BCS Digital Industries Apprenticeship

Standard Specific Guidance for Training Providers

Level 4 Software Developer Apprenticeship

Version 6.0
May 2019

Change History

Any changes made to the project shall be clearly documented with a change history log. This shall include the latest version number, date of the amendment and changes made. The purpose is to identify quickly what changes have been made.

Version Number and Date	Changes Made
November 2016 V1.0	Document created from three earlier documents: • Training Provider Reference & Guide • Summative Portfolio Guide • Employer Reference Guide
November 2016 V1.1	Summative portfolio declaration included within Template 5
February 2017 V1.2	SFIA mappings updated to be more focused on the standard and occupational brief competencies and detailed descriptions.
March 2017 V1.3	Proofread final version
January 2018 V2.0	Update to technical competencies, knowledge standards and work activities.
May 2018 V3.0	Removal of typical evidence and update to work activities.
February 2019 V4.0	Updates to proficiencies Business Skills, Complexity, Autonomy and Influence throughout the document.
April 2019 V5.0	Updates to proficiencies Business Skills, Complexity, Autonomy and Influence throughout the document (Roll back to those used in version 3.0)
Version 6.0 May 2019	Complete document layout overhaul. Competencies and proficiencies unchanged.

Contents

Purpose of this Document 4

Introduction 4

The Software Developer Apprentice 5

Knowledge Standards, Technical Competence and Behaviour and Relationship Standards 5

Table 1 – Software Developer – Knowledge Standards 6
Table 2 – Software Developer – Technical Competency Standards 10
Table 3 – Generic Behaviour and Relationship Standards 22

Software Developer Apprentice Templates 29

Template 1 – Training and Development Plan 30
Template 2 – Weekly Diary 39
Template 3 – Periodic Workplace Competence Assessment and Remedial Action Plan 40
Template 4 – The Employer Reference 45
Template 5 – Summative Portfolio Checklist 46
Template 6 – EPA Readiness Check 47

Professional Development 52

Activities Plan 52
Activities Typical Evidence 53

Purpose of this Document

The purpose of this document is to provide useful information and suggested supporting documentation specific to the Software Developer apprenticeship. It should be read in conjunction with the Standard, Occupational Brief and Assessment Plan and is designed to give training providers some tools to help them build their own programme from training plan through to end point assessment (EPA).

This guide will provide supporting information around how to help the apprentice to meet and go beyond the standard and a number of useful documents to support the training provider in meeting their responsibilities in managing the apprenticeship from training plan through to the EPA.

Introduction

The BCS Level 4 Software Developer Apprenticeship is one of the suite of Digital Industries Apprenticeships that have been designed by the industry to address skills shortages and meet the ever-changing needs of UK employers.

The BCS website provides the broad view on how to run an apprenticeship programme to the BCS Digital Industries Standard. This document has been designed to give training providers the tools to build their programme and to assist them in helping apprentices and employers towards the successful completion of each element of the EPA.

The areas where a training provider should be involved in ensuring a successful outcome to the apprenticeship are:

- mapping and assessing work against the standard;
- advising the employer and the apprentice on which knowledge modules, vendor or professional certificates and other relevant training and activities are most appropriate for their requirements, and agree a suitable training plan;
- assisting the apprentice with applying knowledge in the workplace;
- acting as an advisor to the apprentice and the employer to ensure the programme remains on track and any concerns are addressed;
- helping the apprentice to select evidence for their summative portfolio;
- supporting the apprentice through the synoptic project;
- confirming the apprentice's readiness for the EPA.

The following series of checklists can be used by the training provider to help manage the process through to completion. Training providers may substitute their own processes and documentation as they see fit in order to effectively manage their key areas of responsibility as set out above.

The Software Developer Apprentice

The primary role of a software developer is to build and test simple, high-quality code across front end, logic and database layers. A developer will typically be working as part of a larger team, in which they will have responsibility for some of the straightforward elements of the overall project. The developer will need to be able to interpret design documentation and specifications. The customer requirements will typically be defined and agreed by more experienced or specialist members of the team, such as a business analyst or technical architect.

Job titles may be different across different organisations so the role may also be referred to as Web Developer, Application Developer, Mobile App Developer, Games Developer, Software Developer.

Knowledge Standards, Technical Competence and Behaviour and Relationship Standards

Tables 1, 2 and 3 contain details of the topics that the training provider may decide to cover in their development plans and scheduled work activities in order to stretch the apprentice.

Table 1 – Software Developer – Knowledge Standards

The knowledge standards define learning that must take place during the apprenticeship, **both through the activities and the apprentice's own independent learning**. The additional assessment criteria detailed in the table show how a training provider can stretch the apprentice's learning beyond the requirement as set out in the occupational brief. However, it is important to remember that stretching the apprentice in this way will only have a bearing on their final grading if the impact is demonstrated through their competence in the EPA. These knowledge standards, therefore, show the additional learning that may support the apprentice in improving their overall competence.
Technical knowledge and understanding are assessed throughout the apprenticeship through a combination of Ofqual regulated knowledge modules and/or specified vendor and professional qualifications which must be passed before the EPA can take place.

Qualification Name	IFA Knowledge Standard	Occupational Brief Expected Minimum Requirement	Assessment Criteria The Learner Can…
BCS Level 4 Diploma is Software Development Methodologies	Understands and operates at all stages of the software development lifecycle.	• What is the software development lifecycle (SDLC). • What are the seven generic stages and their high-level deliverables from each stage. • What are the main activities in each stage.	Explain the role and function of the software development lifecycle (SDLC).
			Relate the seven generic stages of the software development lifecycle (SDLC). • Feasibility Study; • Requirements Analysis; • Design; • Code Development; • Testing; • Deployment / Implementation; • Maintenance.
			Show the main activities in each stage of the software development lifecycle.
			Demonstrate the high-level deliverables from each stage of the software development lifecycle.
	Understands the similarities and differences (taking into account positives and negatives of both approaches) between agile and waterfall software development methodologies.	• What is the agile development method. • What is the waterfall development method. • What are the strengths and weaknesses of both approaches.	Describe the primary differences between the waterfall and agile software development methods.
			Explain the respective strengths and weaknesses of each of the waterfall and agile software development methods.
			Explain the respective strengths and weaknesses for using either the waterfall or agile software development method in a given case.
	Understands how teams work		Relate the roles and responsibilities within software development and implementation.

