

Skills
Development
Scotland

**Foundation Apprenticeship in
Software Development at SCQF level 6
Learning Provider Guide
to Support Employers**



Goudham

former Foundation Apprentice
now Graduate Apprentice

Aims

The aim of this guide is to support Learning Providers to identify and discuss with employers' appropriate activities for learners during a Foundation Apprenticeship work placement.

It provides the following information:

- What are Foundation Apprenticeships?
- The definition of work-based learning in the context of Foundation Apprenticeships
- How a Foundation Apprenticeship is delivered
- How employers can support learners
- An understanding of the Scottish Vocational Qualification (SVQ) units within Foundation Apprenticeship qualifications
- Practical examples of work-based activities and evidence for the SVQ units within the Foundation Apprenticeship in Information Technology: Software and Development at SCQF Level 6 (GR54 46)
- Links to useful resources

“Doing the Foundation Apprenticeship at school gave me the edge when it came to my interview - it was easy to talk about my experiences”

Goudham, former Foundation Apprentice now Graduate Apprentice



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now Graduate Apprentice

What are Foundation Apprenticeships?

Foundation Apprenticeships are designed to provide school pupils with industry experience whilst gaining a work-based learning qualification at the same level as a Scottish Higher (SCQF Level 6).

A Foundation Apprenticeship is an industry-recognised qualification, designed to offer valuable insight and experience of the world of work. Delivered by learning providers in partnership with employers, knowledge gained is supported through a series of practical activities including industry projects or placements undertaken virtually and/or in person.

Foundation Apprenticeships at SCQF Level 6 are available in a wide range of subjects that are linked to the growth sectors of the Scottish economy:



Accountancy



Business Skills



Civil Engineering



Creative and Digital Media



Engineering



Financial Services



Food and Drink Technologies



Hardware and System Support



Scientific Technologies



Social Services and Healthcare



Social Services Children and Young People



Software Development

What is work-based learning and how does it apply to Foundation Apprenticeships?

For the purposes of this guide, work-based learning means learning that is directly linked to skills and knowledge required to operate competently in a workplace. A major component of a Foundation Apprenticeship is the sector specific work-based learning. In this context, work-based learning relates directly to the activities undertaken by learners whilst they are on a work-placement.

This provides the first-hand experience for learners to acquire sector specific skills, apply knowledge and reflect on their learning. These activities count towards the overall learning and assessment of the units from the Vocational Qualification within each Foundation Apprenticeship.

How is a Foundation Apprenticeship delivered?

Foundation Apprenticeships are chosen as a subject choice in S5 or S6 and taken alongside other National and Higher qualifications. Pupils work towards the Foundation Apprenticeship qualification over either one or two years.

Learning providers work alongside employers to develop the knowledge and skills learners need to meet all the outcomes of the Foundation Apprenticeship qualification. This includes the classroom-based teaching of knowledge and understanding elements of the Foundation Apprenticeship undertaken with the Learning Provider. This is combined with work-based learning opportunities with an employer to provide learners with the experiential learning they need to apply their learning directly in the workplace,

ultimately to meet the requirements of the SVQ units of the Foundation Apprenticeship qualification.

Learners attendance depends on whether they take part in a 1 year or a 2-year programme.

- 1 year = 1 day with employer and 1 day or 2 half days at college or training centre
- 2 years = 1st year – 1 day a week at college or training centre with some employer input = 2nd year = 1 day a week at work placement.

Attendance on the programme will be a mix of classroom-based activity and employer placement. The placement element is typically one day per week but can be flexible to meet the needs of the sector and employer for example, block intake.

¹ The term 'learners' is used in this guide to refer to pupils.

Employer involvement

The involvement of employers is a critical aspect of Foundation Apprenticeships and includes:

- Providing learners with a work placement to enable them to gain valuable experience in the workplace
- Providing learners with appropriate work-based opportunities to enable them to develop their learning and skills
- Ensuring all work-based learning provided is based on current expertise, equipment, practices and processes
- Setting employer led projects industry challenge projects

Employers may also be involved in other activities, for example, the recruitment and selection process, guest speaking, coaching and mentoring, and in the assessment of practice of learners.

