

apprenticeship FRAMEWORK

Information Security (Wales)

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Information Security (Wales)

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Framework summary

Information Security

Apprenticeship in Information Security

Pathways for this framework at level 3 include:

Pathway 1: Information Security

Competence qualifications available to this pathway:

N/A

Knowledge qualifications available to this pathway:

N/A

Combined qualifications available to this pathway:

B1 - Level 3 Diploma in Information Security

This pathway also contains information on:

- Employee rights and responsibilities
- Essential skills

Information Security

Higher Apprenticeship in Information Security

Pathways for this framework at level 4 include:

Pathway 1: Information Security

Competence qualifications available to this pathway:

C1 - Level 4 Diploma in Information Security Professional Competence

Knowledge qualifications available to this pathway:

K1 - Level 4 Diploma for ICT Professionals - Systems and Principles

K2 - BTEC level 4 HNC Diploma in Computing and Systems Development

Combined qualifications available to this pathway:

B1 - Diploma in Information Security Professional

This pathway also contains information on:

- Essential skills

Framework information

Information on the Publishing 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.

Issue number: 6	This framework includes:
Framework ID: FR04315	Level 3 Level 4
Date this framework is to be reviewed by: 31/12/2017	This framework is for use in: Wales

Short description

This Apprenticeship framework provides the skills and knowledge to become a professional in the field of Information Security (which includes Cyber Security). This level 3 framework covers jobs in areas such as:

- Network Security
- Secure Systems Development
- Information Assurance
- Penetration Testing

The Apprenticeship programme combine skills and knowledge development with employment in an Information Security role, meaning that apprentices are paid throughout the programme. Apprentices will apply and improve their skills in the workplace to build on instructor-led learning.

Contact information

Proposer of this framework

Development of this framework has been driven by employers who have identified an urgent need to increase the supply of suitably qualified people into Information Security roles. According to research undertaken by Frost and Sullivan on behalf of (ISC)² published in 2011 (the 2011 (ISC)² Global Information Security Workforce Study), there was an estimated 2.28 million IS Professionals globally, with an estimated requirement by 2015 of 4.2 million, therefore estimating a global shortfall of 54%.

Employers specifically supporting the development of this framework include:

- BT
- Direct Line
- Fujitsu
- IBM UK
- Kainos
- Logica (now part of CGI)
- Medical Mosaic
- Oracle
- QinetiQ
- Royal Mail
- Ministry of Defence

In addition development is supported by

- The Institute for Information Security Professionals (IISP)
- Council of Registered Ethical Security Testers (CREST)
- Institute of Engineering and Technology (IET)

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Revising a framework

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Why this framework is being revised

Addition of qualifications and other amendments

Summary of changes made to this framework

Addition of new qualifications at Level 3 and 4

Removal of ERR requirements

Change in minimum number of credits required

Qualifications removed

Nil

Qualifications added

Agored Cymru combined qualifications at Levels 3 and 4

Qualifications that have been extended

Nil

Purpose of this framework

Summary of the purpose of the framework

Information (including Cyber) security is one of the most pressing issues of our time. The government has assessed the cost of cyber crime to the UK economy as £27bn a year (Cost of Cyber Crime”: A Detica Report in partnership with the Cabinet Office, February 2011). The National Security Council Strategy October 2010 highlighted attacks on computer networks as among the biggest emerging security threats to the UK, along with international terrorism and international military crises.

Information Security is a business survival issue for every company in every sector, and employers of IT professionals highlight ‘IT security and data protection’ as the most critical priority for the sector, in terms of both impact and urgency . Companies in every sector face increasing business risk through lack of the necessary security skills. The PWC ‘Global State of Information Security Survey’ shows that across Europe, the majority of businesses have detected cyber security incidents in the last year (93% of large companies and 76% of SMEs), with nearly 1 in 5 having detected 50 or more breaches. (Cyber Security M&A, PriceWaterhouseCoopers, November 2011) These attacks resulted in financial loss, intellectual property theft, loss of shareholder value and loss of customers. The suspected sources ranged from employees and competitors to criminals and terrorists.

Wales already has a significant presence of Information Security employers.

What is an Apprenticeship

An Apprenticeship is a job with an accompanying skills development programme designed by employers in the sector. It allows the apprentice to gain technical knowledge and real practical experience, along with functional and personal skills, required for their immediate job and future career. These are acquired through a mix of learning in the workplace, formal off the job training and the opportunity to practice and embed new skills in a real work context. This broader mix differentiates the Apprenticeship experience from training delivered to meet narrowly focused job needs.

