Mapping of Knowledge, Skills and Behaviours between a UWE Award and an Apprenticeship Standard		
Apprenticeship Standard Name and Number	DIGITAL AND TECHNOLOGY SOLUTIONS PROFESSIONAL (INTEGRATED DEGREE)	ST0119
UWE Award Name(s)	BSc (Hons) Digital and Technology Solutions	

Mapping Version	Date Mapping Completed	IfATE Standard Version	UWE Programme Valid From	UWE Programme Valid To
1.0	22/06/2023	1.1	18/09/2023	Current

Core Technical Knowledge (All pathways for L4/L5 common modules)	**Business Security FCFSM-15-1**	**Computer Networks and Protocols UFCE4N-15-1**	**Database Development UFC4EP-15-1**	**Fundamentals of Project Management UFC4ER-15-1**	**Fundamentals of Software Development UFCFQM-30-1**	**Professional Practice I UFC4EQ-30-1**	**Internet of Things UFCE4T-15-2**	**Professional Practice II UFC4ES-30-2**	**Project Change Control and Quality Management UMMDVX-15-2**	**Webapp Development UFCF8R-30-2**
How business exploits technology solutions for competitive advantage.				X					X	
The value of technology investments and how to formulate a business case for a new technology solution, including estimation of both costs and benefits.				X						
Contemporary techniques for design, developing, testing, correcting, deploying and documenting software systems from specifications, using agreed standards and tools.					X		X			X
How teams work effectively to produce technology solutions.						X			X	

The role of data management systems in managing organisational data and information.			X	X				X		
Common vulnerabilities in computer networks including unsecure coding and unprotected networks.	X	X						X		
The various roles, functions and activities related to technology solutions within an organisation.						X				
How strategic decisions are made concerning acquiring technology solutions resources and capabilities including the ability to evaluate the different sourcing options.				X						
How to deliver a technology solutions project accurately consistent with business needs.				X						
The issues of quality, cost and time for projects, including contractual obligations and resource constraints				X						
Core Technical Skills (All pathways for L4/L5 common modules)	**Business Security FCFSM-15-1**	**Computer Networks and Protocols UFCE4N-15-1**	**Database Development UFC4EP-15-1**	**Fundamentals of Project Management UFC4ER-15-1**	**Fundamentals of Software Development UFCFQM-30-1**	**Professional Practice I UFC4EQ-30-1**	**Internet of Things UFCE4T-15-2**	**Professional Practice II UFC4ES-30-2**	**Project Change Control and Quality Management UMMDVX-15-2**	**Webapp Development UFCF8R-30-2**
Information Systems: is able to critically analyse a business domain in order to identify the role of information systems, highlight issues and identify opportunities for improvement through evaluating information systems in relation to their intended purpose and effectiveness.				X		X				

Systems Development: analyses business and technical requirements to select and specify appropriate technology solutions. Designs, implements, tests, and debugs software to meet requirements using contemporary methods including agile development. Manages the development and assurance of software artefacts applying secure development practises to ensure system resilience. Configures and deploys solutions to end users.					X					
Data: identifies organisational information requirements and can model data solutions using conceptual data modelling techniques. Is able to implement a database solution using an industry standard database management system (DBMS). Can perform database administration tasks and is cognisant of the key concepts of data quality and data security. Is able to manage data effectively and undertake data analysis.			X							
Cyber Security: can undertake a security risk assessment for a simple IT system and propose resolution advice. Can identify, analyse and evaluate security threats and hazards to planned and installed information systems or services (e.g. Cloud services).	X									
Business Organisation: can apply organisational theory, change management, marketing, strategic practice, human resource management and IT service management to technology solutions development. Develops well- reasoned investment proposals and provides business insights.				X		X				

IT Project Management: follows a systematic methodology for initiating, planning, executing, controlling, and closing technology solutions projects. Applies industry standard processes, methods, techniques and tools to execute projects. Is able to manage a project (typically less than six months, no inter-dependency with other projects and no strategic impact) including identifying and resolving deviations and the management of problems and escalation processes.				X						
Computer and Network Infrastructure: can plan, design and manage computer networks with an overall focus on the services and capabilities that network infrastructure solutions enable in an organisational context. Identifies network security risks and their resolution.		X								

