-rounded academic experience.*
- *The programme places a strong emphasis on digital innovation, emerging technologies, and sustainability, equipping graduates with the skills and knowledge to navigate the rapidly evolving technological landscape.*
- *The programme offers real-world experience through industry placements and team projects, providing valuable networking opportunities and practical skills.*
- *The programme incorporates various modes of delivery, including full-time, part-time, and face-to-face options, offering flexibility to accommodate different learning needs.*
- *The programme utilises innovative and creative assessments such as portfolios, presentations, demonstrations, walk-through, controlled assessment and projects, thereby minimising the potential misuse of generative AI.*

At Level 6:

- *The programme provides in-depth knowledge and skills in cutting-edge areas like secure design practices and cloud deployment, preparing students for a range of computing professions.*

- *Underlying topics that are applied to a wide range of specialisms within computing including AI, Machine Learning, VR and IoT are taught across modules instead of being distinct modules to develop understanding of how such tools are used across the industry.*
- *Specialised modules in Secure Software Design, Ethical Hacking, Cloud Infrastructure Design and Deployment and Human Computer Interaction provide learners the opportunity to develop high level specialised skills in innovative design and encourage creative solution development skills.*
- *Students undertake a major capstone project, allowing them to conduct independent research and gain practical experience in a chosen specialised area.*
- *Training with industry-standard software, industry standard materials and latest methodologies enhances the employability of graduates, equipping them with the skills needed for the modern workplace.*

5. Support for students and their learning

(For apprenticeships this should include details of how student learning is supported in the workplace)

Tutorials and Workshops

Tutorials and workshops are a crucial part of the learning process, as students have the opportunity to analyse problems and discuss issues in depth. Students should come to these sessions prepared to participate fully as these are a key means of facilitating active learning. These sessions are invaluable in developing independent learning; critical thinking and stronger analytical skills facilitating a process that encourages students to develop many of the key skills employers look for in the computing and digital industries. Students receive tutorial sessions and full-time first year learners also have independent enrichment sessions. Tutorials focus on the development of academic and professional skills including the development of a professional digital portfolio. Enrichment is focused on further developing technical skills on a chosen area of computing. These sessions allow students to have one-to-one tutorials with their personal tutor to discuss any personal, professional or academic issues.

Other Academic Support

In addition to timetabled teaching, there are other academic sessions and resources available for students. This is part of a deliberate strategy to help develop and manage students' own learning and provide high-quality pastoral support. This other academic support includes:

- Formative and summative feedback on assessed work – to help develop knowledge, understanding and skills through undertaking assessments and practical projects;
- Tutorials – Students have timetabled tutorials where work can be discussed with subject tutors. Students can also arrange to meet tutors to discuss work;
- The Learning Resource Centre (LRC) is available for study skills session. Students will also undergo the HEADStart (Higher Education Academic Development) study skills programme as part of their Tutorial provision. This programme covers academic skills including researching, referencing and academic writing.
- Additional learning support – many of our students benefit from the additional learning support by our dedicated Additional Learning Support team. This support is tailored to each student's individual support need to support students with general study skills as well as specialist additional support in close collaboration with the course programme team;
- College Virtual Learning Environment, Student Portal and email. Some staff use these to initiate discussions and set up learning support groups for their modules;
- Electronic learning – Access to eBooks, electronic journals and research papers as well as resources such as eBook readers and laptop computers all serve to facilitate and support student learning and research practice.

6. Criteria for admission

<i>(For apprenticeships this should include details of how the criteria will be used with employers who will be recruiting apprentices.)</i>	
GCSEs required at Grade 4 or above	Maths and English GCSE subjects at 9 - 4 (or grades A* - C)
Other formal awards	FD, HND or Level 5 qualification in related field
Other non-standard awards or experiences / mature students	Mature students who do not meet these formal entry requirements are welcome to apply, if they can evidence their commitment to the subject through previous experience.
Interview/portfolio requirements	Interview
Disclosure and Barring Services (DBS) Check – (formerly CRB check)	No

7. Language of study

All teaching, learning and assessment is conducted in English.

If English is not an applicant's first language they will be asked to provide evidence of their English language ability in order to apply and start the course.

