apprenticeship FRAMEWORK

Digital Degree Apprenticeship (Wales)

IMPORTANT NOTIFICATION FOR ALL APPRENTICESHIP STARTS FROM 14 OCTOBER 2016

Modifications to SASW came into effect on 14 October 2016. These changes relate to the **Essential Skills** and **Employer Rights and Responsibilities** requirements of a framework and they **ONLY** apply to **new Apprenticeship starts on, or after, 14th October**. Apprenticeship starts before this date must continue to meet the 2013 SASW requirements for Essential Skills and Employer Rights and Responsibilities.

For more details of the changes and how they will affect new apprenticeship starts, please read the following preface page to the framework document. NB: Please check the "Revising a Framework" section for information on any additional changes that may have been made to this framework.

Latest framework version?

For any previous versions of this framework: www.acwcerts.co.uk/framework_library

Issue date: 29 January 2019

Document Status:
Issued

Prentisiaethau Apprenticeships

Digital Degree Apprenticeship (Wales)

Contents

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Framework information

Information on the Issuing Authority for this framework:

Instructus

The Apprenticeship sector for occupations in air conditioning, building services engineering, business and administration, cleaning, customer service, digital/information technology, electro technical, electrical and electronic servicing, enterprise and business support, facilities management, heating and ventilating, housing, human resources and recruitment, industrial relations, leadership and management, marketing and sales (also includes contact centres and third sector), plumbing, property and refrigeration.

	This framework includes:
Issue number: 4	
Framework ID: FR04381	Level 2 ☐ Level 3 ☐ Level 4-7 ☒
Date this framework is to be reviewed by: 31/07/2023	This framework is for use in: Wales

Short description

This Degree Apprenticeship programme at level 6 has been designed to provide both the digital sector and those employers in other sectors who require digital specialists in Wales with high quality digital professionals.

Degree Apprentices will develop higher level applied practical skills, knowledge and competence combined with an applied honours degree in one of three areas including:

- Software Engineering
- Data Science
- Cyber Security Management.

Roles in this framework are likely to fit into Standard Occupational Code (SOC): 21

Contact information

Proposer of this framework

The fundamental principles guiding the development of this digital degree apprenticeship framework were established during summer 2017. The need for a digital degree apprenticeship framework was identified by employer consultation and three priority areas were identified for the Digital Degree Apprenticeship for Wales. The applied degree qualification learning and skills outcomes specifications underpinning the degree apprenticeship framework have been developed through collaboration with employers in Wales between November 2017 and March 2018, and are informed by the relevant NOS.

Involved in the consultation were:

Atradius
EstNet
Office for National Statistics (ONS)
Department for Transport
Driver and Vehicle Licensing Agency (DVLA)
Intellectual Property Office (IPO)
Risual
Markes
Method 4
NHS Informatics Wales
Optimum Credit
DevOps Guys
IQE plc
Renishaw
BT
Lloyds Banking Grioup BBC
Innovation Point
CGI

Developer of this framework

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Issuing Authority's contact details

Issued by:	Instructus
Issuer contact name:	Damian Brown
Issuer contact phone:	01536 738 631
Issuer Email:	skills@instructus.org

Who is making this revision	Larisa Puk
Your organisation	Instructus
Your email address:	skills@instructus.org

Revising a framework

Why this framework is being revised

Additional BSc (Hons) degree qualifications are added into this framework following Welsh Government's new apprenticeship skills policy plan to improve productivity through the skilling and upskilling of new and existing employees in Wales.

Summary of changes made to this framework

Additional BSc (Hons) degree qualifications are added into this framework following Welsh Government's new apprenticeship skills policy plan to improve productivity through the skilling and upskilling of new and existing employees in Wales.

Qualifications removed

N/A

Qualifications added

BSc (Hons) in Applied Software Engineering - Cardiff University
BSc (Hons) in Applied Software Engineering - Bangor University

Qualifications that have been extended

N/A

Purpose of this framework

Summary of the purpose of the framework

This Degree Apprenticeship is designed to provide progression and re-skilling routes for Digital / Tech / IT Professionals.

Apprentices can work in the following broad areas:

- Software & Web Development
- Data Analytics and Data Science
- Information and Cyber Security.

What is included in this Apprenticeship?

The apprenticeship is made up of applied degree qualifications and learning that will provide apprentices with the skills and knowledge required to become competent in their chosen job role.

The framework includes a balance of content in technical, business and interpersonal areas, designed to ensure apprentices have an appropriate set of skills to operate in today's digital job roles.

The three named pathways provide applied technical content for Software Engineering, Data Science and Cyber Security Management.

Digital is a key sector for Wales as the application of ICT drives productivity and competitiveness across the whole economy. The digital sector in Wales spans software development (web, application, mainframe and mobile), data, electronics and other new technology applications with a mix of large multinationals and indigenous businesses.