The learning provider meets regularly with employers to provide on-going support and ensure learners are being supported and are working on the right types of activities.

Scottish Vocational Qualification units

It is important that employers understand the SVQ units within a Foundation Apprenticeship, as this will help them to provide learners with access to work-based activities that are relevant to the SVQ units they need to complete.

Within every Foundation Apprenticeship there are a number of SVQ units which relate to a particular occupational function, and which provide the standards upon which competence is assessed in the workplace.

SVQ units are derived directly from National Occupational Standards (NOS) which describe what an individual needs to do (performance criteria), know and understand (knowledge and understanding criteria) to demonstrate competence in the unit. Evidence (assessment) requirements specify the type and amount of evidence required for the unit and are developed by an Awarding Body to complete the unit

development when it is used to form part of a qualification structure.

Learners must provide evidence they are competent across all criteria to meet the requirements of all SVQ units within the Foundation Apprenticeship. All evidence is assessed against the standards and leads to an overall judgment being made by an assessor on whether the learner is competent or not yet competent. Where a learner is found to be not yet competent in any part of the standards, they will be given the opportunity for further training and to provide further evidence for assessment at a later date.

Acceptable performance in a unit will be the satisfactory achievement of the standards set out in the SVQ unit specification. Every SVQ unit has knowledge statements which underpin competence.

About the assessment of SVQ units

Assessment is the process of evaluating an individual's attainment of knowledge, understanding and skills. Assessment of the SVQ units involves generating and collecting evidence of a learner's attainment of knowledge, understanding and skills and judging that evidence against defined standards.

The Guide to Assessment covers a wide range of assessment methods in unit assessments for school, college and workplace qualifications as well as external assessment for National Qualifications. There are three essential forms of assessment: observation, product evaluation and questioning. Assessment can also use a combination of some or all of the three forms. All assessment methods, such as a project or performance, can be classified under one or more of these forms.

SVQ units are assessed internally by centres, this means that work-place assessors are responsible for deciding whether evidence meets the standards for SVQ units. The assessors are identified by the centre, they are occupationally competent in the role and professionally competent in conducting work-based assessment (or working towards this). The internal assessment decisions

are externally verified by the Awarding Organisation who offers the units.

Evidence must meet the following requirements:

Valid	The assessment method chosen will be appropriate to the standards being assessed. It will produce evidence relevant to the standards.
Authentic	The evidence will be the learner's own work.
Current	The evidence will exemplify the current level of the learner's performance.
Reliable	The assessment decision is comparable and consistent with other assessors within the centre.
Sufficient	The evidence will demonstrate competence over time (e.g. not just a single occasion).

Work Based Challenge Unit

The Work-based challenge unit (J4YL 04) has been included as a mandatory unit within the Information Technology: Software Development SCQF Level 6 Foundation Apprenticeship framework.

The aim of this unit is to give learners the opportunity to work with a local employer to design, develop and deliver a project as part of the Foundation Apprenticeship.

This helps develop the learner's meta skills such as: creativity, team-working and self-management, which can contribute to work readiness alongside the technical skills required for the project.

Learners' participation in project-based learning activity, which builds on the knowledge and skills gained in other component parts of the Foundation Apprenticeship. Learners work through the three stages of a plan, do, review process to generate a portfolio of evidence from the tasks, activities, and self-reflections that have been completed. Project based learning has proven to be an attractive method for learners and employers to work together to solve authentic workplace issues in a collaborative manner.

This Work-based Challenge project builds on the National Progression Award (NPA) and other units in the relevant Foundation Apprenticeship. It requires learners to undertake a work-based challenge project to develop, apply and reflect on the development of their meta-skills. The Work-based Challenge could take the form of a systems analysis project which could deliver an outline systems specification. This could be informed by the following content from the National Progression Award (NPA) in Software Development (GL4W 46):

- Computing: Applications Development (SCQF level 6) (H6S9 46)

Outcome 1 Create a design document for the development of an application.

Outcome 4 Evaluate an application, the development process and personal performance.

- Software Design and Development (SCQF level 6) (J27C 76)

Outcome 2 Develop modular programs using one or more software development environments.