On completion of the Apprenticeship the apprentice must be able to undertake the full range of duties, in the range of circumstances appropriate to the job, confidently and competently to the standard set by the industry

This Apprenticeship programme is designed for new entrants to a role in the Information Security sector, and to provide progression and re-skilling routes for existing IT (and other) Professionals.

Apprentices can work in areas such as:

- Network Security
- Information Assurance
- Penetration Testing
- Secure System Development

What is included in this Apprenticeship?

The apprenticeship is made up of 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 Information Security job roles.

The technical content includes units for Secure System Development (Software & Web), Information Assurance and Governance, IS Risk Assessment & Management and IS Testing (including Penetration Testing).

Aims and objectives of this framework (Wales)

The importance of the sector

Information and Cyber security is an area of significant growth potential globally, with the UK having particular expertise. PWC's assessment is that the market for cyber security products and services will grow close to 10% a year . The need for the government to help develop the UK cyber sector has been highlighted as an important growth area for the economy. According to research undertaken by Frost and Sullivan on behalf of (ISC)² published in 2011 , there was an estimated 2.28 million IS Professionals globally, with an estimated requirement by 2015 of 4.2 million, therefore estimating a global shortfall of 54%.

The prime objective of this framework is to increase the flow of suitably qualified persons into Information Security roles in Wales.

How is an apprenticeship delivered?

An Apprenticeship programme is fundamentally designed to be a work-based programme, whereby instructor-led learning can be immediately applied by apprentices in a real work context.

The qualification contained in the framework reflect the overall design of an apprenticeship. Those units designated as competence units must be assessed in the workplace, and wherever

possible, it is recommended that knowledge units should be assessed in the context of the apprentice's job role.

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

There are no specific entry conditions for this Apprenticeship framework. However, most employers will require good (A*-C) GCSE passes in English and Maths as a minimum for entry into an Information Security job role.

The majority of apprenticeship roles within the Information Security sector require:

- Individuals to be proactive, fast learners; able to work both in a team and sometimes alone
- The ability to focus on assisting customers and colleagues find solutions to problems
- The ability to work logically and methodically, often under pressure to set deadlines
- Good attention to detail and the ability to deliver what is required, when it is required
- Individuals to be open to change and focus on the requirements of the business at all times

Roles in areas, such as Secure Systems Development would suit individuals who:

- Have an interest in design and creativity, with good attention to detail
- Have a mathematical or analytical mind
- Have good logical reasoning and problem solving skills

Roles in Testing would suit those who:

- Are able to analyse and solve problems
- Have an interest in both hardware and software
- Enjoy working to deadlines and under pressure

Roles in Information Assurance would suit individuals who:

- Have a broad knowledge of technology
- Have excellent interpersonal skills and are comfortable presenting to others

Level 3

Title for this framework at level 3

Apprenticeship in Information Security

Pathways for this framework at level 3

Pathway 1: Information Security

Level 3, Pathway 1: Information Security

Description of this pathway

This pathway covers all job roles in the Information Security sector.

This framework requires a minimum of 114 credits (including Essential Skills Wales).

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)
Junior Network Security Officer	Assisting with the planning, implementing, upgrading and monitoring security measures for the protection of computer networks and information
Junior Information Assurance Officer	Helping to ensure that information is protected from unauthorised access and compromise, is kept secure and only disclosed or shared in compliance with the information assurance and security strategy, relevant standards and legislation
Assistant Secure System Developer	Assisting with the creation of secure software, implementing secure programming techniques
Penetration Tester (Pentest)	Assisting the evaluation of computer and network security by simulating attacks on a computer system or network from external and internal threats

Qualifications

Competence qualifications available to this pathway

N/A

Knowledge qualifications available to this pathway

N/A

Combined qualifications available to this pathway

B1 - Level 3 Diploma in Information Security						
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value	Total qualification time
B1a	601/1487/3	City and Guilds of London Institute	96	477-504	N/A	
B1b	C00/1235/8	Agored Cymru	96	480	N/A	

Relationship between competence and knowledge qualifications

Not applicable - single combined qualification only.