Wales has approximately 25,000 people directly involved in the digital industry. There are nearly 4,000 operations in Wales – among them Fujitsu Services, BT, ONS, IPO, DVLA, Mitel, Logica, Cassidian, Renishaw, BBC, Optimum Credit, Centrica, General Dynamics UK, IQE, SAIC, Sony UK, Logica and IBM, contributing around £1 billion to the Welsh economy annually. Welsh higher and further education institutions produce more than 3,500 graduates every year in digital / IT related disciplines.

The demand for digital skills in Wales is increasing. There is a growth in digital technology enterprises and these skills are required across all sectors in Wales.

Both young digital businesses in Wales, large private and public sector employers are growing their digital services and product portfolios that require increasing numbers of high quality digital professionals.

This framework will contribute towards meeting the digital skills priorities for Wales.

Aims and objectives of this framework (Wales)

A major barrier to adoption of digital technologies that can improve productivity and enhance products and services is a lack of higher level professional digital skills in the marketplace.

A shortage of candidates with fluency in Data Science and Analytics is amongst the nation's most serious skills gaps, one requiring substantial changes by higher education institutes and employers.

- IBM predicts that demand for data scientists will soar 28% by 2020.
- 59% of all Data Science and Analytics (DSA) job demand is in Finance and Insurance, Professional Services, and IT.
- An estimated 2.72 million new job postings in 2020 will seek workers with skills in data science and analytics, according to a new report from the Business-Higher Education Forum, a non-profit membership group of Fortune 500 CEOs and college leaders, and PricewaterhouseCoopers (PwC).
- According to the (ISC) 2 Global Workforce Survey, conducted by Frost & Sullivan, there will be a shortage of 1.5 million information security professionals by 2020.
- Research carried out by the UK Commission for Employment and Skills (UKCES) 1, states that 43% of vacancies in STEM roles are hard to fill due to a shortage of applicants with the required skills –almost double the UK average of 24%.
- In the report, UKCES projected that there will be 2 million new jobs between now and 2020 that will demand higher STEM skills than in the past, which means organisations need to start preparing now for the jobs of the future, if they want to win the 'war' on talent.
- The GVA of a digital tech worker is now 2 X higher than a non-digital worker, (£103,000 compared to £50,000). This productivity gap has grown from £48,000 to £53,000 over the last five years – further evidence of the significant value that the digital tech sector is adding to the broader UK economy.

(Source: ONS Annual Business Survey/ONS Business Structures Database)

This digital degree Apprenticeship is designed to provide a new vocational route to filling the future skills need for applied digital technology professionals in Wales.

How is an apprenticeship delivered?

A degree apprenticeship programme is fundamentally designed to be a work-based programme, whereby university-led learning and skills can be immediately applied by apprentices in a real work context.

The degree qualifications contained in the framework reflect the needs of employers in Wales

within the overall design of an apprenticeship.

The knowledge units will generally be taught in an off-the-job setting, and assessed using assignments or tests, in order to ensure the apprentice has gained the underpinning theory and principles required for the role.

Entry conditions for this framework

The Digital Degree Apprenticeship framework at Level 6 is primarily suitable for applicants who have either completed A levels appropriate for university entrance, or who may have already completed a related apprenticeship at Levels 3, 4 or 5.

Please note: Applicants for this apprenticeship framework are likely to be 19+ years.

Initial Assessment

It is likely that applicants may be asked to undertake a variety of tests which will include English, maths and problem solving, supported by an interview. These are not meant as a barrier to entry, but more to gauge the ability of the applicant to achieve the programme and to tailor the individual learning plan to meet their needs and those of the employer.

Rules to avoid repeating qualifications

Processes exist to make sure that applicants with relevant prior knowledge, qualifications and/or experience are not disadvantaged by having to repeat learning. Colleges and universities will be able to advise on the current rules for accrediting prior learning and recognising prior experience.

Essential Skills Wales Key skills are accepted as alternatives to Essential Skills Wales qualifications, provided the Key Skills Certificate(s) attained are at the same level(s) as those specified for Essential Skills Wales qualifications. However, Key Skills can not be completed as part of this framework.

It is a requirement that entrants should have completed the Essential Skills in Communication, Application of Number and IT at Level 3 on entry to the framework. These could be achieved either through completing Essential/Key Skills at Level 3, or GCSEs / O levels grade C or above.

Level 6

Title for this framework at level 6

Digital Degree Apprenticeship

Pathways for the framework at level 6:

Pathway 1:   Applied Software Engineering
Pathway 2:   Applied Data Science
Pathway 3:   Applied Cyber Security Management

Level 6, Pathway 1: Applied Software Engineering

Description of this pathway

The requirements for Applied Software Engineering pathway are:

- Competence and knowledge applied degree qualification = 360 credits

Essential Skills Wales (where not already satisfied) 3 x 6 credits =18 credits

Entry requirements for this pathway in addition to the framework entry requirements

There are no additional requirements other than the general entry conditions.