- Computing: Authoring a Website (SCQF level 6) (F3T2 12)

Outcome 1 Describe the main factors influencing website development.

Additionally, the Work-based Challenge also has relevance to the following units within the Foundation Apprenticeship:

- Investigating and Defining Customer Requirements for IT and Telecoms Systems 2 (H3AH 04)



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Links to useful resources

Foundation Apprenticeship Guidance Note:

[Software Development Framework](#)

This document provides all the information needed to deliver the Foundation Apprenticeship in Software Development at SCQF Level 6.

[Developing the Young Workforce](#)

Work Placements Standard: This document sets out the expectations for a young person, school, employer, local authority and parent/carer, before, during and after work placements. Refer to this document for information to help improve the quality of learning in the workplace.

[SQA Guide to Assessment](#)

This guide is designed to provide support for everyone who assesses SQA qualifications. It covers the full range of SQA qualifications and is based around the principles of assessment, that all qualifications must be valid, reliable, practicable, equitable and fair. Refer to this document for information on unit content and standards, methods of assessment and acceptable evidence.

[FA Placement Options](#)

[Meta skills support documentation](#)

[Employer Welcome Pack](#)

This guidance has been developed to share best practice and support employers to get the best experience from their involvement in Foundation Apprenticeships.

Practical Examples

Examples of activities and evidence for the SVQ units: A Foundation Apprenticeship in Information Technology: Software Development at SCQF level 6 (GR54 46)

These examples aim to support employers with identifying suitable work-based activities to develop the practical skills of S5 and S6 pupils during the work placement component of the Foundation Apprenticeship in Information Technology:

Software Development at SCQF level 6 (GR54 46). The Foundation Apprenticeship in Information Technology: Software Development at SCQF level 6 includes four mandatory SVQ units from the Diploma for IT and Telecommunications Professionals. The units are delivered and assessed while on placement in the workplace:

- H3AH 04 Investigating and Defining Customer Requirements for IT & Telecoms Systems 2
- H3BA 04 Data Modelling 1
- H3C5 04 Health and Safety in IT & Telecoms
- H3A4 04 Event Driven Computer Programming 2
- H3AE 04 Procedural Programming 2
- H3AB 04 Object Orientated Computer Programming 2

The table below provides generic examples of typical work-based activities and examples of possible evidence which may support the development of the practical skills within each of the SVQ units. Please note, these are examples and are not intended to be prescriptive. Some examples of activities and evidence are holistic in nature, therefore may cover several performance criteria (and knowledge and understanding) within a unit and/or across units, as opposed to aligning with a single performance criteria. This supports good practice in the holistic approach to assessment, which in turn reduces the volume of evidence required by learners and reduces bureaucracy in assessment.

It is important to note not all work-based activities may be suitable for a pupil to undertake (e.g. not an employee).

H3AH 04 Investigating And Defining Customer Requirements For It & Telecoms Systems 2

Learning Outcomes	Assessment Criteria	Examples of work-based activities which may support learners to develop the required practical skills in the unit	Examples of evidence which may support learners to demonstrate the practical skills in the unit (product evaluation, observation and questioning)
<p>1 Understand how to investigate and define system requirements</p>	<ul style="list-style-type: none"> ■ 1.1 Describe the types of needs and constraints which need to be identified to inform the design of an IT or Telecoms system ■ 1.2 Describe common investigative methods and state the types of information which they can be used to elicit ■ 1.3 Describe the type of defects which can arise in information ■ 1.4 Explain the importance of preserving the security and confidentiality of information 	<ul style="list-style-type: none"> ■ Researching the design and implementation of a new IT Infrastructure install that relates to own work placement ■ Checking company requirements, user needs, existing infrastructure, scope of the work/ project, budget, resources, and project timescale ■ Using investigative methods for collating information e.g. through conducting site surveys and client interviews ■ Discussing the types of information provided, the techniques used and the benefits/ drawbacks this has for the project ■ Using the organisational database to identify and collate required information 	<ul style="list-style-type: none"> ■ Records of own involvement throughout the research ■ Records of planning, agreeing and undertaking the research task ■ Copy of final research outcome e.g. report or presentation ■ Copies of accurately completed documents ■ Completed logbook of own activities ■ Completed report including details of your client interviews and site surveys ■ Personal statement/and or witness testimony
<p>2 Contribute to the investigation and definition of system requirements</p>	<ul style="list-style-type: none"> ■ 2.1 Correctly use specified investigative methods to gather information on existing systems and processes ■ 2.2 Accurately record gathered information using specified documentation 	<ul style="list-style-type: none"> ■ Outlining the best network solution for the organisation to consider ■ Designing a network to meet the business needs of the organisation within an agreed budget and timescales 	<p>▲ See above</p>

