BCS LEVEL 4 DIGITAL MODULAR PROGRAMME

QUALIFICATION GUIDE

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The Chartered Institute for IT

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CONTENTS

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Introduction

As digital technologies continue to evolve they become an ever more intrinsic part of our daily lives and our society. This is significantly transforming the way in which businesses operate and the requirements for today's workforce. As such there is an ever-increasing need for individuals equipped with the skills and knowledge to support the development and implementation of digital solutions within a business that deliver efficiencies and greater productivity; that provide insight through data; that provide greater security; that deliver enhanced customer experiences; and that ensure successful operations can be carried out.

This isn't just limited to having a good technical understanding of how the technology works, or having the specialist skills required for their role; these individuals must also understand the business environment and the needs of their stakeholders, while being able to communicate and collaborate with other teams and individuals in diverse and cross-functional environments, to work together to achieve a common goal. Regardless of their particular specialism, they should understand concepts such as Cyber Security, Networks, Systems and Applications, Data, and Programming, as well as their uses and implications for a business.

In response to this need, BCS has developed the Digital Modular Programme (DMP).

BCS, The Chartered Institute for IT

As the Chartered Institute for IT we are the digital specialists and the only awarding body focussed on computing and IT. Our commitment under our royal charter is to ensure everyone within society, has access to the basic skills required to live and work in a digital age.

Qualification Suitability and Overview

The Level 4 Digital Modular Programme has been designed to support learners who might just be starting out in their digital careers, those currently seeking employment or wanting to retrain for new employment opportunities. It can be taken as a standalone qualification or in combination with other units/modules as part of a wider programme such as an apprenticeship.

It is an occupationally focused qualification that will:

- Enable a learner to develop their knowledge and skill within a particular specialism to help solve business problems.
- Develop an understanding of the wider business environment, working with different stakeholders, and how their role can positively contribute to the success of the organisation.
- Assess their applied knowledge and skills through work-oriented assessment methods.
- Enable a learner to identify a pathway to progress within their career.

With learners' career progression in mind, this qualification has been aligned to the IT skills framework SFIAplus, allowing learners to plot their progression against an internationally recognised and industry defined benchmark. All of BCS's certifications, apprenticeships and professional registrations are aligned to the SFIAplus framework, making it clear to our learners that they are progressing at the right level for their chosen career path.

For more information regarding the SFIAplus framework, visit bcs.org.

In order to gain a BCS Level 4 Digital Modular Programme certificate, a learner will need to complete two modules: the Digital Core module, plus one occupationally-focused module which will enable a learner to become qualified in a particular specialism.

CORE MODULE	UNIT CODE	LEVEL	GLH FOR MODULE	TQT FOR MODULE	CREDIT VALUE
Digital Core	K/618/8039	4	50	87	8
OCCUPATIONALLY-FOCUSED MODULES*	**UNIT CODE**	**LEVEL**	**GLH FOR MODULE**	**TQT FOR MODULE**	**CREDIT VALUE**
Data Analysis	H/618/8041	4	227	320	32
Software Developer	L/618/8793	4	237	340	35
Network Engineer	F/650/5337	4	221	426	43

*BCS is adding to this offer of occupationally-focused modules over time.

LEVEL 4 DIGITAL MODULAR PROGRAMME	
Entry Requirements	Entry requirements for the **Digital Core** are: • Centres must ensure that learners have the potential and opportunity to gain the qualification successfully. Entry requirement for **occupationally-focused modules** is: • Successful completion of L4 Digital Core within past twelve months.
Guided Learning Hours (GLH)	Two modules will need to be completed for a certificate. Each module will have its own guided learning hours – see the table above for more details on individual modules.
Total Qualification Time (TQT)	Total qualification time will vary depending on the DMP pathway chosen – see the table below for more information on each pathway.
Assessment Methods	Digital exam which includes a scenario-based situational judgement assessment. A work-orientated project to enable the demonstration of practical application of skills and behaviours (not required for apprenticeship)
Outcome	Pass/Fail/Distinction