Qualification Name	IFA Knowledge Standard	Occupational Brief Expected Minimum Requirement	Assessment Criteria The Learner Can…
	effectively to produce software and contributes appropriately.	• What are the roles that need to be undertaken. • How are these roles distributed across a team. • What team-working aspects are needed to ensure effective delivery of projects.	Summarise the phases of the SDLC.
			Explain the structure of a software development team within an organisation.
			Explain the team-working aspects that are needed to ensure effective delivery of projects.
BCS Level 4 Diploma in Software Languages	Understands and applies software design approaches and patterns and can interpret and implement a given design, compliant with security and maintainability requirements.	• Software design approaches. • Software patterns. • Documenting software designs. • Secure development. • Designing for software maintainability and re-use.	Demonstrate an understanding of the purpose of software design: • To aid Communication between 'actors'. • As a basis for rigorous development. • To provide a standard approach. • To ensure consistency across the development. • To assist in the identification of re-use. • To compare the current situation with the required.
			Understand and apply the use of software design approaches and software patterns in the software design process.
			Explain the rationale for separating functional and non-functional requirements.
			Show how software designs can be documented including how the design documents will be used to support software implementation.

Qualification Name	IFA Knowledge Standard	Occupational Brief Expected Minimum Requirement	Assessment Criteria The Learner Can…
			Demonstrate the need for secure development and give examples of how this can be included within the software implementation process.
			Discover the need for software maintainability and how software can be implemented in a manner that enables re-use and maintainability.
	Understands and applies the maths required to be a software developer (e.g. algorithms, logic and data structures).	• Understanding of basic algorithmic processing to define the problem and/or solution. • Elements of programming logic - variables; assignment statements; data types; conditionals; loops; arrays; and input/output, knowledge of at least two data structures – such as Arrays or Collection Classes.	Explain and demonstrate the following key techniques of maths required for software development: • decomposition; • pattern recognition; • abstraction; • algorithms; • mathematical logic.
			Demonstrate how algorithms are used to create a logical solution to a computable problem: • The use of semi-formal specification of algorithms, based on a simplified computer model. • Development of code from an algorithm. • The use of operators in algorithms, including arithmetic (+; -; *; /; %); assignment (=); relational (==; >; <; !=; >=; <=); logical (&&; ||, !); bitwise; incremental.'
			Apply the primary elements of programming logic.

Table 2 – Software Developer – Technical Competency Standards

The competency standards have been defined to demonstrate that the knowledge learnt has been applied in real work tasks, activities and projects in a business environment. Competencies are assessed throughout the apprenticeship through a combination of the employer reference, the synoptic project and a summative portfolio completed by apprentices from records of the work activities in which they have been involved. The training provider should assist the employer to identify suitable work tasks, activities and projects within the scope of their normal business activities for the apprentice to practice what they have learnt and to demonstrate all the competencies below.

The BCS apprenticeship is mapped to an internationally recognised skills framework and to work activities in which the apprentice would be involved. The following tables set out these competencies and the expected requirements against the work activities that might be demonstrated at and beyond the minimum expectation:

Competency Standard (IfATE Standard)	Expected Requirement (Occupational Brief)	Work Activities Demonstrating Expected Level of Competence
Logic: writes good quality code (logic) with sound syntax in at least one language.	Apprentices can write code to achieve the desired functionality and which is easy to read and understand, with good naming, indentation and commenting, and applying the fundamentals of good coding. • development paradigms (where this is object oriented programming this must include inheritance, abstractions, encapsulation, polymorphism); • software programming languages; • software development tools (IDEs); • writing programs and methods; • language-specific idioms; • logic and flow-of-control. Apprentices can apply: • elements of programming – variables, assignment statements, data types, conditionals, loops, arrays, and input/output; • functions - modular programming dividing a program into components that can be independently debugged, maintained, and reused writing at least two reusable functions; • algorithms and data structures - classical algorithms for sorting and searching, and fundamental data structures.	Designs moderately complex programs and program modifications from supplied specifications, using agreed standards and tools, to achieve a well-engineered result. Creates, amends and keeps track of moderately complex programs in accordance with the design. Documents all work in accordance with agreed standards. Takes part in reviews of own work. Takes part in reviews of the work of colleagues.

Competency Standard (IfATE Standard)	Expected Requirement (Occupational Brief)	Work Activities Demonstrating Expected Level of Competence
User interface: can develop effective user interfaces for at least one channel.	Apprentices can apply the fundamental concepts of human-computer interaction or user experience design, the development practices leading to a high-quality user interface, and the programming techniques required to construct a graphical user interface. Can interact with screen or UI designers to ensure the logic layer integrates with the user interface. Can develop user interface coding and implementation - techniques for building user interfaces – for at least one channel. Can interact with testers to optimise the user interface.	Designs simple applications using templates and tools to specify user/system interfaces, including for example: menus, screen dialogues, wireframes, boned rigs, inputs, reports, validation and error correction procedures, and processing rules. Contributes to detailed designs including for example: user interface (including colour / language / presentation / input methods / error handling and responses), user documentation, program specifications, and backup, recovery and restart procedures. Constructs, interprets and executes test plans to verify accessibility and usability of completed systems. Documents all work using required standards, methods and tools, including prototyping tools where appropriate.