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Learning Outcomes	Assessment Criteria	Examples of work-based activities	Examples of evidence
<p>3 Understand the ethical and legislative environment relating to IT activities</p>	<ul style="list-style-type: none"> ■ 2.3 Review own gathered information to identify defects and, where necessary, take action to remedy identified defects ■ 2.4 Analyse specified information to identify current and future functionality and capacity needs ■ 2.5 Accurately record the results of analyses using standard documentation ■ 2.6 Follow organisational procedures to preserve the security and confidentiality of information 	<ul style="list-style-type: none"> ■ Compiling a report with your suggestions and recommendations including: <ul style="list-style-type: none"> - Company requirements - User needs - Existing infrastructure - Project scope - Budget - Resources - Project timescale ■ Following the organisation's procedures to ensure compliance with data protection, security and confidentiality of any data sourced from employees and the organisation e.g. information interviews and surveys 	<p>◀ See previous page</p>

Notes

A holistic approach has been taken to provide examples of activities and evidence which cover performance criteria within and across units. This promotes efficient and effective gathering of evidence.

Any element that involves sensitive data should be anonymised.

Guidance on simulation can be found in the Assessment Strategy. Where permitted, simulation should only be undertaken in a minority of situations, for example where there is a potential risk to the learner or others. To be effective, simulation must succeed in recreating the atmosphere, conditions and pressures of the real situation.

H3BA 04 Data Modelling 1

Learning Outcomes	Assessment Criteria	Examples of work-based activities which may support learners to develop the required practical skills in the unit	Examples of evidence which may support learners to demonstrate the practical skills in the unit (product evaluation, observation and questioning)
<p>1 Know the concepts of logical data modelling</p>	<ul style="list-style-type: none"> ■ 1.1 Identify entities, attributes and relationships ■ 1.2 State the objectives of data normalisation and describe how the process is carried out ■ 1.3 Describe the purpose of keys 	<ul style="list-style-type: none"> ■ Investigating at the concepts of database design 	<ul style="list-style-type: none"> ■ Screenshots of the data model including testing ■ Personal statement and/or witness testimony detailing own contributions at each stage of the work
<p>2 Use data modelling techniques to create logical data models</p>	<ul style="list-style-type: none"> ■ 2.1 Identify and name entities and their attributes, assigning the correct type and size ■ 2.2 Identify and represent appropriate entity relationships ■ 2.3 Use a standard notation to create a logical data model of a normalised data set 	<ul style="list-style-type: none"> ■ Developing a data model for a small database application system ■ Identifying entities, attributes and relationships and insert them into a table ■ Describing a step by step process of normalisation to 2nd form normalisation ■ Describing the purpose of keys and how they relate to the data model ■ Creating a database with relevant name entities and their attributes ■ Assigning the correct type and size ■ Identifying and implementing appropriate entity relationships ■ Creating an entity relationship diagram to 2nd normalised form ■ Running a number of queries and reports to confirm the database is configured correctly and returns expected outputs 	<p>▲ See above</p>

Notes

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H3C5 04 Health and Safety in IT & Telecom