Job title(s)	Job role(s)
Software Engineer	Design, development, coding, testing and implementation of high-quality software solutions for use in a variety of platforms (application, web, mobile, mainframe etc.). They apply engineering principles to the full software development life cycle and ensuring security robustness is built in.
Software Tester	Ensures the high quality of software products and digital solutions through planning, designing and executing structured tests against the specified requirements using appropriate manual and/or automated test environments. They define test cases, creating representative test data for each test case.

Qualifications

Competence qualifications available to this pathway

N/A

Knowledge qualifications available to this pathway

N/A

Combined qualifications available to this pathway

B1 – BSc (Hons) Computing (Software Engineering)

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
B1a	145S	University of Wales Trinity Saint David	360	3600	X.

B2 – BSc (Hons) in Applied Software Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
B2a	I300	Swansea University	360	3600	N/A
B2b	nil	The Open University	360	3600	N/A
B2c	nil	Cardiff Metropolitan University	360	3600	N/A
B2d	nil	Cardiff University	360	3600	N/A
B2e	nil	Bangor University	360	3600	N/A

B3 – BSc (Hons) Computing

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
B3a	I100	Wrexham Glyndwr University	360	3600	X.

B4 – BSc (Hons) in Digital and Technology Solutions					
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
B4a	nil	University of South Wales	360	3600	X.

Relationship between competence and knowledge qualifications

This is a combined degree qualification that delivers both the knowledge and competence requirements with minimum of 360 credits as set out in the Applied Software Engineering degree apprenticeship framework specification.

Applied Software Engineering Degree Apprenticeship Framework High Level Skills and Knowledge

Skills

A degree apprenticeship Software Engineering graduate is able to:

1. Develop the knowledge, skills, and professional competences to operate in a professional software engineering environment, through developing a professional approach to:

- Technical software development and integration
- Collaboration and teamwork
- Delivery focus, including project task estimating and tracking project progress
- Presentation and communication

2. Design appropriate software solutions in relevant contemporary application contexts/domains and architectural considerations using contemporary software development approaches that deliver business value and meet customer requirements.

3. Appreciate the full stack approach to software development including front end usability, middle and back end data systems needs are met.

4. Build and test software solutions for a range of application contexts/domains using contemporary development approaches, understanding how to apply contemporary approaches such as Agile, DevOps, continuous integration.

5. Implement approaches to software testing including unit testing, and process based

approaches such as behaviour driven or test-driven development (BDD or TDD).

6. Create relevant software documentation using contemporary practices such as the creation of 'living' documentation.

7. Apply new models, techniques, and technologies as they emerge and appreciate the necessity of such continuing professional development.

8. Embed relevant cyber security resilience requirements through defensive programming approaches throughout the secure software development life cycle.

9. Design, develop and deploy cloud based applications, applying such as scaling/performance and the use of virtual machines (VMs) vs Web Applications.

10. Be fluent in at least one relevant industry-standard programming language according to employer needs, and capable of performing tasks at any relevant level of the technical stackin which they reside.

Knowledge

A degree apprenticeship Software Engineering graduate should know and understand:

1. Current theories, models, and techniques for software engineering problem identification and analysis, software design, development, implementation, verification, and documentation and how to apply these.

2. The range of industry standards and regulation relating to software development, including GDPR.

3. How to implement privacy by design.

4. How to analyse customer requirements and prioritise and apply these to develop software products, making them scalable, robust and secure.

5. How to keep up to date with technical and methodological developments in software engineering practice.

6. The range of industry standard tools such as IDEs, configuration management and source control etc. and how to apply them.

7. The full stack environment, and the range of different activities and roles thatsupport development, including:

- Systems infrastructure (hardware, OS and dependencies)
- Creating, manipulating, and querying databases
- API / back-end code
- Front-end design (UX/ UI) and code.

8. The techniques that can be implemented to mitigate against cyber security threats and the main sources of industry research for cyber security threats to applications (e.g. OWASP top ten application security risks).

9. The principles of current software patterns and how to apply them.

10. Current industry regulation, including privacy by design and GDPR.

11. How to document, build, deploy and maintain software products and services, supporting real users.

12. How to implement software testing using unit testing to review, debug and test code to identify and fix bugs and defects and contemporary process based approaches such as behaviour driven or test-driven development (BDD or TDD).

13. The importance of applying negotiation, effective work habits, leadership, and good communication with stakeholders in a typical software development businessenvironment.

14. That user experience and the full user journey, including all touchpoints where a user interacts with the software system or product are important inputs into the software design development process.

15. The fundamentals of cloud environment and services such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS).

16. How to create and link datasets to applications and apply database design considerations such as indexing, locking, sequencing, security, transactional, clustering, etc.

17. How to communicate technical software development ideas to a range of audiences, verbally and in writing.

18. How to apply project delivery techniques appropriate to software engineering projects such as estimation, reviewing delivery plans and monitoring development progress.