Core Behaviours (All pathways for common modules)	**Business Security FCFSM-15-1**	**Computer Networks and Protocols UFCE4N-15-1**	**Database Development UFC4EP-15-1**	**Fundamentals of Project Management UFC4ER-15-1**	**Fundamentals of Software Development UFCFQM-30-1**	**Professional Practice I UFC4EQ-30-1**	**Internet of Things UFCE4T-15-2**	**Professional Practice II UFC4ES-30-2**	**Project Change Control and Quality Management UMMDVX-15-2**	**Webapp Development UFCF8R-30-2**	**Professional Practice III UFCE4U-15-3**	**DTS End-Point Assessment UFCFHN-30-3**
Fluent in written communications and able to articulate complex issues.		X		X		X		X			X	X
Makes concise, engaging and well-structured verbal	X			X	X		X					X

presentations, arguments and explanations.												
Able to deal with different, competing interests within and outside the organisation with excellent negotiation skills.								X	X		X	
Is able to identify the preferences, motivations, strengths and limitations of other people and apply these insights to work more effectively with and to motivate others.				X		X		X			X	X
Competent in active listening and in leading, influencing and persuading others.		X		X		X		X	X		X	X
Able to give and receive feedback constructively and incorporate it into his/her own development and life-long learning.						X		X			X	X
Applies analytical and critical thinking skills to Technology Solutions development and to systematically analyse and apply structured problem solving techniques to complex systems and situations.			X		X		X	X		X	X	X
Able to put forward, demonstrate value and gain commitment to a moderately complex technology-oriented solution, demonstrating understanding of business need, using open questions				X				X			X	X

and summarising skills and basic negotiating skills.												
Able to conduct effective research, using literature and other media, into IT and business related topics.	X			X		X		X	X		X	X
Have demonstrated that they have mastered basic business disciplines, ethics and courtesies, demonstrating timeliness and focus when faced with distractions and the ability to complete tasks to a deadline with high quality.				X		X		X	X		X	X
Flexible attitude.	X	X		X		X			X		X	X
Ability to perform under pressure.		X	X		X		X	X	X	X	X	X
A thorough approach to work.	X	X	X	X	X	X	X	X	X	X	X	X
Logical thinking and creative approach to problem solving.	X	X	X		X	X	X	X		X	X	X

Software Engineering Pathway

Specialist Knowledge (Software Engineer)	**Internet of Things UFCE4T-15-2**	**Professional Practice II UFC4ES-30-2**	**Project Change Control and Quality Management UMMDVX-15-2**	**Webapp Development UFCF8R-30-2**	**Object Oriented Software Design and Development UFCFME-30-2**	**Cloud Computing Platforms UFCFEN-15-3**	**Professional Practice III UFCE4U-15-3**	**Artificial Intelligence UFCE57-30-3**	**Coding for Machine Learning and Data Science UFCE56-30-3**	**Collaborative Software Project UFCFFN-30-3**	**DTS End-Point Assessment UFCFHN-30-3**
How to operate at all stages of the software development lifecycle.		X		X	X		X	X	X	X	X
How teams work effectively to develop software solutions embracing agile and other development approaches.		X					X			X	
How to apply software analysis and design approaches.	X	X		X	X		X	X	X	X	X
How to interpret and implement a design, compliant with functional, non-functional and security requirements.	X	X		X	X	X	X	X	X	X	X
How to perform functional and unit testing.		X			X		X	X	X	X	X
How to use and apply the range of software tools used in Software engineering.	X	X		X	X		X	X	X	X	X

Specialist Skills (Software Engineer)	**Internet of Things UFCE4T-15-2**	**Professional Practice II UFC4ES-30-2**	**Project Change Control and Quality Management UMMDVX-15-2**	**Webapp Development UFCF8R-30-2**	**Object Oriented Software Design and Development UFCFME-30-2**	**Cloud Computing Platforms UFCFEN-15-3**	**Professional Practice III UFCE4U-15-3**	**Artificial Intelligence UFCE57-30-3**	**Coding for Machine Learning and Data Science UFCE56-30-3**	**Collaborative Software Project UFCFFN-30-3**	**DTS End-Point Assessment UFCFHN-30-3**
Create effective and secure software solutions using contemporary software development languages to deliver the full range of functional and non-functional requirements using relevant development methodologies.	X			X		X	X	X	X	X	X
Undertake analysis and design to create artefacts, such as use cases to produce robust software designs.					X		X				X
Produce high quality code with sound syntax in at least one language following best practices and standards.	X			X	X		X	X	X	X	X
Perform code reviews, debugging and refactoring to improve code quality and efficiency.					X		X	X	X	X	X
Test code to ensure that the functional and non-functional requirements have been met.					X		X	X	X	X	X
Deliver software solutions using industry standard build processes, and tools for configuration management, version control and software build, release and deployment into enterprise environments.	X			X	X		X	X	X	X	X