Learning Outcomes	Assessment Criteria	Examples of work-based activities which may support learners to develop the required practical skills in the unit	Examples of evidence which may support learners to demonstrate the practical skills in the unit (product evaluation, observation and questioning)
1 Comply with relevant Health & Safety procedures	<ul style="list-style-type: none">■ 1.1 Identify relevant organisational Health & Safety procedures■ 1.2 Identify available sources of Health & Safety information■ 1.3 Demonstrate how relevant Health & Safety procedures have been followed	<ul style="list-style-type: none">■ Attending relevant Health & Safety training sessions and meetings■ Reading and comprehension of organisational policies, standards and procedures e.g. Health & Safety, information security and confidentiality policies and procedures■ Undertaking a workstation assessment■ Completing a research task which enables the learner to understand and apply organisational Health & Safety procedures■ Identifying and reporting any Health & Safety issues within own area of work	<ul style="list-style-type: none">■ Records of training attended■ Records of attending meetings including own contributions■ Questioning by assessor■ Emails■ Completed Health & Safety checks■ Copies of accurately completed Health & Safety documentation■ Records of reporting issues according to organisational procedures■ Personal statement and/or witness testimony detailing Health & Safety procedures demonstrated in your day-to-day activity

Notes

A holistic approach has been taken to provide examples of activities and evidence which cover performance criteria within and across units. This promotes efficient and effective gathering of evidence.

Any element that involves sensitive data should be anonymised.

Guidance on simulation can be found in the Assessment Strategy. Where permitted, simulation should only be undertaken in a minority of situations, for example where there is a potential risk to the learner or others. To be effective, simulation must succeed in recreating the atmosphere, conditions and pressures of the real situation.

Simulation should only be undertaken in a minority of situations when the learner is unable to complete the standards because of the lack of opportunity within their practice. Simulation may also be considered if there is a potential risk to the learner or others. Evidence of competence in such situations is viewed as essential to ensure best practice and confidence in the learner's ability to act appropriately. Further information can be found in the Assessment Strategy.

H3A4 04 Event Driven Computer Programming 2

Learning Outcomes	Assessment Criteria	Examples of work-based activities which may support learners to develop the required practical skills in the unit	Examples of evidence
<p>1 Implement a software design using event driven programming</p>	<ul style="list-style-type: none"> ■ 1.1 Identify the screen components and data and file structures required to implement a given design ■ 1.2 Select, declare and initialise variable and data structure types and sizes to implement design requirements. ■ 1.3 Select and assign properties to screen components to implement design requirements ■ 1.4 Select and associate events (including parameter passing) to screen components to implement design requirements. ■ 1.5 Implement event handling using control structures to meet the design algorithms ■ 1.6 Select and declare file structures to meet design file storage requirements 	<ul style="list-style-type: none"> ■ Taking output from units such as Investigating and Defining Customer Requirements to define the software solution. ■ Listening, sharing and contributing to ideas presented by colleagues and team members in a positive way with a view to developing a solution. ■ Attending team meetings to discuss project plan that will include design, develop, implement, test, evaluate. ■ Listening to others and accepting praise or criticism in a positive way e.g. team meetings, supervisor. ■ Developing a program solution in line with employer direction and utilising features of programming language to good effect. ■ Presenting progress of solutions regularly to employer 	<ul style="list-style-type: none"> ■ Recordings of witness testimony by assessor/mentor/supervisor ■ Notes of meetings and points discussed and/ or personal statement signed by team leader/ supervisor ■ Record of observation and/or witness testimony by assessor/mentor/supervisor indicating: <ul style="list-style-type: none"> - How the learner listened, considered, contributed and presented ideas in a positive way at the appropriate time and place - The feedback given to colleagues and how this was done ■ Records of sharing own/team ideas using the company's systems and processes ■ Personal statement detailing activities carried out by the learner and signed by supervisor ■ Feedback on performance from supervisor/mentor ■ Copies of records or documents completed by the learn ■ Fully documented solution including test scripts, code listings and screen grabs

Learning Outcomes	Assessment Criteria	Examples of work-based activities which may support learners to develop the required practical skills in the unit	Examples of evidence
	<ul style="list-style-type: none"> ■ 1.7 Select and use standard input/output commands to implement design requirements ■ 1.8 Make effective use of operators and predefined functions ■ 1.9 Make effective use of an Integrated Development Environment (IDE) including code and screen templates 	<p>◀ See previous page</p>	<p>◀ See previous page</p>
<p>2 Refine an event driven program to improve quality</p>	<ul style="list-style-type: none"> ■ 2.1 Use an agreed standard for naming, comments and code layout ■ 2.2 Define user functions to replace repeating code sequences ■ 2.3 Implement data validation for inputs ■ 2.4 Identify and implement opportunities for error handling and reporting. 		