19. The implementation of relevant contemporary software architectures, including service oriented architecture (SOA) and microservices architecture.

Applied Software Engineering Low Level Learning and Skills Outcomes

Learning and Skills Topics for Software Engineering

1. Business
1.1 Business functions, behaviours, ethics and courtesies
1.2 Business strategy and management
1.3 Business information security.

2. Technology
2.1 Software Development Essentials
2.2 Data and Algorithms

2.3 Software Modelling & Analysis

2.4 Software Architecture

2.5 Software Requirements Management

2.6 Software Design

2.7 Software Verification and Testing

2.8 Software Development Process

2.9 Software Development in Context

2.10 Software Configuration and Release Management

2.11 Software Deployment

2.12 Software Maintenance

2.13 Software Quality

2.14 Data Modelling, Database Development and Data Analysis

2.15 Software Security.

3. Defensive Programming / Software Security

3.1. The critical web application security risks

3.2. Secure coding practices

3.3. Coding frameworks and their benefits.

4. Personal and Inter-Personal

4.1 Communications

4.2 Personal attributes

4.3 Professional attributes

4.4 Project responsibilities

4.5 Team working.

Essential Skills

An apprenticeship framework must specify as a Welsh certificate requirement the expected achievement levels of Essential Skills in Communication and the Application of Number, and Digital Literacy (where required).

ESSENTIAL SKILLS WALES

Communication	**N/A**
Application of Number	**N/A**
IT/Digital Literacy	**N/A**

For the current list of acceptable proxy qualifications and appropriate minimum grade/level requirements, please refer to the most recent version of SASW on the gov.wales website. Additional guidance materials can be found on the Knowledge Base section of the ACW website.

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Progression routes into and from this pathway

Progression routes into this pathway include those who:

- have completed the Higher Apprenticeship at Level 4 or 5 and have undertaken a relevant Foundation Degree linked to the Honours degrees listed in this framework
- have completed a relevant HNC/HND that links to the Honours degrees listed in this framework.

Progression from this pathway for those who have completed a degree apprenticeship in Applied Software Engineering (Level 6):

- employment as a software engineer in the job roles stated in this framework or similar job roles
- Masters Degrees in the relevant specialism.

UCAS points for this pathway:

104-128

Employee rights and responsibilities

Please note that for Apprenticeship starts from 14/10/2016 onwards ERR is no longer a **mandatory** requirement in all frameworks.

However, it may still be included in some frameworks and where it is not explicitly stated that ERR is not a requirement then confirmation of an Apprentice's ERR achievement will still remain a requirement for Apprenticeship certification purposes.

Is ERR a requirement for this framework?   **YES**   ☐   **NO**   ☒

Delivery and assessment

Framework Developer to complete with relevant info

Level 6, Pathway 2: Applied Data Science

Description of this pathway

The requirements for Applied Data Science pathway are:

Competence and knowledge applied degree qualification = 360 credits Essential Skills Wales (where not already satisfied) 3 x 6 credits =18 credits

Entry requirements for this pathway in addition to the framework entry requirements

There are no additional requirements other than the general entry conditions.

Job title(s)	Job role(s)
Data Scientist	A data scientist is a specialist that applies expertise in statistics and building machine learning models to make predictions to answer key business questions. They need to be able to identify, source, process and visualize data, with expertise to train and optimize machine learning models.
Data Analyst	Data Analysts use data to answer questions and communicate the results to help make business decisions. Common tasks include data cleaning, executing analysis and creating data visualizations. They are generalists who can fit into many roles and teams to help them make better data-driven decisions.
Data Manager	Data managers create database systems that meet business needs for the data they use and seek to derive value from. Tasks include identifying user data needs and creating databases that meet those needs, merging old and new databases, backing up information and modifying a database's structure.

Qualifications

Competence qualifications available to this pathway

N/A

Knowledge qualifications available to this pathway

N/A

Combined qualifications available to this pathway

B1 – BSc (Hons) Computing (Data and Information Systems)

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
B1a	318S	University of Wales Trinity Saint David	360	3600	X.

B2 – BSc (Hons) Applied Data Science

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
B2a	nil	Cardiff Metropolitan University	360	3600	X.

Relationship between competence and knowledge qualifications

This is a combined degree qualification that delivers both the knowledge and competence requirements with minimum of 360 credits as set out in the Applied Data Science degree apprenticeship framework specification.

Applied Data Science Degree Apprenticeship Framework High Level Skills and Knowledge

Skills

A degree apprenticeship Data Science graduate is able to:

1. Develop the knowledge, skills, and professional competences to operate in a professional data science environment, through developing a professional approach to:

- Technical data engineering, data analytics and data science
- Collaboration and teamwork
- Data project delivery
- Presentation and communication

2. Identify and clarify problems an organisation faces, and reformulate them into Data Science problems. Devise solutions and make decisions in context by seeking feedback from stakeholders. Apply scientific methods through experiment design, measurement, hypothesis testing and delivery of results. Collaborate with colleagues to gather requirements.