Core Behaviours (Software Engineer Specialist Modules)	**Object Oriented Software Design and Development UFCFME-30-2**	**Artificial Intelligence UFCE57-30-3**	**Coding for Machine Learning and Data Science UFCE56-30-3**	**Collaborative Software Project UFCFFN-30-3**
Fluent in written communications and able to articulate complex issues.	X			X
Makes concise, engaging and well-structured verbal presentations, arguments and explanations.	X			X
Able to deal with different, competing interests within and outside the organisation with excellent negotiation skills.				X
Is able to identify the preferences, motivations, strengths and limitations of other people and apply these insights to work more effectively with and to motivate others.				X
Competent in active listening and in leading, influencing and persuading others.				X
Able to give and receive feedback constructively and incorporate it into his/her own development and life-long learning.				X
Applies analytical and critical thinking skills to Technology Solutions development and to systematically analyse and apply structured problem solving techniques to complex systems and situations.	X	X	X	X
Able to put forward, demonstrate value and gain commitment to a moderately complex technology-oriented solution, demonstrating understanding of business need, using open questions and summarising skills and basic negotiating skills.				X
Able to conduct effective research, using literature and other media, into IT and business related topics.		X	X	

Have demonstrated that they have mastered basic business disciplines, ethics and courtesies, demonstrating timeliness and focus when faced with distractions and the ability to complete tasks to a deadline with high quality.		X		X
Flexible attitude.				X
Ability to perform under pressure.	X	X	X	X
A thorough approach to work.	X	X	X	X
Logical thinking and creative approach to problem solving.	X	X	X	X

Cyber Security Specialist Pathway

Knowledge (Cyber Security Specialist)	**Internet of Things UFCE4T-15-2**	**Professional Practice II UFC4ES-30-2**	**Project Change Control and Quality Management UMMDVX-15-2**	**Webapp Development UFCF8R-30-2**	**Cyber Security Forensics UFCE53-30-2**	**Cloud Computing Platforms UFCFEN-15-3**	**Cyber Security Intelligence UFCE58-30-3**	**Professional Practice III UFCE4U-15-3**	**Practical Security UFCFBN-30-3**	**DTS End-Point Assessment UFCFHN-30-3**
The types of security (confidentiality, authentication; non-repudiation; service integrity) and security big picture (network security; host OS security; physical security).	X				X	X	X		X	
The main types of common attack techniques, including phishing, social engineering, malware, network interception, blended techniques, denial of service and theft.					X		X		X	
How to recognise and assess risk including performing a risk assessment.					X		X		X	
How to apply penetration testing effectively and how it contributes to assurance.		X					X	X	X	
The different approaches to risk treatment and management in practice.		X						X		X
What the 'cyber security culture' in an organisation is, and how it may contribute to security risk.		X						X		X

Skills (Cyber Security Specialist)	**Internet of Things UFCE4T-15-2**	**Professional Practice II UFC4ES-30-2**	**Project Change Control and Quality Management UMMDVX-15-2**	**Webapp Development UFCF8R-30-2**	**Cyber Security Forensics UFCE53-30-2**	**Cloud Computing Platforms UFCFEN-15-3**	**Cyber Security Intelligence UFCE58-30-3**	**Professional Practice III UFCE4U-15-3**	**Practical Security UFCFBN-30-3**	**DTS End-Point Assessment UFCFHN-30-3**
Analyse and evaluate security threats and vulnerabilities to planned and installed information systems or services and identify how these can be mitigated against.	X				X		X		X	X
Perform security risk assessments for a range of information systems and propose solutions.		X			X		X		X	X
Develop a security case against recognised security threats, and recommend mitigation, security controls and appropriate processes.		X						X		
Define and justify a user access policy for an information system given knowledge of the system architecture, security requirements and threat/risk environment. This should be in terms of what they can do, resources they can access, and operations they are allowed to perform.		X						X		X
Perform a business impact analysis in response to a security incident and follow a disaster recovery plan to meet elements of a given business continuity policy.		X	X					X		X

Conduct a range of cyber security audit activities to demonstrate security control effectiveness					X		X	X	X	X

Core Behaviours (Cyber Security Specialist Modules)	**Cyber Security Forensics UFCE53-30-2**	**Cyber Security Intelligence UFCE58-30-3**	**Practical Security UFCFBN-30-3**
Fluent in written communications and able to articulate complex issues.	X	X	X
Makes concise, engaging and well-structured verbal presentations, arguments and explanations.	X	X	X
Able to deal with different, competing interests within and outside the organisation with excellent negotiation skills.			
Is able to identify the preferences, motivations, strengths and limitations of other people and apply these insights to work more effectively with and to motivate others.			
Competent in active listening and in leading, influencing and persuading others.			
Able to give and receive feedback constructively and incorporate it into his/her own development and life-long learning.			X
Applies analytical and critical thinking skills to Technology Solutions development and to systematically analyse and apply structured problem solving techniques to complex systems and situations.	X	X	X
Able to put forward, demonstrate value and gain commitment to a moderately complex technology-oriented solution, demonstrating understanding of business need, using open questions and summarising skills and basic negotiating skills.		X	
Able to conduct effective research, using literature and other media, into IT and business related topics.	X	X	X