Competency Standard (IfATE Standard)	Expected Requirement (Occupational Brief)	Work Activities Demonstrating Expected Level of Competence
Data: can effectively link code to the database/data sets.	Apprentices can link to a range of database types and embed data queries within their code: • can make a connection to a database; • can execute CRUD statements on the database; • can use one-off queries and stored procedures; Can transform returned data in to format the application requires.	Within a project environment, assists in the investigation of application data and process requirements, documenting them according to the required standards utilising the prescribed methods and tools. Within a project environment, applies data analysis and data modelling techniques, based upon a general understanding of the business process, to establish, modify or maintain a data structure and its associated components (e.g. Entity descriptions, Relationship descriptions, Attribute definitions). Creates, amends and keeps track of moderately complex programs in accordance with the design.

Competency Standard (IfATE Standard)	Expected Requirement (Occupational Brief)	Work Activities Demonstrating Expected Level of Competence
Test: can test code and analyse results to correct errors found using either V-model manual testing and/or using unit testing.	Apprentices can test and analyse their code to identify errors as soon as possible in the coding process and on an interactive basis: • can apply test and debugging strategies; • can design and develop manual or unit tests; Can test code segment functionality against requirements; • can assess test results against expected results and acceptance criteria.	Plans, designs and conducts tests of moderately complex programs; corrects errors and re-tests to achieve an error-free result. Reviews requirements and specifications, and defines test conditions. Analyses test requirements, designs and builds simple test case suites, test scripts, and test procedures, with expected results. Interprets and executes sets of moderately complex test scripts using agreed methods and standards, recording and reporting outcomes. Checks test results, and documents test failures and successes compared with pre-determined criteria, in accordance with agreed standards. Analyses and reports test results to supervisor and/or other colleagues in a clear and concise manner. Identifies and reports issues and risks associated with own work. Reviews and tests non-functional aspects of systems at a high-level.
Problem solving: can apply structured techniques to problem solving, can debug code and can understand the structure of programmes in order to identify and resolve issues	Can use a minimum of two problem solving tools and techniques to identify and resolve programming issues: • can apply structured problem solving methods. • can apply problem-solving techniques to programming activities.	Plans, designs and conducts tests of moderately complex programs; corrects errors and re-tests to achieve an error-free result. Carries out fault diagnosis relating to simple software failures, reporting the results of the diagnosis in a clear and concise manner.

Competency Standard (IfATE Standard)	Expected Requirement (Occupational Brief)	Work Activities Demonstrating Expected Level of Competence
Design: can create simple data models and software designs to effectively communicate understanding of the program, following best practices and standards.	Can take a high level design and can interpret and convert the design in to simple data models and/or programme modules to communicate it to others: • can apply a software design methodologies (e.g., structured or object-oriented); • can use standard design notation such as UML; • can apply data modelling; • can apply reconcile design against analysis models; • can design software solutions to meet requirements.	Designs simple applications using templates and tools to specify user/system interfaces, including for example: menus, screen dialogues, wireframes, boned rigs, inputs, reports, validation and error correction procedures, and processing rules. Assists as part of a team on design of software components of larger systems. Produces components of detailed designs, such as: physical data flows, class diagrams, file layouts, common routines and utilities, program specifications or prototypes, and backup, recovery and restart procedures. Documents all work using required standards, methods and tools, including prototyping tools where appropriate. Designs moderately complex programs and program modifications from supplied specifications, using agreed standards and tools, to achieve a well-engineered result.

Competency Standard (IfATE Standard)	Expected Requirement (Occupational Brief)	Work Activities Demonstrating Expected Level of Competence
Analysis: can understand and create basic analysis artefacts, such as user cases and/or user stories.	Can take a variety of data and business requirements and convert them into basic analysis artefacts to understand and can clarify the intended use of the proposed software. Can identify and represent required functionality (e.g. use cases). Can identify and represent activity workflow (e.g. activity diagrams).	Understands the purpose and benefits of modelling, and uses established techniques as directed to model simple subject areas with clearly-defined boundaries. Elicits and records business/context rules and concepts and confirms them with business experts. Develops models with input from subject matter experts and communicates the results back to them for review and confirmation. Reviews models with more experienced modellers for consistency, completeness and accuracy. May assist in more complex modelling activities. Assists colleagues and clients/users to investigate and model business functions, processes, information flows and data structures, using various methodical and consistent techniques. Assists colleagues and clients/users in specifying information flows, processes/procedures and data objects that align with the needs of the business. Records work with appropriate documentation meeting the required standards, and uses suitable methods and tools.

Competency Standard (IfATE Standard)	Expected Requirement (Occupational Brief)	Work Activities Demonstrating Expected Level of Competence
Deployment: can understand and utilise skills to build, manage and deploy code into enterprise environments.	Can package and build completed programmes as appropriate to the resources available for deployment and for migration to different environments, including: • developing appropriate user documentation; • planning for user training; • data migration.	Assists in the configuration of software and equipment for the systems testing of platform specific versions of one or more software products. Participates in the configuration of software and equipment for systems testing of platform specific versions of one or more software products with minimum supervision. Produces software builds, for loading onto target hardware, from software source code (typically held within a configuration management system). Conducts a series of tests as defined in an integration test specification and records the details of any failures in a concise but complete manner.

Competency Standard (IfATE Standard)	Expected Requirement (Occupational Brief)	Work Activities Demonstrating Expected Level of Competence
Development lifecycle: can operate at all stages of the software development lifecycle, with increasing breadth and depth over time with initial focus on build and test.	Apprentices can operate as software developers showing a good understanding of the other phases of the software development lifecycle and the deliverables that are produced at each stage and as relevant to the development methodology (waterfall, agile, test led etc.) In addition to the stages above, the apprentice can also operate in the support and maintenance phases: • can advise third line support for relevant applications; • can fix bugs and deal with change requests.	Receives and logs requests for application support from help desk, other service delivery staff and/or users. Within own area of competence investigates issues and other requests for application support and determines appropriate actions to take. Within own area of competence and working closely with more senior colleagues, provides correct responses to requests for software application support by means of for example: making modifications to system parameters, developing work-arounds or site-specific enhancements, reconfiguring systems, changing operating procedures, training users or operations staff, producing additional documentation, or escalating requests to other software development staff or software suppliers. Ensures all work is carried out and documented in accordance with required standards, methods and procedures. Provides input to known problem and solution and change management function. May carry out Early Life Support activities such as providing support advice to initial users.