Learning Outcomes	Assessment Criteria	Examples of work-based activities which may support learners to develop the required practical skills in the unit	Examples of evidence
<p>3 Test the operation of an event driven program</p>	<ul style="list-style-type: none"> ■ 3.1 Make effective use of the debugging facilities available in the IDE ■ 3.2 Prepare a test strategy ■ 3.3 Select suitable test data and determine expected test results ■ 3.4 Record actual test results to enable comparison with expected results ■ 3.5 Analyse actual test results against expected results to identify discrepancies ■ 3.6 Investigate test discrepancies to identify and rectify their causes 	<p>◀ See previous page</p>	<p>◀ See previous page</p>
<p>4 Document an event driven program</p>	<ul style="list-style-type: none"> ■ 4.1 Create on-screen help to assist the users of a computer program ■ 4.2 Create documentation for the support and maintenance of a computer program 		

H3AE 04 Procedural Programming 2

Learning Outcomes	Assessment Criteria	Examples of work-based activities which may support learners to develop the required practical skills in the unit	Examples of evidence
<p>1 Implement a software design using procedural programming</p>	<ul style="list-style-type: none"> ■ 1.1 Identify the program modules, data and file structures required to implement a given design ■ 1.2 Select, declare and initialise variable and data structure types and sizes to implement design requirements ■ 1.3 Select and implement control structures to meet the design algorithms ■ 1.4 Select and declare file structures to meet design file storage requirements ■ 1.5 Select and use standard input/output commands to implement design requirements ■ 1.6 Make effective use of operators and predefined functions ■ 1.7 Correctly use parameter passing mechanisms 	<ul style="list-style-type: none"> ■ Taking output from units such as Investigating and Defining Customer Requirements to define the software solution ■ Listening, sharing and contributing to ideas presented by colleagues and team members in a positive way with a view to developing a solution ■ Attending team meetings to discuss project plan that will include design, develop, implement, test, evaluate ■ Listening to others and accepting praise or criticism in a positive way e.g. team meetings, supervisor ■ Developing a program solution in line with employer direction and utilising features of programming language to good effect ■ Presenting progress of solutions regularly to employer 	<ul style="list-style-type: none"> ■ Recordings of witness testimony by assessor/mentor/supervisor ■ Notes of meetings and points discussed and/ or personal statement signed by team leader/ supervisor ■ Record of observation and/or witness testimony by assessor/mentor/supervisor indicating: <ul style="list-style-type: none"> - How the learner listened, considered, contributed and presented ideas in a positive way at the appropriate time and place - The feedback given to colleagues and how this was done ■ Records of sharing own/team ideas using the company's systems and processes ■ Personal statement detailing activities carried out by the learner and signed by supervisor. ■ Feedback on performance from supervisor/mentor ■ Copies of records or documents completed by the learn ■ Fully documented solution including test scripts, code listings and screen grabs

Learning Outcomes	Assessment Criteria	Examples of work-based activities which may support learners to develop the required practical skills in the unit	Examples of evidence
<p>2 Refine a procedural program to improve quality</p>	<ul style="list-style-type: none"> ■ 2.1 Use an agreed standard for naming, comments and code layout ■ 2.2 Define user functions to replace repeating code sequences ■ 2.3 Implement data validation for inputs ■ 2.4 Identify and implement opportunities for error handling and reporting 	<p>◀ See previous page</p>	<p>◀ See previous page</p>
<p>3 Test the operation of a procedural program</p>	<ul style="list-style-type: none"> ■ 3.1 Make effective use of available debugging tools ■ 3.2 Prepare a test strategy to an agreed format ■ 3.3 Select suitable test data and determine expected test results ■ 3.4 Record actual test results to enable comparison with expected results 		