The standard English language requirement for entry is IELTS 6.0 with a minimum of 5.5 in any one paper, or equivalent.

8. Information about non-OU standard assessment regulations (including PSRB requirements)

There will be no exceptions to the academic regulations of The Open University/University Centre Somerset.

The Open University Academic Regulations are available on the University Centre Somerset website at <http://somerset.ac.uk>.

9. For apprenticeships in England End Point Assessment (EPA)

(Summary of the approved assessment plan and how the academic award fits within this and the EPA)

N/A

10. Methods for evaluating and improving the quality and standards of teaching and learning

All programme teams participate in Annual Programme Monitoring during their Programme Committee Meeting every Autumn. This process involves obtaining student views as well as the views of the staff that delivered each module and where appropriate may consider the views of employers who have been involved with the programme. In order to ensure robust evaluation, the programme team also consider student opinion, programme statistics, (including retention, achievement, gender and ethnicity), and student survey results, in addition to the External Examiner report.

The programme team produces an action plan based on their evaluation to assist in bringing about the developments they have identified. Each Spring the Programme Committee Meeting is held again to review progress with the action plan and to canvas opinions from staff, students and employers connected to the programme. This evaluation process is overseen by the cross-college HE Senate, the Senate receives summary reports of all HE matters each term and produces and monitors a top-level cross-college HE Enhancement Action Plan as a result.

Frequent Continuing Professional Development (CPD) sessions are run at the College for academic staff, to share good practice and to support effective teaching, learning and assessment. Peer Review is used at UCS. It is a supportive and productive developmental tool where staff observe each other.

University Centre Somerset has a formal structure for hearing the student voice. Student representatives from each group gather views that are widely felt, strongly felt and achievable and report these to the twice-yearly Programme Committee Meetings.

In addition to this the Learning Resource Centre gain feedback, which helps them to improve their service to learners.

Students are requested to complete written surveys including the Student Perception Questionnaire, in order to formally record their impressions of the programmes. The HE Student Governor provides the student voice at Senate meetings which oversee HE provision at UCS, and at the Board of Governors.

These mechanisms are all designed to evaluate and improve the quality and standards of teaching and learning and the student experience.

11. Changes made to the programme since last (re)validation

N/A

Annexe 1 - Curriculum map

This table indicates which study units assume responsibility for delivering (shaded) and assessing (✓) particular programme learning outcomes.

Level	Study module/unit	Programme outcomes							
		PA5	PA6	PB5	PB6	PC5	PC6	PD5	PD6
6	SCDV61 Secure Software Design			✓		✓			
	SCDV62 Human Computer Interaction	✓					✓		
	SCDV63 Ethical Hacking		✓						
	SCDV64 Cloud Infrastructure Design and Deployment				✓				✓
	SCDV65 Individual Capstone Project		✓	✓	✓	✓	✓	✓	✓

Module Specifications

*SCDV61 Secure Software Design
Module Specification*

1. Factual information			
Module title	SCDV61 Secure Software Design		
Module tutor	Jenetha James	Level	6
Module type	Taught	Credit value	20
Mode of delivery	Taught face-to-face		
Notional learning hours	200		

2. Rationale for the module and its links with other modules
<p>This module challenges students to build on their existing software development skills and their knowledge of industry standard software engineering practices and apply them to the specific focus of the development of secure software applications. The module will explore the standards and protocols used in secure software design and apply those to the design, build and testing of a secure software artifact in line with industry standard quality assurance practices. This module builds on SCDV51 Software Engineering and has cross over links to SCDV63 Ethical Hacking.</p>

3. Aims of the module
<ul style="list-style-type: none"> • To explore the utilisation of secure coding standards and practices including the concept of secure software design • To develop students' skills in the application of secure software solutions and coding standards to the development process. • To give students the opportunity to design, build and test a secure application with particular emphasis on secure design and subsequent security testing of the software.