Competency Standard (IfATE Standard)	Expected Requirement (Occupational Brief)	Work Activities Demonstrating Expected Level of Competence
Can apply good practice approaches according to the relevant paradigm (for example object oriented, event driven or procedural).	Apprentices can identify and follow standards and good practice that can improve programming efficiency, style and quality, including: • programming standards, both organisational and external; • generic best practices including readability, reusability, maintainability; • best practice approaches of different paradigms and languages.	Designs moderately complex programs and program modifications from supplied specifications, using agreed standards and tools, to achieve a well-engineered result. Documents all work in accordance with agreed standards. Conducts reviews of supplied specifications, with others as appropriate. Takes part in reviews of own work. Takes part in reviews of the work of colleagues.
Can interpret and follow: • software designs, functional/technical specifications; • company defined 'coding standards' or industry good practice for coding; • testing frameworks and methodologies, and; • company, team or client approaches to continuous integration, version and source control.	Apprentices can adapt to the employer's domain and context for software development and interpret and follow the software development approach being implemented: • can read software designs and functional/technical specifications, especially those based upon the employer domain and context; • can identify, interpret and follow 'coding standards'; • can identify, interpret and follow best practice coding approaches for specific paradigms and languages; • can identify, interpret and follow company, team or client approaches to continuous integration, version and source control.	Designs moderately complex programs and program modifications from supplied specifications, using agreed standards and tools, to achieve a well-engineered result. Documents all work in accordance with agreed standards. Conducts reviews of supplied specifications, with others as appropriate. Interprets and executes sets of moderately complex test scripts using agreed methods and standards, recording and reporting outcomes. Interprets and executes complex test scripts using agreed methods and standards.

Competency Standard (IfATE Standard)	Expected Requirement (Occupational Brief)	Work Activities Demonstrating Expected Level of Competence
Can respond to the business environment and business issues related to software development.	Apprentices can apply the following considerations when working on projects: • business context; • business drivers (efficiency gains, increased functionality and improved quality of outputs).	Receives and logs requests for application support from help desk, other service delivery staff and/or users.
Can operate effectively in their own businesses', their customers' and the industry's environments.	Can demonstrate working within operational requirements such as health and safety, budgets, brands and normal business protocols.	No defined work activities, see expected requirement.
Can apply the maths required to be a software developer (e.g. algorithms, logic and data structures).	Can apply the maths required to be a software developer (e.g. algorithms, logic and data structures).	No defined work activities, see expected requirement.

Below are the criteria for demonstrating if the apprentice is working at a significantly higher level than the expected level of competence:

Criteria for Demonstrating Significantly Higher Competencies.	Key Indicators
Understands and applies a wide range of tools and methods.	This must be in addition to the range of tools required for a pass and demonstrate solid breadth and depth of knowledge, application and purpose of the tools used.
Accurately and appropriately applies and effectively implements the right tools and methods in a variety of different situations.	These situations / tasks must show a wide range and breadth of situations and be in addition to normal day to day work
A sophisticated user - fully exploits the functionality/capability of the tools and methods.	This must demonstrate solid breadth and depth of functionality, application and purpose of the tools selected. That they have researched and understood the rational for use and not just taken directions from others in the selection.
Extensive and deep understanding of different tools and methods and how and why they can be applied in different contexts.	This must demonstrate breadth and depth of the tools selected, why they have been selected and their appropriateness for the different tasks and uses.
Deals confidently and capably with a high level of interrelated and interdependent factors in their work.	This must demonstrate a confident and consistent approach to all areas of their work (both mundane and interesting work). They should have a thorough understanding and appreciation of their reliance and actions on others work.

Table 3 – Generic Behaviour and Relationship Standards

The behaviour and relationship standards have been defined to demonstrate that the apprentice applies the good behaviours and interpersonal skills that are needed in a business environment. Behaviours and business relationship skills are assessed throughout the apprenticeship through a combination of the employer reference, the synoptic project and a summative portfolio, which is completed by apprentices from records of the work activities in which they have been involved. The training provider could assist the apprentice by offering some additional soft skills training over and above their apprenticeship. The apprenticeship standard sets out the attributes required within the occupation brief, which can be accessed via the Apprenticeship section of www.bcs.org.

Behaviour and Relationship Standard	Expected Requirement
Apprentices can demonstrate the full range of skills, knowledge and behaviours required to fulfil their job role.	Understands the scope of the job role. Knows what skills, knowledge and behaviours are needed to do the job well. Are aware of their own strengths in the job role, and any areas for improvement. Appreciate who else is important, for them to do their job and fulfil the role effectively (e.g. colleagues, managers, other stakeholders). Are aware of potential risks in the job role (e.g. security, privacy, regulatory). Use personal attributes effectively in the role (e.g. entrepreneurship). Understand how the job fits into the organisation as a whole. Knows what the net steps in their career might be.
Apprentices can demonstrate how they contribute to the wider business objectives and show an understanding of the wider business environments.	Understands the goals, vision and values of the organisation. Knows how they contribute to these in their own work. Aware of the commercial objectives of the tasks/ projects they are working on. Understands the importance of meeting or exceeding customers' requirements and expectations. Is in tune with the organisation's culture. Aware of the position of the organisation in the economy and its contribution to society. Understands the key external factors that shape the way the organisation function, e.g. regulation. Knows how the organisation can gain advantage in the industry, e.g. through innovation, technology, customer service etc.