PATHWAY	QAN	GLH	TQT	CREDITS
BCS Level 4 Diploma - Digital Modular Programme for Data Analysts	**603/7752/5**	**277**	**407**	**40**
BCS Level 4 Diploma - Digital Modular Programme in Software Development	**603/7899/2**	**287**	**427**	**43**
BCS Level 4 Diploma - Digital Modular Programme in Network Engineering	**610/2082/5**	**271**	**514**	**51**

* Relevant qualifications and experience might include:

- Work experience - this will be particularly important if you are beginning an apprenticeship as an existing employee.
- Previous education, training or qualifications – these will be in a subject related to the sector you wish to specialise in, and will go beyond English and Maths.
- Any previous apprenticeship you have completed or started.

Learner Journey

Undertaking this programme as a stand-alone qualification

A learner may choose to complete the DMP as a stand-alone programme if they are already employed and wish to progress their career within a particular specialism, or they are currently seeking employment, or preparing themselves to enter the workplace. This programme will give them a broader understanding of an organisation and the role they will play within it; they will develop both technical skills, making them specialists in their particular role, and transferable skills, which will equip them for the wider world of work.

Undertaking this programme as part of an apprenticeship

Learners undertaking the DMP as part of their apprenticeship, will need to provide evidence that they have gained the relevant knowledge to be occupationally competent. As each of the modules developed for the DMP aligns to the relevant digital apprenticeship standards, this will enable learners to gain the knowledge they need to be successful in their roles. It also complements other forms of on- and off-the-job training which support them to develop their skills and behaviours, providing a solid foundation on which they can build as they progress through their career.

Learner Progression

After completing their DMP, learners may wish to continue their studies with BCS. A wide range of flexible certifications are on offer.

For apprentices who are more focused on building their careers than on further study, government figures suggest that 90% of apprentices in England remained employed once they had completed their qualification – 71% of those stayed with the same employer.

Module Criteria

Each module requires the learner to undertake a work-oriented project which includes a set of pass and distinction criteria. Please refer to the relevant project brief for the specific assessment criteria.

DIGITAL CORE	
Topic area:	**Assessment criteria: The learner can...**
Business context and emerging technologies.	Identify an organisation's structure, evaluating how this influences the way in which it operates.
	Analyse and interpret an organisation's mission and vision statement.
	Explain the purpose of organisational and personal objectives.
	Interpret and apply organisational policies and procedures.
	Analyse the use of new and emerging technologies in an organisational context.
Business culture in a digital environment.	Analyse an organisation's culture and how it influences working practices.
	Analyse the business context for software applications, their usage and development.
The principles of cyber security.	Explain how information and cyber security can affect society.
	Explain why cyber security is important to organisations.
	Explain the importance of following organisational policies and procedures relating to information security.
	Explain the factors that contribute to a negative or positive cyber security environment.
	Identify security threats.
	Describe security procedures.
	Explain the importance of maintaining data and program integrity by backing up the data securely and regularly.
Understand the purpose and use of networks, systems and applications.	Describe how different Operating Systems interact with different platforms.
	Describe the in-built facilities found in different types of Operating Systems, on different platforms.
	Describe the function of different types of server.

DIGITAL CORE CONTINUED...	
Topic area:	**Assessment criteria: The learner can...**
The principles of networks, systems and applications.	Describe the components and equipment of a network.
	Explain the positives and negatives of a range of platforms.
	Explain the purpose of Operating Systems, databases and applications.
	Explain the use of common types of desktop applications.
	Explain the key function of business application software.
	Explain the process for installing a software operating system.
The principles of using data.	Explain types of data and their sources in an organisational context.
	Explain the data lifecycle.
	Explain the use of big data in an organisational context.
	Explain key components of data protection legislation.
The principles of basic programming.	Describe the common programming languages.
	Explain good practice when working with coding languages.
	Explain the need to understand the appropriate use of code with different platforms.
	Explain the primary elements of programming logic.
Collaborative working in a digital environment.	Analyse different stakeholders and their requirements.
	Apply communication methods required for effective working.
	Explain methods used to influence without authority.
	Explain concepts of agile working practices.
	Explain the use of the Systems Development Lifecycle.