Have demonstrated that they have mastered basic business disciplines, ethics and courtesies, demonstrating timeliness and focus when faced with distractions and the ability to complete tasks to a deadline with high quality.		X	
Flexible attitude.	X	X	X
Ability to perform under pressure.	X	X	X
A thorough approach to work.	X	X	X
Logical thinking and creative approach to problem solving.	X	X	X

Data analyst Pathway

Knowledge (Data analyst)	**Internet of Things UFCE4T-15-2**	**Professional Practice II UFC4ES-30-2**	**Project Change Control and Quality Management UMMDVX-15-2**	**Webapp Development UFCF8R-30-2**	**Data Analytics UFCE54-30-2**	**Cloud Computing Platforms UFCFEN-15-3**	**Professional Practice III UFCE4U-15-3**	**Applied Statistics UFCE5A-30-3**	**Artificial Intelligence UFCE57-30-3**	**Coding for Machine Learning and Data Science UFCE56-30-3**	**DTS End-Point Assessment UFCFHN-30-3**
The quality issues that can arise with data and how to avoid and/or resolve these.					X		X				
The processes involved in carrying out data analysis projects.			X		X		X	X			X
How to use and apply industry standard tools and methods for data analysis.		X	X		X		X	X	X	X	X
The range of data protection and legal issues.		X		X	X	X	X				
The fundamentals of data structures, database system design, implementation and maintenance.	X	X		X	X		X				X
The organisation's data architecture.		X					X				X

Skills (Data analyst)	**Internet of Things UFCE4T-15-2**	**Professional Practice II UFC4ES-30-2**	**Project Change Control and Quality Management UMMDVX-15-2**	**Webapp Development UFCF8R-30-2**	**Data Analytics UFCE54-30-2**	**Cloud Computing Platforms UFCFEN-15-3**	**Professional Practice III UFCE4U-15-3**	**Applied Statistics UFCE5A-30-3**	**Artificial Intelligence UFCE57-30-3**	**Coding for Machine Learning and Data Science UFCE56-30-3**	**DTS End-Point Assessment UFCFHN-30-3**
Import, cleanse, transform, and validate data with the purpose of understanding or making conclusions from the data for business decision making purposes.		X			X		X	X			X
Present data visualisation using charts, graphs, tables, and more sophisticated visualisation tools.		X			X		X	X			X
Perform routine statistical analyses and ad-hoc queries.		X					X				
Use a range of analytical techniques such as data mining, time series forecasting and modelling techniques to identify and predict trends and patterns in data.		X			X		X	X			X
Report on conclusions gained from analysing data using a range of statistical software tools.		X			X		X	X			X
Summarise and present results to a range of stakeholders making recommendations.		X					X				X

Core Behaviours (Data analyst Specialist Modules)	**Data Analytics UFCE54-30-2**	**Applied Statistics UFCE5A-30-3**	**Artificial Intelligence UFCE57-30-3**	**Coding for Machine Learning and Data Science UFCE56-30-3**
Fluent in written communications and able to articulate complex issues.	X	X		
Makes concise, engaging and well-structured verbal presentations, arguments and explanations.	X	X		
Able to deal with different, competing interests within and outside the organisation with excellent negotiation skills.				
Is able to identify the preferences, motivations, strengths and limitations of other people and apply these insights to work more effectively with and to motivate others.				
Competent in active listening and in leading, influencing and persuading others.				
Able to give and receive feedback constructively and incorporate it into his/her own development and life-long learning.				
Applies analytical and critical thinking skills to Technology Solutions development and to systematically analyse and apply structured problem solving techniques to complex systems and situations.	X	X	X	X
Able to put forward, demonstrate value and gain commitment to a moderately complex technology-oriented solution, demonstrating understanding of business need, using open questions and summarising skills and basic negotiating skills.	X		X	X
Able to conduct effective research, using literature and other media, into IT and business related topics.			X	X
Have demonstrated that they have mastered basic business disciplines, ethics and courtesies, demonstrating timeliness and focus when faced with distractions and the ability to complete tasks to a deadline with high quality.	X		X	X
Flexible attitude.	X	X		