Behaviour and Relationship Standard	Expected Requirement
Apprentices can demonstrate the ability to use both logical and creative thinking skills when undertaking work tasks, recognising and applying techniques from both.	Logical thinking: • Understands initial premise(s) and preconditions; • Analyses situations from known facts; • Recognises the conclusion to be reached; • Proceeds by rational steps; • Evaluates information, judging its relevance and value; • Supports conclusions, using reasoned arguments and evidence. Creative thinking: • Looks at situations from a fresh perspective; • Explores ideas and possibilities; • Makes connections between different aspects; • Questions assumptions; • Generates solutions that may be imaginative or unconventional; • Devises new approaches; • Adapts ideas and approaches as conditions or circumstances change.
Apprentices can show that they recognise problems inherent in, or emerging during, work tasks, and can tackle them effectively.	Problem-solving: • Analyses situations; • Defines goals; • Develops solutions; • Prioritises actions; • Deals with unexpected occurrences.

Behaviour and Relationship Standard	Expected Requirement
Apprentices can manage relationships with work colleagues, including those in more senior roles, customers / clients and other stakeholders, internal or external, and as appropriate to their roles, so as to gain their confidence, keep them involved and maintain their support for the task / project in hand. Apprentices can establish and maintain productive working relationships, and can use a range of different techniques for doing so.	Managing relationships: • Understands the value and importance of good relationships; • Adopts a way of working that maintains and improves relationships; • Involves other people in decisions and actions; • Influences others by listening to and incorporating their ideas and views; • Acknowledges other people's accomplishments and strengths; • Overcomes barriers that prevent productive action; • Manages conflict constructively; • Promotes teamwork by encouraging others to participate; Customer/client relationships: • Establishes contact with customers/clients and keeping in touch; • Keeps customers/clients informed ('no surprises'); • Understands their requirements, including constraints and limiting factors; • Sets reasonable expectations; • Involves them in decisions and actions ('co-production'); • Interacts positively with them; • Communicates in different ways; • Provides a complete answer in response to queries ('transparency', 'full disclosure'); • Actively seeks feedback; Stakeholders: • Understands who they are and what their 'stake' is; • Prioritises stakeholders in terms of their importance, power to affect the task and interest in it; • Uses stakeholders' views to shape projects early on; • Gains support from stakeholders, e.g. to win resources; • Agrees objectives; • Manages expectations.

Behaviour and Relationship Standard	Expected Requirement
Apprentices can communicate effectively with a range of people at work, one-to-one and in groups, in different situations and using a variety of methods. Apprentices can demonstrate various methods of communication, with an understanding of the strengths, weaknesses and limitations of these, the factors that may disrupt it, and the importance of checking other people's understanding.	Intention/purpose: • Understands the purpose of communicating in a particular situation or circumstance (e.g. inform, instruct, suggest, discuss, negotiate etc.); • Checks that the person/people with whom one is communicating also understand the purpose; • Is sensitive to the dynamics of the situation; • Is aware of anything that might disrupt the effectiveness of the communication (e.g. status, past history); Method: • Knowing the range of possible communication methods (e.g. spoken, written, graphical, multimedia); • Chooses a good, appropriate method for the situation; • Aware of the limitations of the chosen method, and the possible risks of miscommunication (e.g. ambiguity); • Takes account of the affective dimensions of the method (e.g. body language, tone of voice, eye contact, facial expression etc.); Execution: • Expresses self clearly and succinctly, but not over-simplifying; • Checks that the other person/people understand what is being expressed; • Takes account of the potential barriers to understanding (e.g. filtering, selective perception, information overload); • Modifies the purpose and methods of communication during a situation in response to cues from the other person/people.

These attributes are difficult to measure and are subjective in nature so cannot guarantee that any greater level of competence or proficiency is being demonstrated. The BCS apprenticeship is mapped to the Skills Framework for the Information Age (SFIA), an internationally recognised skills framework and to observable activities that an apprentice working to the level of responsibility appropriate for the role should demonstrate. Accordingly, the proficiencies that should be demonstrated by the apprentice are shown below.

Proficiency Standard	**Work Activities Demonstrating Expected Level of Competence**
Business skills	Demonstrates an analytical and systematic approach to issue resolution. Takes the initiative in identifying and negotiating appropriate personal development opportunities. Demonstrates effective communication skills. Contributes fully to the work of teams. Plans, schedules and monitors own work (and that of others where applicable) competently within limited deadlines and according to relevant legislation, standards and procedures. Appreciates the wider business context, and how their role relates to other roles and to the business of the employer or client.
Complexity	Performs a range of work, sometimes complex and non-routine, in a variety of environments. Applies a methodical approach to issue definition and resolution. Undertakes all work in accordance with agreed safety, technical and quality standards, using appropriate methods and tools.
Influence	Interacts with and influences colleagues. Has working level contact with customers, suppliers and partners. May supervise others or make decisions which impact the work assigned to individuals or phases of projects. Makes decisions which influence the success of projects and team objectives.

Proficiency Standard	Work Activities Demonstrating Expected Level of Competence
Autonomy	Works under general direction. Uses discretion in identifying and responding to complex issues and assignments. Usually receives specific instructions and has work reviewed at frequent milestones. Determines when issues should be escalated to a higher level.

Below are the criteria for demonstrating if the apprentice is working at a significantly higher level than the expected level of proficiency:

Proficiency Standard	Work Activities Demonstrating Competence Beyond the Minimum Expected
Business skills	Works independently and takes high level of responsibility. Undertakes work that is more complex, more critical or more difficult. Independently demonstrates an ability to extend or enhance their approach to work and the quality of outcomes. Doesn't just solve the problem but explores creative or innovative options to do it better, more efficiently, more elegantly or to better meet customer needs. Shows strong project management skills, in defining problem, identifying solutions and making them happen.
Complexity	Demonstrates a disciplined approach to execution, harnessing resources effectively. Drives solutions – with strong goal focused and appropriate level of urgency.
Influence	Externally – works with customers, suppliers, and partners in a variety of situations. Actively inspires and leads others, takes others with them, leads by example.

Proficiency Standard	Work Activities Demonstrating Competence Beyond the Minimum Expected
Autonomy	Internally – works alone, 1:1, in a team and across the company with colleagues at all levels. Reads situation, adapts behaviours, and communicates appropriately for the situation and the audience. Can be trusted to deliver, perform and behave professionally, manages and delivers against expectations, proactively updates colleagues and behaves in line with the highest values and business ethics.