3. Perform data engineering: create and handle datasets for analysis. Use tools and techniques to source, access, explore, profile, pipeline, combine, transform and store data, and apply governance (quality control, security, privacy) to data.

4. Identify and use an appropriate range of programming languages and tools for data manipulation, analysis, visualisation, and system integration. Select appropriate data structures and algorithms for the problem. Develop reproducible analysis and robust code, working in accordance with software development standards, including security,accessibility, code quality and version control.

5. Use analysis and models to inform and improve organisational outcomes, building models and validating results with statistical testing: perform statistical analysis, feature selection and engineering, machine learning, optimisation, and simulations, using the appropriate techniques for the problem.

6. Implement data solutions, using relevant software engineering architectures and design patterns. Evaluate Cloud vs. on-premise deployment. Assess value for money and Return on Investment. Scale a system up/out.

7. Find, present, communicate and disseminate outputs effectively and with high impact through creative storytelling, tailoring the message for the audience. Use the best mediumfor each audience, such as technical writing, reporting and dashboards. Visualise data to tell compelling and actionable narratives relevant for organisation goals.

8. Develop and maintain collaborative relationships at strategic and operational levels, using methods of organisational empathy (human, organisation and technical) and build relationships through active listening and trust development.

9. Use project delivery techniques and tools appropriate to their Data Science project and organisation. Plan, organise and manage resources to successfully run a small Data Science project, achieve organisational goals and enable effective change.

Knowledge

A degree apprenticeship Data Science graduate should understand:

1. The context of Data Science and the Data Science community in relation to computer science, statistics and software engineering. How differing schools of thought in these disciplines have driven new approaches to data systems.

2. How Data Science operates within the context of data governance, data security, and communications. How Data Science can be applied to improve an organisation's processes, operations and outputs. How data and analysis may exhibit biases and prejudice. Howethics and current privacy legislation affect Data Science work.

3. How data can be used systematically in an organisation, including:

3.1 Data processing and storage, including on-premise and cloud technologies.

3.2 Database systems including relational, data warehousing & online analytical processing, and "NoSQL" approaches; the pros and cons of each approach.

3.3 Data-driven decision making and the good use of evidence and analytics in making choices and decisions.

4. How to design, implement and optimise analytical algorithms – as prototypes and at production scale – using:

4.1 Statistical and mathematical models and methods.

4.2 Advanced analytics and machine learning techniques, simulations and optimisation.

4.3 Applications such as computer vision and Natural Language Processing.

4.4 An awareness of the computing and organisational resource constraints and trade-offs involved in selecting models, algorithms and tools.

4.5 Development standards, including programming practice, testing, source control.

5. The data landscape: how to critically analyse, interpret and evaluate complex information from diverse datasets:

5.1 Sources of data including but not exclusive to files, operational systems, databases, web services, open data, government data, news and social media.

5.2 Data formats, structures and data delivery methods including "unstructured" data.

5.3 Common patterns in real-world data.

Applied Data Science Degree Apprenticeship Framework Topics and Low Level Outcomes

Learning and Skills Topics for Applied Data Science

1. Business

1.1. Business functions, behaviours, ethics, and courtesies

1.2. Business strategy and management

1.3. Business information security.

2. Data Science Techniques

2.1 Data problem analysis and hypothesis

2.2 Statistical analysis

2.3 Data engineering

2.4 Data programming

2.5 Data analysis

2.6 Applied machine learning

2.7 Data visualisation, presentation and communication

2.8 Data ethics.

3. Personal and interpersonal

3.1. Communications

3.2. Personal attributes

3.3. Professional attributes

3.4 Project responsibilities

3.5. Team working.

Essential Skills

An apprenticeship framework must specify as a Welsh certificate requirement the expected achievement levels of Essential Skills in Communication and the Application of Number, and Digital Literacy (where required).

ESSENTIAL SKILLS WALES

Communication	**N/A**
Application of Number	**N/A**
IT/Digital Literacy	**N/A**

For the current list of acceptable proxy qualifications and appropriate minimum grade/level requirements, please refer to the most recent version of SASW on the gov.wales website. Additional guidance materials can be found on the Knowledge Base section of the ACW website.

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Progression routes into and from this pathway

Progression routes into this pathway include those who:

- have completed the Higher Apprenticeship at Level 4 or 5 and have undertaken a relevant Foundation Degree linked to the Honours degrees listed in this framework
- have completed a relevant HNC/HND that links to the Honours degrees listed in this framework.

Progression from this pathway for those who have completed a degree apprenticeship in Applied Data Science (Level 6):

- employment as a data scientist in the job roles stated in this framework or similar job roles
- Masters Degrees in the relevant specialism.