Transferable skills (Wales)

Essential skills (Wales)

Subject	Minimum Level
Communication	2
Application of numbers	2
ICT/Digital literacy	2

For a full list of available proxies for starts on or after 14th October 2016 please see section 35 of the current [SASW](#).

Progression routes into and from this pathway

Entry into this apprenticeship programme may be:

- directly from school or college with the suggested level of academic qualifications
- directly from university with an IT or other degree
- as a career transition from a general IT role or business role.

The Level 3 Apprenticeship programme offers successful apprentices the opportunity to further progress in their studies and go on to undertake a related degree programme.

They could select from Bachelors degrees, Foundation degrees, Higher Nationals or another higher level qualification. Apprentices may also elect to continue within their job role and pursue their learning by undertaking additional technical, business or managerial level training and qualifications.

Apprentices who have completed a Level 3 apprenticeship programme have often progressed within their career to take on team leader or senior level positions, utilising their expanding technical expertise – and guiding and training others within the organisation.

UCAS points for this pathway: N/A

Employee rights and responsibilities

Additional employer requirements

(No requirement specified)

Level 4

Title for this framework at level 4

Higher Apprenticeship in Information Security

Pathways for this framework at level 4

Pathway 1: Information Security

Level 4, Pathway 1: Information Security

Description of this pathway

This pathway covers all roles in Information and Cyber Security.

A minimum of 150 credits is required.

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

Candidates wishing to enter a Higher Apprenticeship will need to have achieved one of the following:

- A Levels, or equivalent educational attainment, including the Level 3 IT Diploma, Welsh or International Baccalaureate or a relevant Level 3 Technical Certificate
- An Apprenticeship (Level 3)
- Employment within the technology/telecommunications industry for a number of years and demonstrated to their employer that they have a reasonable expectation of achieving the required outcomes of the Higher Apprenticeship. This can be supported by the demonstration or evidence of prior achievement or performance in the role prior to starting the Higher Apprenticeship.

Potential apprentices should bear in mind that a Higher Apprenticeship combines the challenges of higher-level education with full-time employment, and should be prepared for the greater volume and level of study than in the Apprenticeship or another Level 3 qualification.

Job title(s)	Job role(s)
Network Security Officer	Contributing to the planning, implementing, upgrading and monitoring security measures for the protection of computer networks and information
Information Assurance Officer	Ensuring that information is protected from unauthorised access and compromise, is kept secure and only disclosed or shared in compliance with the information assurance and security strategy, relevant standards and legislation
Secure System Developer	Creating secure software, implementing secure programming techniques
Penetration Tester (Pentest)	Evaluating computer and network security by simulating attacks on a computer system or network from external and internal threats

Qualifications

Competence qualifications available to this pathway

C1 - Level 4 Diploma in Information Security Professional Competence						
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value	Total qualification time
C1a	601/1789/8	City & Guilds	78	280-380	NA	
C1b	601/3783/6	Pearson	78	280-380	NA	

Knowledge qualifications available to this pathway

K1 - Level 4 Diploma for ICT Professionals - Systems and Principles						
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value	Total qualification time
K1a	600/6124/8	City & Guilds	120	522-725	NA	

K2 - BTEC level 4 HNC Diploma in Computing and Systems Development						
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value	Total qualification time
K2a	500/8254/1	Pearson	120	480	NA	

Combined qualifications available to this pathway

B1 - Diploma in Information Security Professional						
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value	Total qualification time
B1a	C/00/1235/9	Agored Cymru	150	681	N/A	

Relationship between competence and knowledge qualifications

This pathway covers all job roles in the Information and Cyber Security sector. The framework is designed in

this way to provide maximum flexibility for employers and apprentices, due to the constantly changing job roles and technology requirements in the sector.

The Level 4 'Diploma in Professional Competence' contains a wide range of units that can be selected by employers, apprentices and training providers to match any of the job roles required in the sector.

The knowledge qualifications are designed to be suitable for all job roles, and should be selected based on the apprentice's job role. Foundation Degrees or CertHEs may be used with prior approval obtained from the Tech Partnership and this framework updated accordingly.

Transferable skills (Wales)

Essential skills (Wales)

Subject	Minimum Level
Communication	2
Application of numbers	2
ICT/Digital literacy	2

For a full list of available proxies for starts on or after 14th October 2016 please see section 35 of the current [SASW](#).