4. Pre-requisite modules or specified entry requirements
SCDV51 Software Engineering

5. Is the module compensatable?
Yes

6. Are there any PSRB requirements regarding the module?
No

7. Intended learning outcomes		
A. Knowledge and understanding	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>At the end of the module, students will be expected to:</i></p> <p>A1 Synthesise the core concepts, tools and practices involved in the development of secure software</p>	PA5	<p>Lectures</p> <p>Practical workshops</p> <p>Seminars</p> <p>Online Learning</p>
B. Cognitive skills	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>At the end of the module students will be expected to:</i></p> <p>B1 Critically analyse software coding standards and practices in relation to their use in development of secure software.</p>	PB5	<p>Lectures</p> <p>Practical workshops</p> <p>Seminars</p>

C. Practical and professional skills	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>At the end of the module, students will be expected to:</i></p> <p>C1 Utilise secure software development methodologies in the design, build and testing of a secure application in line with industry standard quality assurance practices</p>	PC5	<p>Practical workshops</p> <p>Seminars</p>

D Key transferable skills	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>At the end of the module, students will be expected to:</i></p>		

8. Indicative content.
<p>During the module students will study the core concepts of secure software development including: Threat modelling, principles of least privilege, defence in depth, security by design, secure coding practices to avoid common vulnerabilities such as buffer overflows, injection attacks and insecure dependencies, secure communications, authentication and authorisation, input validation, error handling, audit trails and logging. The module will also include the use of application security testing tools including static, dynamic and interactive testing tools, dependency scanning and security linters. The module will also include the implementation of industry standard quality assurance tools and practices in the development of secure software. Finally, the unit will consider and put into practice the use of best practices including code reviews, patch management, incident response planning, secure DevOps and regulatory compliance.</p>

9. Assessment strategy, assessment methods, their relative weightings and mapping to module learning outcomes

Assessment Strategy:

Secure Software Development Toolkit: Students produce a fully referenced manual which identifies the core concepts, tools and practices involved in the development of secure software as well as analysing coding standards and practices as they relate to secure software design and development. The submission will be in the form of fully referenced manual.

Software Artefact and Documentation: Students specify, design, build and test a piece of secure software for a specific scenario. They will be required to provide full technical documentation and demonstrate the security of the software using recognised tools and practices. The submission will be in the form of a video or live demonstration of the software testing accompanied by technical documentation on the software development including quality assurance documentation using industry standard practices.

Students must pass each assessment element to achieve a grade in the module

Assessment Task	Weighting	Week submitted	Grading (Pass / Fail / %)	Module Learning Outcome(s) the assessment task maps to
Secure Software Development Toolkit	50%		%	A1, B1
Software Artefact and Documentation	50%		%	C1

10. Teaching staff associated with the module

Name and contact details

Jenetha James (Email: JamesJE@btc.ac.uk)

11. Key reading list				
Author	Year	Title	Publisher	Location
Dooley, J.	2017	Software Development, Design and Coding: With Patterns, Debugging, Unit Testing, and Refactoring	Apress	
Walkinshaw, N.	2017	Software Quality Assurance: Consistency in the Face of Complexity and Change (Undergraduate Topics in Computer Science)	Springer	

12. Other indicative text (e.g. websites)
https://www.khanacademy.org/ https://www.lynda.com/ https://ocw.mit.edu/index.html

13. List of amendments since last (re)validation		
Area amended	Details	Date Central Quality informed

*SCDV62 Human Computer Interaction
Module Specification*

1. Factual information			
Module title	SCDV62 Human Computer Interaction		
Module tutor	Andrew Maries	Level	6
Module type	Taught	Credit value	20
Mode of delivery	Taught face-to-face		
Notional learning hours	200		

2. Rationale for the module and its links with other modules
<p>This module is intended to build on the core principles of web design from SCDV42 Web Application Development and SCDV52 Full Stack Development to explore the principles behind development of highly functional and user-centred applications. The unit will study the principles of interface design required to make applications user-friendly and accessible as well as the technology required to make the design fully functional. The module will culminate in the design and deployment of an application in response to a client brief using modern and/or innovative UX solutions.</p>

3. Aims of the module
<ul style="list-style-type: none">• To review the principles of Human Computer Interaction (HCI) and user experience in relation to application development on a range of platforms• To apply the principles of HCI to the design of an application which makes use of modern and emerging technology to enhance the user experience• To equip the students with the skills to apply sophisticated judgement, critical thinking and research design when problem solving to create effective computational systems for complex problems and situations, with a high degree of autonomy.