DATA ANALYST	
Topic area:	**Assessment criteria: The learner can...**
Classifying data.	Describe how different forms of data can be applied to complex business situations
	Explain the range of different types of data and the implications for allowable use, data quality, privacy concerns and availability.
	Demonstrate how to classify data, understanding its use within the business situation.
	Analyse and interpret the flow of an information system's data, understanding the business requirements at each stage of the lifecycle.
Data structures.	Identify different data structures, explaining how they are used to form logical groupings.
	Explain common sources of structured data.
	Explain how structured data can be processed by data analysis tools.
	Identify various formats of unstructured data.
	Illustrate how structured and unstructured data can complement each other to derive rich insight.
The principles of data analysis.	Apply relevant domain (industry/organisation) knowledge to enable effective data analysis.
	Implement different types of data analysis to solve specific business problems.
	Explain the need to comply with Data Protection regulation.
	Apply data protection principles to manage any privacy issues that may occur during data analysis activities.
	Analyse customer requirements and recognise the best way to obtain the relevant information.
	Apply the requirements elicitation process.
	Interpret various data models used in the requirements gathering process.
	Explain the importance and necessity of good quality data.
	Demonstrate how to identify common sources of errors and how to avoid and/or resolve them.

DATA ANALYST CONTINUED...	
Topic area:	**Assessment criteria: The learner can...**
	Explain how minor data errors can cause major issues for data analysis.
	Explain how to take account of data quality in preparing data for analysis to improve accuracy, quality and usefulness.
Data architecture.	Explain how an organisation's data architecture defines how data is stored, managed, used and integrated within an organisation and its database systems.
	Explain the nature of the Data Architecture functions.
	Explain the nature and challenges of data volumes being processed through integration activities and how a programming approach can improve this.
	Apply data modelling techniques within database design, producing data models from conceptual, logical and physical perspectives.
	Recognise the most common forms of database.
	Demonstrate how a logical data model can be transformed into a physical database design.
	Demonstrate how data can be queried within a database through the use of SQL queries.
	Explain the importance of database maintenance.
Data preparation and integration.	Demonstrate how data from multiple sources can be integrated to provide a unified view of the data.
	Explain how data manipulation is achieved and the purpose and outputs of data integration activities.
	Analyse and compare the capabilities of statistical programming languages and software analysis tools.
	Demonstrate how statistical programming languages are used in preparing data for analysis and within analysis projects.
The data analysis lifecycle.	Implement the typical routine steps of data analysis.
	Explain how routine data analysis includes creating a problem hypothesis and identifying what to measure.

DATA ANALYST CONTINUED...	
Topic area:	**Assessment criteria: The learner can...**
The data analysis lifecycle.	Explain that routine data analysis includes clarification and confirmation of the requirement and identification of the right data and location.
	Explain that routine data analysis includes modelling data.
	Identify testing requirements to ensure that unified data sets are correct, complete and up-to-date.
	Explain how routine data analysis is used for analysing data, as well as for interpreting, documenting, and communicating results.

SOFTWARE DEVELOPER	
Topic area:	**Assessment criteria: The learner can...**
The Software Development Lifecycle (SDLC).	Implement the Software Development Lifecycle in a business context.
	Apply the seven stages of the Software Development Lifecycle to a business situation.
	Implement the main activities expected of a software developer role at each stage of the Software Development Lifecycle.
	Produce the high-level deliverables from each stage of the Software Development Lifecycle.
The roles and responsibilities within the Software Development Lifecycle (SDLC).	Analyse the roles and duties of others and relate them to the Software Development Lifecycle.
	Relate software development roles to the expected involvement in each stage of the SDLC.
	Compare and contrast the skills required to fulfil each role within the SDLC.
The project lifecycle.	Employ the phases of the project lifecycle.
	Explain the characteristics of the project lifecycle.
	Compare and contrast the duties associated with each of the roles in the project lifecycle.
	Explain how the principles of the project life cycle management were applied in a familiar software development project.