Software Developer Apprentice Templates

The following templates are designed to support the training provider, and will take them from training and development planning, through to the EPA readiness check. As with the tables above they can be used by the training provider to help them manage the process through to completion, although training providers may also substitute their own processes and documentation as they see fit in order to effectively manage their programme.

Template 1 – Training and Development Plan

Apprentice Details

Name	
ULN number	

Employer Details

Contact name	
Company name	
Company address	

Training Provider Details

Contact name	
Company name	
Company address	

Role Mapping Against the Software Developer Standard

For each area of technical and behavioural competence an overall evaluation should be provided on a three-point scale to show how often this competence is required during the normal work carried out by the employer:

- competence is applied most of the time;
- competence is applied some of the time;
- competence is rarely required.

This evaluation could form the basis of an ongoing review with the apprentice on a regular basis.

Workplace Competence Map

This template shows the type of activities that are identified in the apprenticeship standard.

It is recognised that there are differences between the types of work carried out by different employers, so this template provides the opportunity to include any other activity that demonstrates the apprentice's competence during their normal duties.

The tables below could be used to make an evaluation of the apprentice's work environment and detail the work activities that a competent apprentice should be able to undertake. This activity should then lead to a discussion to identify any gaps with the employer and make a plan to redress the balance.

	Is the apprentice required to demonstrate the competency in the normal course of work?		
Competency Standard	**Most of the Time**	**Some of the Time**	**Rarely**
Logic: writes good quality code (logic) with sound syntax in at least one language.	☐	☐	☐
User interface: can develop effective user interfaces for at least one channel.	☐	☐	☐
Data: can effectively link code to the database/data sets.	☐	☐	☐
Test: can test code and analyse results to correct errors found using either V-model manual testing and/or using unit testing.	☐	☐	☐
Problem solving: can apply structured techniques to problem solving, can debug code and can understand the structure of programmes in order to identify and resolve issues.	☐	☐	☐
Design: can create simple data models and software designs to effectively communicate understanding of the program, following best practices and standards.	☐	☐	☐
Analysis: can understand and create basic analysis artefacts, such as user cases and/or user stories.	☐	☐	☐

	Is the apprentice required to demonstrate the competency in the normal course of work?		
Competency Standard	**Most of the Time**	**Some of the Time**	**Rarely**
Deployment: can understand and utilise skills to build, manage and deploy code into enterprise environments.	☐	☐	☐
Development lifecycle: can operate at all stages of the software development lifecycle, with increasing breadth and depth over time with initial focus on build and test.	☐	☐	☐
Can apply good practice approaches according to the relevant paradigm (for example object oriented, event driven or procedural).	☐	☐	☐
Can interpret and follow: • software designs, functional/technical specifications; • company defined 'coding standards' or industry good practice for coding; • testing frameworks and methodologies; • company, team or client approaches to continuous integration, version and source control.	☐	☐	☐
Can respond to the business environment and business issues related to software development.	☐	☐	☐
Can operate effectively in their own businesses', their customers' and the industry's environments.	☐	☐	☐
Can apply the maths required to be a software developer (e.g. algorithms, logic and data structures).	☐	☐	☐

What is your overall evaluation of the apprentice's opportunity to demonstrate the technical competencies in the employer's normal workplace environment?

Please continue on a separate sheet if required.

Knowledge Module Training Plan

The knowledge standards define learning that should take place during the apprenticeship, both through the training provider activities and the apprentice's independent learning. The training provider should work with the employer to identify appropriate training for the apprentice to meet the requirements of the standard and the employer should identify opportunities within the scope of their normal business activities for the apprentice to demonstrate what they have learnt.

Knowledge and understanding will be delivered through BCS qualifications and vendor certifications in accordance with the standard.

Training Plan – Knowledge

BCS qualification	Selected	Vendor certification alternatives (or their direct replacement)	Selected
BCS Level 4 Diploma in Software Development Methodologies	☐	BCS Systems Development essentials	☐
BCS Level 4 Diploma in Software Languages	☐	Cloud certified developer apache Hadoop C++ PHP Drupal Oracle SQL Developer Oracle Java Certified MCP.net MTA/MCP programming in HTML5 with Javascript and CSS3 C#	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Technical Competence Development Plan

The following template may be used to ensure that the apprentice will be given the opportunity to demonstrate each of the required technical competencies stated in the standard.

	Responsibility	Employer ☐	Training Provider ☐
Logic: writes good quality code (logic) with sound syntax in at least one language.			
How will this be ensured?			

	Responsibility	Employer ☐	Training Provider ☐
User interface: can develop effective user interfaces for at least one channel.			
How will this be ensured?			

	Responsibility	Employer ☐	Training Provider ☐
Data: can effectively link code to the database/data sets.			
How will this be ensured?			

Responsibility	Employer ☐	Training Provider ☐

Test: can test code and analyse results to correct errors found using either V-model manual testing and/or using unit testing.
How will this be ensured?

Responsibility	Employer ☐	Training Provider ☐

Problem solving: can apply structured techniques to problem solving, can debug code and can understand the structure of programmes in order to identify and resolve issues.
How will this be ensured?

Responsibility	Employer ☐	Training Provider ☐

Design: can create simple data models and software designs to effectively communicate understanding of the program, following best practices and standards.
How will this be ensured?

Responsibility	Employer ☐	Training Provider ☐

Analysis: can understand and create basic analysis artefacts, such as user cases and/or user stories.
How will this be ensured?

Responsibility	Employer ☐	Training Provider ☐

Deployment: can understand and utilise skills to build, manage and deploy code into enterprise environments.
How will this be ensured?

Responsibility	Employer ☐	Training Provider ☐

Development lifecycle: can operate at all stages of the software development lifecycle, with increasing breadth and depth over time with initial focus on build and test.
How will this be ensured?