UCAS points for this pathway:

104

Employee rights and responsibilities

Please note that for Apprenticeship starts from 14/10/2016 onwards ERR is no longer a **mandatory** requirement in all frameworks.

However, it may still be included in some frameworks and where it is not explicitly stated that ERR is not a requirement then confirmation of an Apprentice's ERR achievement will still remain a requirement for Apprenticeship certification purposes.

Is ERR a requirement for this framework?   **YES**   ☐   **NO**   ☒

Delivery and assessment

Framework Developer to complete with relevant info

Level 6, Pathway 3: Applied Cyber Security Management

Description of this pathway

The requirements for Applied Cyber Security Management pathway are:

- Competence and knowledge applied degree qualification = 360 credits
- Essential Skills Wales (where not already satisfied) 3 x 6 credits =18 credits

Entry requirements for this pathway in addition to the framework entry requirements

There are no additional requirements other than the general entry conditions.

Job title(s)	Job role(s)
Security Analyst	Security analysts analyse and assesses vulnerabilities in digital infrastructure (software, hardware, networks), review available tools and countermeasures to remedy the detected vulnerabilities, and recommends solutions and best practices.
Security Engineer	A security engineer performs security monitoring, security and data/logs analysis, and forensic analysis, to detect security incidents, and mounts incident response. Investigates and utilizes new technologies and processes to enhance security capabilities and implement improvements.
Security Architect	A security architect designs a security system or major components of a security system, and may head a security design team building a new security system.
Intrusion Detection Specialist	An intrusion detection specialist monitors networks, computers, and applications in organisations, looking for events and indicators that signal intrusion. Determines the damage caused by detected intrusions, identifies how an intrusion occurred, and recommends safeguards against similar intrusions.

Qualifications

Competence qualifications available to this pathway

N/A

Knowledge qualifications available to this pathway

N/A

Combined qualifications available to this pathway

B1 – BSc (Hons) Computing (Computer Networks & Cyber Security)

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
B1a	233S	University of Wales Trinity Saint David	360	3600	X.

B2 – BSc (Hons) Cyber Security

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
B2a	I100	Wrexham Glyndwr University	360	3600	X.

B3 – BSc (Hons) Applied Cyber Security

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
B3a	nil	Cardiff Metropolitan University	360	3600	X.

Relationship between competence and knowledge qualifications

This is a combined degree qualification that delivers both the knowledge and competence requirements with minimum of 360 credits as set out in the Applied Cyber Security Management degree apprenticeship framework specification.

Applied Cyber Security Degree Apprenticeship Framework High Level Skills and Knowledge

Skills

A Cyber Security degree apprenticeship graduate is able to:

1. Develop the knowledge, skills, and professional competences to operate in aprofessional cyber security environment, through developing a professional approach to:

- Information security governance, risk management, security program development and

management, and security incident management
- Collaboration and teamwork
- Cyber security project delivery
- Presentation and communication.

2. Assist in developing and implementing an information security strategy aligned with business goals and objectives. Identify drivers affecting the enterprise. Develop business cases
justifying investment in information security. Identify legal and regulatory requirements.

3. Identify, analyse and evaluate security threats and hazards to a digital business system or service using relevant external sources of threat intelligence or advice.

4. Establish a process for information asset classification and ownership. Implement a systematic and structured information risk assessment process. Ensure that business impact assessments are conducted periodically. Ensure that threat and vulnerability evaluations are performed on an ongoing basis. Identify and evaluate information security controls and countermeasures. Identify the gap between current and desired risk levels to manage risk to an acceptable level. Report significant changes in information risk to appropriate levels of management.

5. Specify the activities to be performed within an information security program. Ensure alignment between the information security program and other assurance functions. Ensure the communication and maintenance of standards, procedures and other documentation that support information security policies. Monitor, measure, test and report on the effectiveness and efficiency of information security controls and compliance with information security policies.

6. Proactively identify, analyse, manage and respond effectively to unexpected security events that may adversely affect the enterprise's information assets and/or its ability to operate.

Knowledge

A degree apprenticeship Cyber Security graduate should know and understand:

1. The foundations of cyber security, its significance to business and society, the theory and concepts such as; security, identity, confidentiality, integrity, availability, threat, vulnerability, risk, hazard and assurance, and how these relate to each other.

2. Understand the broad requirements for effective information security governance, the elements and actions required to develop an information security strategy and a plan of action to implement it.

3. Understand the nature of the information that is being protected to classify it and to identify the impact of such information being compromised.

4. The importance of risk management as a tool for meeting business needs and developing a security management program to support these needs while managing information risk to an acceptable level to meet the business and compliance requirements of the organisation.

5. The broad requirements and activities needed to create, manage and maintain a program to implement an information security strategy. The information security program may consist of a series of projects and initiatives to achieve the objectives the strategy is designed to address as well as ongoing management and administration.

6. How to implement cyber security incident response processes and follow these when an incident is identified.

7. Relevant laws and ethics – describe security standards, regulations and their consequences; the role of criminal and other law; key relevant features of UK and international law.