4. Pre-requisite modules or specified entry requirements
SCDV52 Full Stack Development

5. Is the module compensatable?
Yes

6. Are there any PSRB requirements regarding the module?
No

7. Intended learning outcomes		
A. Knowledge and understanding	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>By the end of the module students will be able to:</i></p> <p>A1 Critique the principles of modern Human Computer Interaction and how they relate to the concept of UX (User Experience) in application design</p>	PA5	<p>Lectures</p> <p>Seminars</p> <p>Case studies</p> <p>Digital learning using Coursera, Microsoft Learn and AWS Training and Certification</p>
B. Cognitive skills	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>By the end of the module students will be able to:</i></p>		

C. Practical and professional skills	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>By the end of the module students will be able to:</i></p> <p>C1 Apply the principles of HCI to the development of an application which makes use of modern and emerging technology to enhance the user experience</p>	PC6	<p>Lectures</p> <p>Practical Workshops</p> <p>Digital learning using Coursera, Microsoft Learn and AWS Training and Certification</p>

D Key transferable skills	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>By the end of the module students will be able to:</i></p> <p>D1 Apply sophisticated judgement, critical thinking and research design when problem solving to create effective computational systems for complex problems and situations, with a high degree of autonomy.</p>	PD6	<p>Practical Workshops</p> <p>Seminars</p> <p>Case studies</p> <p>Digital learning using Coursera, Microsoft Learn and AWS Training and Certification</p>

8. Indicative content.

Develop core knowledge of HCI and UX principles including UCD (User Centred Design), useability, design for UX, task analysis, interaction design, information architecture, prototyping and iterative design, accessibility, cognitive psychology, human factors affecting UX and the context of use. In addition, the module will cover the advanced application of design principles of complex scenarios involving HCI, the importance of advanced testing and feedback systems as well the integration of cognitive psychology into the development of a successful application. The application of emerging technologies including AR, VR, voice recognition and “deepfake” technology to application development. Hands-on experience with prototyping tools such as Adobe XD, Framer, Unity will also be covered. The module will focus on the utilisation of high-level design and complex problem-solving methods to create highly useable applications based on the skills acquired in prior units.

9. Assessment strategy, assessment methods, their relative weightings and mapping to module learning outcomes

Assessment Strategy:

Human Computer Interaction Report: Students write a fully referenced report which critiques the principles of Human Computer Interaction making reference to currently accepted theory in the field.

Optimised UX Application Development: Students design, develop and test a quality assured application that makes use of modern and/or emerging technologies to enhance the user experience in response to a specification. The application will be extensively tested and be accompanied by a full technical documentation including a user guide.

Students must pass each assessment element to achieve a grade in the module

9. Assessment strategy, assessment methods, their relative weightings and mapping to module learning outcomes				
Assessment Task	Weighting	Week submitted	Grading (Pass / Fail / %)	Module Learning Outcome(s) the assessment task maps to
Human Computer Interaction Report	40%		%	A1
Optimised UX Application Development	60%		%	C1, D1

10. Teaching staff associated with the module
Name and contact details
Andrew Maries (mariesa@btc.ac.uk)

11. Key reading list				
Author	Year	Title	Publisher	Location
Steve Krug	2013	Don't Make Me Think, Revisited: A Common Sense Approach to Web Usability	New Riders	
Shlomo Benartzi	2015	The Smarter Screen: What Your Business Can Learn from the Way Consumers Think Online	Piatkus	
Jenifer Tidwill, Aynne Valencia–brooks, Charles Brewer	2020	Designing Interfaces	O'Reilly	

12. Other indicative text (e.g. websites)

13. List of amendments since last (re)validation		
Area amended	Details	Date Central Quality informed

*SCDV63 Ethical Hacking
Module Specification*

1. Factual information			
Module title	SCDV63 Ethical Hacking		
Module tutor	Richard Everard	Level	6
Module type	Taught	Credit value	20
Mode of delivery	Taught face-to-face		
Notional learning hours	200		