SOFTWARE DEVELOPER CONTINUED...	
Topic area:	**Assessment criteria: The learner can...**
Software development methodologies.	Implement the primary characteristics of software development methodologies.
	Compare and contrast the respective strengths and weaknesses of each of the software development methodologies listed in 5.1.
	Describe the circumstances under which the use of a particular software development methodology would be appropriate.
Software design approaches and solutions.	Explain the importance of the following software design concepts in a business context.
	Assess the importance of the following software characteristics to a given software product.
	Choose the most appropriate software design pattern and framework.
Organisational policies and procedures relating to the tasks being undertaken.	Describe the relationship between policies and procedures and explain how different procedures can implement the same policy.
	Apply well-defined policies and procedures to ensure the effectiveness of an organisation's operations.
	Discuss the range of policies and procedures that might be implemented in a software development environment.
The principles of algorithms, logic and data structures relevant to software development.	Analyse the role and purpose of different types of algorithms to meet a business need.
	Prepare examples of the use of Sequence, Selection, Iteration and Recursion in an algorithm.
	Analyse the use of abstract data types in the design and analysis of algorithms.
	Calculate the space and time complexity of an algorithm.
	Analyse the purpose and use of single and multidimensional arrays in programming.
	Discuss the advantages and disadvantages of use a list in place of an array and explain the way in which a list may be implemented as a linked structure.
	Analyse the implementation of a stack and a queue using linked lists and/or arrays.

SOFTWARE DEVELOPER CONTINUED...	
Topic area:	**Assessment criteria: The learner can...**
The principles of algorithms, logic and data structures relevant to software development.	Analyse the implementation of a tree structure and discuss its use in software development.
	Show how a graph structure can be used to represent directed and undirected graphs and describe the basic operations provided by a graph structure.
	Analyse the operation and implementation of common sorting algorithms.
	Analyse the operation and implementation of a number of common searching algorithms.
	Compare and contrast the use of Hash Tables with a range of search algorithms.
The principles and uses of relational and non-relational databases.	Analyse the use of database software for storing data.
	Discuss the characteristics of a relational database management system and the nature of Structured Query Language (SQL).
	Compare and contrast the use of relational databases with the use of Not Only SQL (NOSQL) systems.
	Compare and contrast differing implementations of No SQL databases.
The nature of software designs and functional/technical specifications.	Produce flowcharts and pseudocode to represent a software design.
	Produce a functional specification for a given requirements document.
	Produce a technical specification for a given requirements document.
The nature of software testing frameworks and methodologies.	Compare and contrast functional testing methods.
	Compare and contrast non-functional testing methods.
	Compare and contrast commonly used software testing frameworks.

NETWORK ENGINEER	
Topic area:	**Assessment criteria: The learner can...**
The principles of networking.	Choose the appropriate components for a network.
	Compare different types of network switches and their use.
	Identify the types of routers, their function and their key features.
	Compare and contrast the functions of wireless systems and select the appropriate wireless standard.
	Apply key network security devices within a network.
	Explain the purpose of all seven layers and representative protocols at each layer within the OSI model.
	Describe all layers of the TCP/IP representative protocols.
	Explain the purpose and compare the features of IP.
Network design and operation.	Use different types of network topologies.
	Interpret campus network design.
	Apply different numbering systems.
	Demonstrate an ability to convert between binary and decimal.
	Demonstrate an ability to calculate the number of host addresses available when given a network and a subnet mask.
	Demonstrate an ability to calculate the necessary subnet mask when given a network diagram in order to accommodate the requirements of the network.
	Explain the benefits of variable length subnet masking (VLSM).
	Interpret rules to facilitate data communication.
	Identify the role of protocols in facilitating interoperability in network communications and use different types of routing protocols.
	Use network monitoring systems to collect data for statistical analysis and forecasting.

NETWORK ENGINEER CONTINUED...	
Topic area:	**Assessment criteria: The learner can...**
Servers and virtualisation.	Describe the functions of basic components of virtualised systems.
	Compare the various levels of cloud service.
	Describe the function of virtual desktop infrastructure.
	Compare server implementations.
	Apply knowledge of the features of a typical client operating system.
	Describe the features of a typical server operating system.
	Analyse the functions of different types of servers.
	Choose the appropriate business application software based on its key functions.
	Explain the key features of middleware.
Performance.	Implement design features for attaining and maintaining appropriate network performance.
	Analyse the causes of high network latency and the impact on different applications, and identify the appropriate response.
	Analyse the causes of lack of bandwidth and identify the appropriate response.
	Analyse the causes of lack of storage capacity and identify the appropriate response.
	Analyse the causes of lack of memory and identify the appropriate response.
	Analyse the causes of lack of compute (CPU) capacity and identify the appropriate response.