Responsibility	Employer ☐	Training Provider ☐

Can apply good practice approaches according to the relevant paradigm (for example object oriented, event driven or procedural).
How will this be ensured?

Responsibility	Employer ☐	Training Provider ☐

Can interpret and follow: • software designs and functional/technical specifications; • company defined 'coding standards' or industry good practice for coding; • testing frameworks and methodologies; • company, team or client approaches to continuous integration, version and source control.
How will this be ensured?

Responsibility	Employer ☐	Training Provider ☐

Can respond to the business environment and business issues related to software development.
How will this be ensured?

Responsibility	Employer ☐	Training Provider ☐
Can operate effectively in their own business's, their customers' and the industry's environments.		
How will this be ensured?		

Responsibility	Employer ☐	Training Provider ☐
Can apply the maths required to be a software developer (e.g. algorithms, logic and data structures).		
How will this be ensured?		

Template 2 – Weekly Diary

Week number	Activities completed	Competencies displayed	Supporting evidence

Template 3 – Periodic Workplace Competence Assessment and Remedial Action Plan

This template can be used to track the competencies being applied in the workplace on a continual / periodic basis. The training provider can then discuss any gaps with the employer and make a plan to redress the balance.

Competence assessment

Is the apprentice meeting the minimum competence standard?	☐

Logic: writes good quality code (logic) with sound syntax in at least one language.
What should the apprentice start, stop or continue doing in order to develop this competence?

Is the apprentice meeting the minimum competence standard?	☐

User interface: can develop effective user interfaces for at least one channel.
What should the apprentice start, stop or continue doing in order to develop this competence?

Is the apprentice meeting the minimum competence standard?	☐

Data: can effectively link code to the database/data sets.
What should the apprentice start, stop or continue doing in order to develop this competence?

Is the apprentice meeting the minimum competence standard?	☐

Test: can test code and analyse results to correct errors found using either V-model manual testing and/or using unit testing.
What should the apprentice start, stop or continue doing in order to develop this competence?

Is the apprentice meeting the minimum competence standard?	☐

Problem solving: can apply structured techniques to problem solving, can debug code and can understand the structure of programmes in order to identify and resolve issues.
What should the apprentice start, stop or continue doing in order to develop this competence?

Is the apprentice meeting the minimum competence standard?	☐

Design: can create simple data models and software designs to effectively communicate understanding of the program, following best practices and standards.
What should the apprentice start, stop or continue doing in order to develop this competence?

Is the apprentice meeting the minimum competence standard?	☐

Analysis: can understand and create basic analysis artefacts, such as user cases and/or user stories.
What should the apprentice start, stop or continue doing in order to develop this competence?

Is the apprentice meeting the minimum competence standard?	☐

Deployment: can understand and utilise skills to build, manage and deploy code into enterprise environments.
What should the apprentice start, stop or continue doing in order to develop this competence?

Is the apprentice meeting the minimum competence standard?	☐

Development lifecycle: can operate at all stages of the software development lifecycle, with increasing breadth and depth over time with initial focus on build and test.
What should the apprentice start, stop or continue doing in order to develop this competence?

Is the apprentice meeting the minimum competence standard?	☐

Can apply good practice approaches according to the relevant paradigm (for example object oriented, event driven or procedural).
What should the apprentice start, stop or continue doing in order to develop this competence?

Is the apprentice meeting the minimum competence standard?	☐

Can interpret and follow: • software designs and functional/technical specifications; • company defined 'coding standards' or industry good practice for coding; • testing frameworks and methodologies; • company, team or client approaches to continuous integration, version and source control.
What should the apprentice start, stop or continue doing in order to develop this competence?

Is the apprentice meeting the minimum competence standard?	☐

Can respond to the business environment and business issues related to software development.
What should the apprentice start, stop or continue doing in order to develop this competence?

Is the apprentice meeting the minimum competence standard?	☐

Can operate effectively in their own business's, their customers' and the industry's environments.
What should the apprentice start, stop or continue doing in order to develop this competence?

Is the apprentice meeting the minimum competence standard?	☐

Can apply the maths required to be a software developer (e.g. algorithms, logic and data structures).
What should the apprentice start, stop or continue doing in order to develop this competence?

Remedial action plan

An important function of the training provider is to act as an advisor to the apprentice and the employer to ensure that the programme remains on track and any concerns are addressed. The training provider should agree how best to provide ongoing assistance / advice throughout the apprenticeship, possibly as part of their contract / service agreement with the apprentice's employer.

If any remedial action is required, the table below could be used to record it.

Please continue on a separate sheet as required.

Template 4 – The Employer Reference

Overview

This template and guidance will assist the training provider in supporting the employer when completing the employer reference, which forms a key part of the EPA. The intent of the employer reference is for the employer to support the apprentice by validating the evidence that they have submitted for EPA.

The employer will be asked to provide an overall evaluation of the apprentice for each area of technical competence and behavioural proficiency, giving detail of how the apprentice meets each requirement.

This guidance shows the type of activities that could demonstrate the required competencies and behaviours being applied in the workplace. There are always differences between individual employers and their requirements so there is the opportunity for the employer to include any other activity that they think demonstrates the apprentice's competence. It should be completed by a senior member of the team, who is able to comment directly on work activities.

The apprenticeship standards are designed to cover a wide range of different job roles so there may be a small number of areas within these mandatory requirements that are not naturally occurring within the day-to-day duties of the apprentice. If it is not possible for the apprentice to demonstrate competence within their duties, a synoptic project should be selected that will allow the apprentice to demonstrate that they are competent in criteria that they are not exposed to during their normal working activities.

The template is provided as a standalone editable document and can be found on the BCS Accredited Provider area. This should be completed by the employer and submitted for review as part of the EPA.

Template 5 – Summative Portfolio Checklist

This template will support the training provider in working with the apprentice and employer to ensure the successful completion of the summative portfolio.

The checklists can be used by training providers to help them manage the process through to completion, although training providers may also substitute their own processes and documentation as they see fit.