2. Rationale for the module and its links with other modules	
<p>This module builds on SCDV53 Cyber Incident Response. Learners will utilise their foundational and advanced knowledge previously attained in order to showcase specialist knowledge and skills in cyber security, specifically in relation to Ethical Hacking and System Penetration methodology. This culminates in the ability to act as a penetration tester and ethical hacker, using a wide variety of tools and techniques to fully evaluate vulnerabilities, threats and remedies within network security.</p>	

3. Aims of the module	
<ul style="list-style-type: none"> • To enable students to engage with a range of techniques that will allow an ethical hacker or penetration tester to understand their role and responsibilities identify targets (physical, virtual and human) as a part of blue team/red team/purple team activities. • To enable students to probe systems and services for vulnerabilities before documenting the exploitable resources. • To evaluate protective mechanisms, appropriate to modern computer networks and software design practices. 	

4. Pre-requisite modules or specified entry requirements	
SCDV53 Cyber Incident Response	

5. Is the module compensatable?	
Yes	

6. Are there any PSRB requirements regarding the module?	
No	

7. Intended learning outcomes		
A. Knowledge and understanding	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>At the end of the module, students will be expected to:</i></p> <p>A1 Describe and critique the roles and responsibilities of an ethical hacker and penetration tester, with consideration for legal and ethical issues.</p>	PA6	<p>Lecturers</p> <p>Seminars</p> <p>Case Studies</p> <p>Digital learning using Cisco Netacad and TryHackMe</p>
B. Cognitive skills	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>At the end of the module students will be expected to:</i></p> <p>B1 Critically select appropriate tools and techniques that could be used to both attack and defend in given cyber security scenarios and interpret results from a range of tools and documenting findings in an appropriate manner.</p>	PB6	<p>Lecturers</p> <p>Seminars</p> <p>Case Studies</p> <p>Practical Work</p> <p>Digital learning using Cisco Netacad and TryHackMe</p>

C. Practical and professional skills	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>At the end of the module, students will be expected to:</i></p> <p>C1 Perform penetration testing as a member of the blue team/red team/purple team for a penetration testing service and produce detailed documentation of operations undertaken and the corrective measures needed to ensure future security.</p>	PC6	Lecturers Seminars Case Studies Practical Work Digital learning using Cisco Netacad and TryHackMe

D Key transferable skills	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>At the end of the module, students will be expected to:</i></p> <p>D1 Apply critical and thinking skills and using an analytical approach to ethical hacking and penetration testing.</p>	PD6	Lecturers Seminars Case Studies Practical Work Digital learning using Cisco Netacad and TryHackMe

8. Indicative content.

Develop knowledge, understanding and practical skills in the differing and contemporary techniques for penetration testing and ethical hacking, which includes techniques such as ethical hacking and penetration testing as a career – the roles, responsibilities, ethical and legal considerations that one must consider. The tools and techniques required for effective penetration testing, such as foot-printing, reconnaissance, scanning, data access and exploitation techniques. The importance of documentation is crucial, and each of these techniques must be considered for their ethical and legal implications, as well as their effectiveness. Possible protection or mitigation mechanisms in place must also be understood and scouted. Reverse engineering, as well as the ability to break through wireless network encryption and firewalls, will be considered in relation to quick extrication with no trace. Legal/ethical context, foot printing, scanning, enumeration, sniffing, social engineering, application-level attacks, wireless networks, firewalls, network access control, traffic auditing, exfiltration techniques, anonymisation, reverse engineering.

9. Assessment strategy, assessment methods, their relative weightings and mapping to module learning outcomes

Assessment Strategy:

Case Report – Students write a report which critically analyses the roles and responsibilities of members of the cybersecurity team in relation to a selected recent cyber incident case study.

Practical and Reflective Review – Students carry out a blue team and red team ethical hacking and penetration testing exercise with accompanying reflective review. This is conducted as a group assessment with an individual reflective review.