8. The existing threat landscape, trends and their significance, including how to apply relevant techniques for threat intelligence.

9. The need to embed cyber security resilience requirements throughout application and infrastructure development life cycles.

Applied Cyber Security Degree Apprenticeship Framework Topics and Low Level Outcomes

Learning and Skills Topics for Applied Cyber Security

1. Business
1.1. Business functions, behaviours, ethics, and courtesies
1.2. Business strategy and management.

2. Security concepts and foundations
2.1 Cyber security concepts
2.2 Cyber security threats
2.3 Cyber security vulnerabilities
2.4 Insider threat analysis and management
2.5 Information assurance
2.6 Cyber security culture
2.7 Cyber security awareness.

3. Information security governance
3.1. The legal, regulatory and compliance environment
3.2. The role of assurance in management of the secure enterprise
3.3. Security management standards and policies
3.4. Establish an information security strategy
3.5. Establish and maintain an information security governance framework
3.6. Integrate information security governance into enterprise governance
3.7. Establish and maintaining information security policies.

4. Information risk management and compliance

4.1. Risk modelling and analysis

4.2. Risk assessment

4.3. Applied risk management.

5. Information security program development and management

5.1. Implement and execute security programs

5.2. Integrate information security requirements into internal processes and 3rd party contracts

5.3. Monitor information security program metrics.

6. Incident investigation and management

6.1. Security monitoring, analysis and intrusion detection

6.2. Incident response management and handling

6.3. Digital forensics.

7. Personal and interpersonal

7.1. Communications

7.2. Personal attributes

7.3. Professional attributes

7.4. Project responsibilities

7.5. Team working.

Essential Skills

An apprenticeship framework must specify as a Welsh certificate requirement the expected achievement levels of Essential Skills in Communication and the Application of Number, and Digital Literacy (where required).

ESSENTIAL SKILLS WALES

Communication	**N/A**
Application of Number	**N/A**
IT/Digital Literacy	**N/A**

For the current list of acceptable proxy qualifications and appropriate minimum grade/level requirements, please refer to the most recent version of SASW on the gov.wales website. Additional guidance materials can be found on the Knowledge Base section of the ACW website.

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Progression routes into and from this pathway

Progression routes into this pathway include those who:

- have completed the Higher Apprenticeship at Level 4 or 5 and have undertaken a relevant Foundation Degree linked to the Honours degrees listed in this framework
- have completed a relevant HNC/HND that links to the Honours degrees listed in this framework.

Progression from this pathway for those who have completed a degree apprenticeship in Applied Cyber Security(Level 6):

- employment as a cyber security analyst in the job roles stated in this framework or similar job roles
- Masters Degrees in the relevant specialism.

UCAS points for this pathway:

104-112

Employee rights and responsibilities

Please note that for Apprenticeship starts from 14/10/2016 onwards ERR is no longer a **mandatory** requirement in all frameworks.

However, it may still be included in some frameworks and where it is not explicitly stated that ERR is not a requirement then confirmation of an Apprentice's ERR achievement will still remain a requirement for Apprenticeship certification purposes.

Is ERR a requirement for this framework?   **YES**   ☐   **NO**   ☒

Delivery and assessment

Framework Developer to complete with relevant info

The remaining sections apply to all levels and pathways within this framework.

How equality and diversity will be met

Digital Degree Apprenticeship Framework offers no barriers to entry and is intended to accommodate all learners regardless of their gender, age, disability, religious beliefs, or ethnic origins.The learning content required for the off-the-job learning can be delivered in a number of different learning styles to accommodate learner requirements.

Apprenticeships are seen as a vital route to encourage and facilitate a greater diversity of individuals into the industry. Employers and training providers are encouraged to offer additional support and mentoring to ensure that apprentices complete their training.

Training providers and employers MUST comply with the Equality Act 2010 to ensure that applicants are not discriminated against in terms of entry to and promotion within the Industry, using the 9 protected characteristics:

1. Age
2. Disability
3. Gender
4. Gender reassignment
5. Marriage and civil partnership
6. Pregnancy and maternity
7. Race
8. Religion or Belief
9. Sex or sexual orientation.

The following sections are included to identify current workforce demographics. (Data refers to the UK as a whole and to the IT & Telecoms sectors).

Gender Equality

Gender imbalance remains a significant issue for the IT & Telecoms sector. Considering IT & Telecoms professional job roles across all sectors, there has been a drop of female representation from 22% in 2001 to 18% in 2011. This compares to the overall UK workforce being 48% female.

As is the case in industry, gender imbalance is prevalent across IT-related courses, and this is worsening over time throughout the education system. 15% of applicants to Computing degree courses are female and the proportion of females who sat the 2013 Computing A-Level is 6.5%, 1.3 percentage points lower than in 2012.