The apprentice should gather artefacts and record information that can evidence their activities undertaken in the workplace. The portfolio of evidence should demonstrate that the apprentice can fulfil the full range of competencies which are required by the standard, as shown in this template.

The apprenticeship standards are designed to cover a wide range of different job roles so there may be a small number of areas within these mandatory requirements that are not naturally occurring within the day-to-day duties of the apprentice. If it is not possible for the apprentice to demonstrate competence within their summative portfolio, a synoptic project should be selected that will allow the apprentice to demonstrate that they are competent in criteria that they are not exposed to during their normal working activities.

The template is provided as a standalone editable document and can be found on the BCS Accredited Provider area.

Template 6 – EPA Readiness Check

This template is to support the training provider in assessing whether the apprentice has met the criteria for the EPA, as defined in the standard.

	Is the apprentice ready? ☐
Logic: writes good quality code (logic) with sound syntax in at least one language.	
Comments	

	Is the apprentice ready? ☐
User interface: can develop effective user interfaces for at least one channel.	
Comments	

	Is the apprentice ready? ☐
Data: can effectively link code to the database/data sets.	
Comments	

	Is the apprentice ready? ☐
Test: can test code and analyse results to correct errors found using either V-model manual testing and/or using unit testing.	
Comments	

	Is the apprentice ready? ☐
Problem solving: can apply structured techniques to problem solving, can debug code and can understand the structure of programmes in order to identify and resolve issues.	
Comments	

	Is the apprentice ready? ☐
Design: can create simple data models and software designs to effectively communicate understanding of the program, following best practices and standards.	
Comments	

	Is the apprentice ready? ☐
Analysis: can understand and create basic analysis artefacts, such as user cases and/or user stories.	
Comments	

	Is the apprentice ready? ☐
Deployment: can understand and utilise skills to build, manage and deploy code into enterprise environments.	
Comments	

	Is the apprentice ready? ☐
Development lifecycle: can operate at all stages of the software development lifecycle, with increasing breadth and depth over time with initial focus on build and test.	
Comments	

	Is the apprentice ready? ☐
Can apply good practice approaches according to the relevant paradigm (for example object oriented, event driven or procedural).	
Comments	

	Is the apprentice ready? ☐
Can interpret and follow: • software designs and functional/technical specifications; • company defined 'coding standards' or industry good practice for coding; • testing frameworks and methodologies; • company, team or client approaches to continuous integration, version and source control.	
Comments	

	Is the apprentice ready? ☐
Can respond to the business environment and business issues related to software development.	
Comments	

	Is the apprentice ready? ☐
Can operate effectively in their own business's, their customers' and the industry's environments.	
Comments	

	Is the apprentice ready? ☐
Can apply the maths required to be a software developer (e.g. algorithms, logic and data structures).	
Comments	

Professional Development

Activities Plan

BCS has defined a number of professional development activities that support wider professional and career development. These activities have been associated with the various levels of responsibility, and the activities listed in the table below represent those that are appropriate for an apprentice.

Training providers may wish to engage in assisting the apprentice in some of these activities as they can contribute towards the portfolio of evidence. The recommended activities include those shown below.

Professional Development Activities	Appropriate to the Role	Agreed with Apprentice and Employer
Participating in group activities inside or outside the working environment that can assist with the development of interpersonal skills.	☐	☐
Undertaking unpaid activities that can help to develop professional skills or offer additional insight into, or understanding of, their working role.	☐	☐
Undertaking learning in subjects relevant to, but not directly related to, their role (e.g. mentoring skills, cultural awareness and diversity training), perhaps through self-study or evening classes.	☐	☐
Gaining basic knowledge of the employing organisation, its business, structure, culture, products/services, operations and terminology.	☐	☐
Gaining knowledge of IT activities in the employing organisation external to their function.	☐	☐
Exploring a topic that is not part of their normal responsibilities, and presenting findings to colleagues and/or management.	☐	☐
Attending meetings, seminars and workshops organised by a professional body, and reading published material such as journals and web content.	☐	☐
Undertaking learning and practice in the techniques of team and collaborative working. Gaining an understanding of the underlying concepts.	☐	☐
Undertaking learning and practice in oral and written communications, including report writing and presentations.	☐	☐

Activities Typical Evidence

Areas of additional professional development activities that might be undertaken and associated typical evidence are shown below.

Professional Development Topic	Objectives	Typical Evidence
Understanding organisation	Gaining basic knowledge of the employing organisation, its business, structure, culture, products/services, operations and terminology. Gaining knowledge of IT activities in the employing organisation external to their function.	• organisation charts; • company annual reports; • company website; • documents or reports from other areas of the business.
Additional business skills	Undertaking learning and practice in the techniques of team and collaborative working. Gaining an understanding of the underlying concepts. Undertaking learning and practice in oral and written communications, including report writing and presentations. Learning from experience and mistakes and applying the lessons as part of continuous improvement.	• presentations, reports or minutes of meetings that demonstrate communication skills, report writing abilities and collaborative activities; • evidence of reviewing their work and suggesting improvements or critically appraising what they did and what they learned from it.
External activities	Participating in group activities inside or outside the working environment that can assist with the development of interpersonal skills. Undertaking pro bono (unpaid) activities that can help to develop professional skills or offer additional insight into, or understanding of, their working role.	• evidence of meetings attended through continuous professional development records; • evidence of activities undertaken.

Professional Development Topic	Objectives	Typical Evidence
Additional learning	Undertaking learning in subjects relevant to, but not directly related to, their role (e.g. foreign language courses, mentoring skills, cultural awareness and diversity training), perhaps through self-study or evening classes. Exploring a topic that is not part of their normal responsibilities, and presenting findings to colleagues and/or management.	• evidence of learning undertaken from continuous professional development records; • evidence of presentations given to colleagues and/or management.
Professional networking	Attending meetings, seminars and workshops organised by a professional body and reading published material such as journals and web content.	• evidence of meetings attended through continuous professional development records; • written evidence summarising learning gained from reading.