Students must pass each assessment element to achieve a grade in the module

9. Assessment strategy, assessment methods, their relative weightings and mapping to module learning outcomes				
Assessment Task	Weighting	Week submitted	Grading (Pass / Fail / %)	Module Learning Outcome(s) the assessment task maps to
Case Report	30%		%	A1
Practical and Reflective Review	70%		%	B1 C1, D1

10. Teaching staff associated with the module
Name and contact details
Richard Everard everardr@btc.ac.uk

11. Key reading list				
Author	Year	Title	Publisher	Location
Diogenes, Y and Ozakya, E.	2018	Cybersecurity – Attack and Defence Strategies	Packt	
Velu Kumar, V.	2017	Mastering Kali Linux for Advanced Penetration (2nd Edition)	Packt	
Clark, B and Downer, N.	2022	RTFM: Red Team Field Manual v2	Independent	

12. Other indicative text (e.g. websites)
https://www.khanacademy.org/ http://linux.wikia.com/wiki/Kali_Linux https://ocw.mit.edu/index.html

13. List of amendments since last (re)validation		
Area amended	Details	Date Central Quality informed

*SCDV64 Cloud Infrastructure Design and Deployment
Module Specification*

1. Factual information			
Module title	SCDV64 Cloud Infrastructure Design and Deployment		
Module tutor	Richard Everard	Level	6
Module type	Taught	Credit value	20
Mode of delivery	Taught face-to-face		
Notional learning hours	200		

2. Rationale for the module and its links with other modules
<p>This module builds directly on the foundations set by both SCDV44 Network Fundamentals and Design and SCDV54 Network Infrastructure Management and applies the principles to the deployment and management of modern cloud-based systems. The module will focus on the skills required to implement a cloud-based solution to paradigms previously studied as physical solutions and the benefits, challenges and ethical concerns involved in such deployments.</p>

3. Aims of the module
<ul style="list-style-type: none"> • To appraise the core principles of cloud deployment solutions and how they relate to their real-world applications for both infrastructure management and software deployment • To demonstrate practical skills in the deployment of cloud-based network infrastructure and software solutions • To evaluate the ethical considerations of cloud deployment solutions in current and emerging innovative applications of the technology

4. Pre-requisite modules or specified entry requirements
SCDV54 Network Infrastructure Management

5. Is the module compensatable?
Yes

6. Are there any PSRB requirements regarding the module?
No

7. Intended learning outcomes		
A. Knowledge and understanding	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<i>At the end of the module, students will be expected to:</i>		

B. Cognitive skills	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<i>At the end of the module, students will be expected to:</i> B1 Appraise the use of cloud based networked and software solutions in modern IT data systems	PB6	Lectures Seminars Case studies Digital learning using Cisco Netacad, Microsoft Learn and AWS Training and Certification

C. Practical and professional skills	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>At the end of the module, students will be expected to:</i></p> <p>C1 Deploy a cloud based network infrastructure solution and associated software packages in response to a client design</p>	PC6	<p>Practical workshops</p> <p>Digital learning using Cisco Netacad, Microsoft Learn and AWS Training and Certification</p>

D Key transferable skills	Programme Learning Outcome(s) this maps against	Learning and teaching strategy
<p><i>At the end of the module, students will be expected to:</i></p> <p>D1 Critically evaluate the ethical considerations of an increasingly cloud based infrastructure paradigm for corporate and worldwide networked data systems</p>	PD6	<p>Lectures</p> <p>Seminars</p> <p>Case studies</p> <p>Digital learning using Cisco Netacad, Microsoft Learn and AWS Training and Certification</p>

8. Indicative content.

Develop knowledge of principles involved in the deployment of cloud-based infrastructure solutions including scalability, reliability, security, performance optimisation, automation, cost optimisation, monitoring and logging, interoperability and vendor lock-in, compliance and governance and elasticity of systems. Practical experience in the use of major cloud development and deployment solutions which could include AWS (Amazon Web Services) Google Cloud or Microsoft Azure. Ethical considerations relating to cloud deployment including data privacy, security and confidentiality, worker rights, ethical use of AI and machine learning, surveillance culture, compliance, environmental impacts, accessibility and the digital divide.

9. Assessment strategy, assessment methods, their relative weightings and mapping to module learning outcomes

Assessment Strategy:

Cloud Systems Seminar: Students research and present a 20-minute seminar on the use of cloud-based solutions and the ethical considerations of such systems. The seminar will be accompanied by a fully referenced set of research notes for attendees of the seminar.

Cloud Deployment Demonstration: Students plan, deploy and demonstrate a cloud-based infrastructure solution in response to a set brief. The demonstration will be done on the live system and be accompanied by a technical handover document. This is a group assessment with an individual demonstration and documentation.