Progression routes into and from this pathway

Following the completion of the Level 4 Higher Apprenticeship framework, successful apprentices will be able to follow up on their knowledge studies and continue on to complete full Honours degree programmes.

Other industry recognised, role-specific qualifications:

- Project Management training and accreditation (PRINCE2, MSP, PMI, APM and Agile)
- Service Management training and accreditation (ITIL, SDI and ISO/IEC 2000 training)
- Management and Personal Development Training

A wide range of vendor and core technology training – leading to industry recognised qualifications.

Some qualifications entitle membership of a professional organisation, offering networking and career advancement opportunities. For example, becoming a member of a professional organisation:

- The British Computer Society (BCS)
- The Institute of Engineering and Technology (IET)
- The Institute of Telecommunications Professionals (ITP)
- The Institute of Information Security Professionals (IISP)

UCAS points for this pathway: NA

Employee rights and responsibilities

(No requirement specified)

Additional employer requirements

(No requirement specified)

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

How equality and diversity will be met

Instructus Information Security Framework offers no barriers to entry and is intended to accommodate all learners regardless of gender, age, disability or ethnic origin.

The learning content required for the off-the-job learning can be delivered in a number of different learning styles to accommodate learner requirements.

This Apprenticeship framework is primarily designed to help new entrants into the Information Systems workforce, thereby ensuring fair access for all that apply for the programme.

Instructus expects employers and training providers to comply with the Equality Act 2010 to ensure that applicants are not discriminated against in terms of entry to, and progression within the sector, using the protected characteristics.

The following sections are included to identify current workforce demographics.

(Data refers to the UK as a whole and to the whole of the IT & Telecoms sector of which Information Security is a part)

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 including:

- a 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 has 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.

On and off the job training (Wales)

Summary of on- and off-the-job training

The minimum total number of training hours which each apprentice must receive is 677 hours (inclusive of Essential Skills Wales).

Recognition of prior learning (RPL) is encouraged e.g. relevant content from the Welsh Baccalaureate.

Training hours are delivered during contracted working hours under an Apprenticeship Agreement, or must have been completed no more than three years prior to commencing the apprenticeship.

On and off the job training hours:

- must be planned, reviewed and evaluated jointly between the apprentice and tutor, teacher, mentor or manager;
- must allow 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

Off-the-job training are those learning activities undertaken away from normal work duties. The minimum required is 345 hours.

This is made up of:

- Qualification units: 145 hours
- Employee Rights and Responsibilities: 20 hours
- Essential Skills Wales (for apprentices without the required levels): 180 hours

How this requirement will be met

Off-the-job learning will be required for the Apprentice to achieve the designated knowledge units of the combined Diploma qualification. This may involve a combination of day release, block release, web based learning, mentoring and coaching.

Achievement of the designated knowledge units, ERR and Essential Skills (if required) will be evidence of completion of the required number of off the job GLH.

On-the-job training

An apprentice must receive a minimum of 332 hours on the job training.

How this requirement will be met

An Apprenticeship programme is fundamentally designed to be a work-based programme, whereby instructor-led learning can be immediately applied by apprentices in a real work context.

The qualification contained in the framework reflects the overall design of an apprenticeship, containing some units which are designed to be delivered off-the-job and competence based units which are designed to be delivered on-the-job.

Wherever possible, the competences should be assessed holistically in the workplace, ensuring that any knowledge elements in the units are learned in the work and organisational context. This can be recorded by any suitable means including, for example, portfolios of work, performance reviews and work logs/diaries.

The discrete knowledge units must be taught 'off-the-job' and assessed using assignments or tests in order to ensure the apprentice has gained an appreciation of the wider impact of Information Security in business and society and understands the underpinning theory and principles required for their role.

An Apprentice can plan and review their use of predefined or commonly used tools and techniques for complex and non-routine activities. As a result of reviewing their work, they will be able to devise solutions in the use of these in order to improve productivity for themselves and others.

Through coaching on-the-job, they will develop transferable skills and techniques for self-help and in turn be prepared to offer support and advice to others.

Evidence of guided learning hours undertaken should be recorded in the apprentice's Individual Learning Plan, and updated at 12 week reviews throughout the programme. On completion of the Apprenticeship, the total number of guided learning hours can be evidenced through submission of the Combined Qualification, Essential Skills Wales and Employee Rights and Responsibilities.

Essential employability skills (Wales)

Essential employability skills

(No requirement specified)

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