Ability to perform under pressure.	X	X	X	X
A thorough approach to work.	X	X	X	X
Logical thinking and creative approach to problem solving.	X	X	X	X

Network Engineer Pathway

Knowledge (Network Engineer)	**Internet of Things UFCE4T-15-2**	**Professional Practice II UFC4ES-30-2**	**Project Change Control and Quality Management UMMDVX-15-2**	**Webapp Development UFCF8R-30-2**	**Network Monitoring and Diagnostics UFCE55-30-2**	**Cloud Computing Platforms UFCFEN-15-3**	**Professional Practice III UFCE4U-15-3**	**Advanced Networking Administration UFCE5B-30-3**	**Network Infrastructure Planning UFCE59-30-3**	**DTS End-Point Assessment UFCFHN-30-3**
The fundamental building blocks (e.g. routers, switches, hubs, storage, transmission) and typical architectures (e.g. server/client, hub/spoke) of computers, networks and the Internet.		X			X	X	X	X	X	X
The main features of routing and Internet network protocols in use, their purpose and relationship to each other, including the physical and data link layer (e.g. https, HTTP, SMTP, SNMP, TCP, IP, etc.).	X	X		X	X	X	X	X	X	X
The main factors that affect network performance (e.g. the relationship between bandwidth, number of users, nature of traffic, contention).	X	X			X			X	X	X
Failure modes in protocols (e.g. why a protocol may 'hang' and the effect of data communication errors).		X			X		X	X		X
The ways to improve performance (e.g. application of traffic shaping, changes to architecture to avoid bottlenecks, network policy that prohibit streaming protocols).		X			X	X	X	X	X	X

The issues that may arise in the day to day operation of networks and how to resolve them.		X			X		X	X	X	
Skills (Network Engineer)	**Internet of Things UFCE4T-15-2**	**Professional Practice II UFC4ES-30-2**	**Project Change Control and Quality Management UMMDVX-15-2**	**Webapp Development UFCF8R-30-2**	**Network Monitoring and Diagnostics UFCE55-30-2**	**Cloud Computing Platforms UFCFEN-15-3**	**Professional Practice III UFCE4U-15-3**	**Advanced Networking Administration UFCE5B-30-3**	**Network Infrastructure Planning UFCE59-30-3**	**DTS End-Point Assessment UFCFHN-30-3**
Plan, design, build and test a simple network to a requirement specification that includes hubs, switches, routers and wireless user devices, applying appropriate security products and processes.		X			X	X	X	X	X	X
Identify the key characteristics of a new network service and develop estimates of the expected traffic intensity and traffic load that the network must support.					X		X	X	X	X
Determine the minimum network capacity of planned networks to meet network requirements.		X			X		X		X	X
Design, build, test, configure and optimise a distributed network (more than 1 sub- net), including switches, routers and firewalls to meet given requirements.		X					X		X	X
Analyse network performance and troubleshoot typical problems in networks.		X			X		X		X	

Identify and evaluate network security risks and incorporate appropriate security products and processes into network designs to increase security, resilience and dependability.		X			X		X	X		X

Core Behaviours (Network Engineer Specialist Modules)	**Network Monitoring and Diagnostics UFCE55-30-2**	**Advanced Networking Administration UFCE5B-30-3**	**Network Infrastructure Planning UFCE59-30-3**
Fluent in written communications and able to articulate complex issues.	X	X	X
Makes concise, engaging and well-structured verbal presentations, arguments and explanations.	X	X	X
Able to deal with different, competing interests within and outside the organisation with excellent negotiation skills.			
Is able to identify the preferences, motivations, strengths and limitations of other people and apply these insights to work more effectively with and to motivate others.			
Competent in active listening and in leading, influencing and persuading others.			
Able to give and receive feedback constructively and incorporate it into his/her own development and life-long learning.			
Applies analytical and critical thinking skills to Technology Solutions development and to systematically analyse and apply structured problem solving techniques to complex systems and situations.	X	X	X
Able to put forward, demonstrate value and gain commitment to a moderately complex technology-oriented solution, demonstrating understanding of business need, using open questions and summarising skills and basic negotiating skills.			X

Able to conduct effective research, using literature and other media, into IT and business related topics.		X	X
Have demonstrated that they have mastered basic business disciplines, ethics and courtesies, demonstrating timeliness and focus when faced with distractions and the ability to complete tasks to a deadline with high quality.		X	X
Flexible attitude.	X	X	X
Ability to perform under pressure.	X	X	X
A thorough approach to work.	X	X	X
Logical thinking and creative approach to problem solving.	X	X	X