Learning Outcomes	Assessment Criteria	Examples of work-based activities which may support learners to develop the required practical skills in the unit	Examples of evidence
	<ul style="list-style-type: none"> ■ 3.5 Analyse actual test results against expected results to identify discrepancies ■ 3.6 Investigate test discrepancies to identify and rectify their causes 	<p>◀ See previous page</p>	<p>◀ See previous page</p>
<p>4 Document a computer program</p>	<ul style="list-style-type: none"> ■ 4.1 Create documentation to assist the users of a computer program ■ 4.2 Create documentation for the support and maintenance of a computer program 		

H3AB 04 Oriented Programming 2

Learning Outcomes	Assessment Criteria	Examples of work-based activities which may support learners to develop the required practical skills in the unit	Examples of evidence
<p>1 Implement a software design using object-oriented programming</p>	<ul style="list-style-type: none"> ■ 1.1 Identify the objects and data and file structures required to implement a given design ■ 1.2 Select, declare and initialise variable and data structure types and sizes to implement design requirements ■ 1.3 Define relationships between objects to implement design requirements ■ 1.4 Implement message passing between objects to implement design requirements ■ 1.5 Implement object behaviours using control structures to meet the design algorithms ■ 1.6 Select and declare file structures to meet design file storage requirements 	<ul style="list-style-type: none"> ■ Taking output from units such as Investigating and Defining Customer Requirements to define the software solution ■ Listening, sharing and contributing to ideas presented by colleagues and team members in a positive way with a view to developing a solution. ■ Attending team meetings to discuss project plan that will include design, develop, implement, test, evaluate. ■ Listening to others and accepting praise or criticism in a positive way e.g. team meetings, supervisor. ■ Developing a program solution in line with employer direction and utilising features of programming language to good effect. ■ Presenting progress of solutions regularly to employer 	<ul style="list-style-type: none"> ■ Recordings of witness testimony by assessor/mentor/supervisor ■ Notes of meetings and points discussed and/ or personal statement signed by team leader/ supervisor ■ Record of observation and/or witness testimony by assessor/mentor/supervisor indicating: <ul style="list-style-type: none"> - How the learner listened, considered, contributed and presented ideas in a positive way at the appropriate time and place - The feedback given to colleagues and how this was done ■ Records of sharing own/team ideas using the company's systems and processes ■ Personal statement detailing activities carried out by the learner and signed by supervisor ■ Feedback on performance from supervisor/mentor ■ Copies of records or documents completed by the learn ■ Fully documented solution including test scripts, code listings and screen grabs

Learning Outcomes	Assessment Criteria	Examples of work-based activities which may support learners to develop the required practical skills in the unit	Examples of evidence
	<ul style="list-style-type: none"> ■ 1.7 Select and use standard input/output commands to implement design requirements ■ 1.8 Make effective use of operators and predefined functions. ■ 1.9 Make effective use of an Integrated Development Environment (IDE) including code and screen templates. 	<p>◀ See previous page</p>	<p>◀ See previous page</p>
<p>2 Refine an object-oriented program to improve quality</p>	<ul style="list-style-type: none"> ■ 2.1 Use an agreed standard for naming, comments and code layout. ■ 2.2 Make effective use of encapsulation, polymorphism and inheritance. ■ 2.3 Implement data validation for inputs. ■ 2.4 Identify and implement opportunities for error handling and reporting 		

Learning Outcomes	Assessment Criteria	Examples of work-based activities which may support learners to develop the required practical skills in the unit	Examples of evidence
<p>3 Test the operation of a procedural program</p>	<ul style="list-style-type: none"> ■ 3.1 Make effective use of available debugging tools ■ 3.2 Prepare a test strategy to an agreed format ■ 3.3 Select suitable test data and determine expected test results ■ 3.4 Record actual test results to enable comparison with expected results ■ 3.5 Analyse actual test results against expected results to identify discrepancies ■ 3.6 Investigate test discrepancies to identify and rectify their causes 	<p>◀ See previous page</p>	<p>◀ See previous page</p>
<p>4 Document a computer program</p>	<ul style="list-style-type: none"> ■ 4.1 Create documentation to assist the users of a computer program ■ 4.2 Create documentation for the support and maintenance of a computer program 		