Students must pass each assessment element to achieve a grade in the module

9. Assessment strategy, assessment methods, their relative weightings and mapping to module learning outcomes				
Assessment Task	Weighting	Week submitted	Grading (Pass / Fail / %)	Module Learning Outcome(s) the assessment task maps to
Cloud Systems Seminar	40%		%	B1, D1
Cloud Deployment Demonstration	60%		%	C1

10. Teaching staff associated with the module
Name and contact details
Richard Everard (everardr@btc.ac.uk)

11. Key reading list				
Author	Year	Title	Publisher	Location
Kurose, J and Ross, K.	2021	Computer Networking: A Top-Down approach, Global Edition	Pearson	
Armstrong, J.	2020	Migrating to AWS: A Manager's Guide	O'Reilly	
Shukla, A., Patel, J., Panzade, K., and Sardana, H.	2023	Cisco Cloud Infrastructure	Cisco Press	

12. Other indicative text (e.g. websites)
Netacad.net

13. List of amendments since last (re)validation

Area amended	Details	Date Central Quality informed

*SCDV65 Individual Capstone Project
Module Specification*

1. Factual information			
Module title	SCDV65 Individual Capstone Project		
Module tutor	Richard Everard	Level	6
Module type	Taught	Credit value	40
Mode of delivery	Taught face-to-face		
Notional learning hours	400		

2. Rationale for the module and its links with other modules
<p>This individual project will provide students a platform to apply the knowledge and skills that they have acquired on the programme, in a scientific manner to enable the development of a substantial computing project and write a comprehensive dissertation style report.</p> <p>Students will develop strategies allowing them to understand and practice problem solving with regard to inception, research, synthesis, realisation and evaluation. The module culminates in a final presentation of their computing project to a panel.</p>

3. Aims of the module
<ul style="list-style-type: none"> • To enable students to become proficient in the extended application and manipulation of a range of tools, techniques and technologies in the production and delivery of a complex computing project. • To fully plan and manage a self-developed design brief and final computer project in a professional manner with a final project artefact. • To exercise and evaluate self-management skills in the context of industry standard processes and standards.

4. Pre-requisite modules or specified entry requirements
None

5. Is the module compensatable?
No

6. Are there any PSRB requirements regarding the module?
No

9. Assessment strategy, assessment methods, their relative weightings and mapping to module learning outcomes

Assessment Strategy:

Project Documentation – Students produce research project documentation that analyses a given problem and provides an analysis, proposal and design of a possible software solution, alongside an appropriate discussion of design, development and testing methodologies, as well as an overview of an agile, iterative development process, and an evaluation against the project’s initial requirements, as well as any ethical issues that may arise. The project report will include three project progress logs, over the course of the project, which discuss developments in the project, key tools and techniques that they have learnt and any problems that have arisen and how these will be solved or mitigated moving forwards.

Presentation (Viva) and Academic Poster – Students formally present their final project in a 30 minute Viva to demonstrate functionality and overall effectiveness, including an overview of methodologies, tools and techniques used to develop the project. As part of this Viva, students are expected to produce and present a professional academic poster, providing a graphical overview of the development lifecycle for the project.

Students must pass each assessment element to achieve a grade in the module

Assessment Task	Weighting	Week submitted	Grading (Pass / Fail / %)	Module Learning Outcome(s) the assessment task maps to
Project Documentation	80%		%	A1, B1, B2, C1, C2, D1, D2
Presentation (Viva) and Academic Poster	20%		%	B1

10. Teaching staff associated with the module
Name and contact details
Richard Everard (everardr@btc.ac.uk)

11. Key reading list				
Author	Year	Title	Publisher	Location
Dawson, C.W.	2015	The Essence of Computing Projects: A Student's Guide.	Prentice Hall	
Cottrell, S.	2014	Dissertations and Project Reports: A Step by Step Guide (Palgrave Study Skills)	Macmillian	
Wysocki, R. K.	2019	Effective Project Management: Traditional, Agile, Extreme	Wiley	

12. Other indicative text (e.g. websites)

13. List of amendments since last (re)validation		
Area amended	Details	Date Central Quality informed

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