This under-representation of women across the whole IT & Telecoms sector has a number of causes. These include:

- lack of awareness (by both individuals and career advisors) of the broad range of career opportunities available
- confusion in school teaching of ICT between IT User and IT professional roles.

Instructus initiated or participated in a number of programmes to address this gender gap and encourage girls to consider a career in IT.

Age of Workforce

Analysis of the period 2001-2011 shows a changing trend in the age profile of IT & Telecoms professionals. The proportion of people aged 16-29 has dropped from 33% in 2001 to 19% in 2011.

The average age of IT & Telecoms professionals working in the UK is estimated to be 39 years old, compared with 41 years old for workers more generally. Just under one half (47%) of IT & Telecoms professionals are aged 40 or above and less than one in five (19%) are in the 16-29 age bracket.

A key contributory factor to this changing dynamic in IT & Telecoms is the effect of globalisation. The maintenance of strong apprenticeship programmes in the sector will be vital to ensure that this trend can be halted or reversed in the coming years, thereby ensuring that the sector has the pipeline of skilled professionals that it requires to move into higher level job roles in 5-10 years time.

Ethnicity and Disability

The Information and communication technologies industry is one of the most ethnically diverse industries in the UK, with 13 per cent of the workforce (an increase from 8% of the workforce in 2002) coming from Black, Asian and Minority Ethnic backgrounds compared to nine per cent across the whole economy.

There is significant provision for individuals with disabilities throughout the IT & Telecoms sector with many, varied opportunities for rewarding careers at all levels. This in turn means that apprenticeships are available in a wide range of areas for those with differing levels of disability.

Instructus will monitor take up and achievement of all Apprenticeships through the Apprenticeship Review and Approvals Group (ARAG) and continue to take steps to address any barriers to take up and achievement as part of our Sector Qualifications Strategy.

On and off the job training

Summary of on- and off-the-job training

Total on and off the job training for all pathways

At Level 6, degree apprentices will only be required to undertake the further competence and knowledge training as specified in the qualifications section of the relevant pathway.

The knowledge and skills requirement is met through the achievement of an Honours degree in the relevant pathway that aligns with appropriate degree learning and skills specification – unspecified hours.

Duration of training is measured in years and semesters and delivery of honours degrees will typically vary between three and four years. All the degrees specified within the pathways within this framework are part time.

On and off the job training hours must be planned, reviewed and evaluated jointly between the apprentice, university tutor and employer, mentor or manager.

Education and training support via a tutor, teacher, mentor or manager may be delivered through one or more of the following methods:

-individual and group teaching
-e-learning
-distance learning
-coaching
-mentoring
-feedback and assessment
-collaborative/networked learning.

Off-the-job training

All degree apprentices must achieve the Honours degree in the relevant pathway, including Essential Skills Wales, or Wider Key Skills requirements.

The off-the-job training are those learning activities unde rtaken away from normal work duties.

The minimum required is 900 hours. This is made up of:

-Degree qualification: 720 hours (80%)
-Essential Skills Wales for apprentices without the required levels: 180 hours (20%).

How this requirement will be met

Off-the-job learning will be required for the apprentice to achieve the designated module credits of the combined degree qualification. This may involve a combination of day release, block release, web based learning, mentoring and coaching.

Achievement of the designated module credits and Essential Skills (if required) will be the evidence of completion of the required number of off the job Guided Learning Hours (GLH).

On-the-job training

An apprentice must receive a minimum of 500 hours on the job training for each pathway.

Note: The total number of hours required will be determined by the actual modules, their directed study and assessment requirements.

How this requirement will be met

A degree apprenticeship programme is fundamentally designed to be a work-based programme, whereby HE delivered learning can be immediately applied by apprentices in a real work context.

The degree qualifications contained in the framework reflect the overall design of a degree apprenticeship, containing modules which are designed to be delivered partly within the HE and in the workplace through their directed study and assessment requirements.

Wherever possible, the assessment is undertaken using project based methods with real world workplace examples, ensuring that any knowledge elements in the modules are learned in the work and organisational context.

Off-the-job training needs to achieve the learning outcomes and skills contained in the relevant degree specification.

This will be planned, reviewed and evaluated jointly between the apprentice, university lecturers, employer, mentor/manager through:

- directed study
- projects

feedback and assessment collaborative/networking learning.

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Wider key skills assessment and recognition

While Wider Key Skills are not a **mandatory** part of the framework, training providers are encouraged to provide apprentices the opportunity to achieve them.

For this framework, there are natural opportunities for Wider Key Skills to be embedded within the mandatory units of the following qualifications:

Enter Qualification Names

Improving own learning and performance

Give examples - signpost to specific units in framework qualifications that would meet these requirements

Working with others

Give examples - signpost to specific units in framework qualifications that would meet these requirements

Problem solving

Give examples - signpost to specific units in framework qualifications that would meet these requirements

For more information visit-
www.acwcerts.co.uk/framework_library