NETWORK ENGINEER CONTINUED...	
Topic area:	**Assessment criteria: The learner can...**
Reliability and availability.	Implement network design considerations to maintain network reliability and availability.
	Analyse the causes and impact of computer systems failure and identify the appropriate response.
	Analyse the causes and impact of a network failure and identify the appropriate response.
	Analyse the causes and impact of excessive heat and identify the appropriate response.
	Analyse the causes and impact of a lack of power and identify the appropriate response.
	Analyse the causes and impact of DNS round robin and network load balancing failures and identify the appropriate response.
	Analyse the causes and impact of locally attached storage protocol failures and identify the appropriate response.
	Analyse the causes and impact of failures of RAID (0,1,5,10) and identify the appropriate response.
	Analyse the causes and impact of storage area network (SAN) failures over the Fibre Channel protocol and Fibre Channel over Ethernet (FCoE) and iSCSI, and identify the appropriate response.
	Analyse the causes and impact of cloud storage failure and identify the appropriate response.
	Analyse the impact of incorrectly applied configuration changes and identify the appropriate response.
	Analyse the causes and impact of IP addressing configuration errors and identify the appropriate response.
	Analyse the causes and impact of VLAN configuration errors and identify the appropriate response.
	Apply methodologies for patching and upgrading network elements.

NETWORK ENGINEER CONTINUED...	
Topic area:	**Assessment criteria: The learner can...**
Security.	Apply measures to fix identified vulnerabilities and security threats.
	Demonstrate understanding of security procedures.
	Apply common methods to protect data.
	Analyse network status and vulnerabilities using data.
	Analyse the causes and impact of backup failure and identify the appropriate response.
	Analyse the causes and impact of malware infection and identify the appropriate response.
	Analyse the causes and impact of poor wireless security and identify the appropriate response.
	Analyse the causes and impact of failure to implement physical security.

Resources

There are a range of useful resources available to help you and your learners make the most of the Digital Modular Programme.

AVAILABLE RESOURCES

Syllabus

Each module includes an in-depth syllabus which includes indicative content and guidance that can help with the planning of delivery and will give learners a clear sense of the topics to be tested and at what depth.

Sample Papers

There are a number of sample papers available which will help your learners to prepare for each of the final assessments, so they become familiar with the assessment format and the types of questions they will be asked.

Digital Courseware

BCS is currently working to provide digital courseware to support delivery of the DMP modules.

Assessment

Digital Assessment

Each module is assessed through a digital assessment. A learner should expect to take two exams: one for the Digital Core and one for their chosen occupationally focused module. Each exam will be provided in two parts:

- Part 1 - Knowledge Test
  This will focus on testing the learner's knowledge through a series of questions that will include multiple response, fill the blanks, drag and drop and ordering questions.

- Part 2 - Situational Judgement Assessment
  This will focus on testing a learner's applied knowledge, skills and behaviours to a set of real-world scenarios. Each scenario will include a set of questions and tasks that will challenge the learner to solve a particular business problem through analysis, decision making, and application of techniques specific to their occupationally focused module, for example, practical use of statistical programming languages.

The learner will be assessed against the criteria in the Digital Core and their chosen occupationally focused module for the digital assessments.

Work-Oriented Project

In order to enable the learner to showcase the specialist skills they have developed while on programme, they will be required to carry out a work-oriented project that will account for 30 hours of their total qualification time. Through the undertaking of this project, the learner will be able to practically demonstrate their ability to solve a particular business problem, providing evidence of their competency within the skills and behaviours defined in the occupational standard e.g. Data Analysis.

This project can be carried out in the context of their own workplace or in relation to a given scenario where the learner is not currently working in the role. The learner will be required to present the results of their project within a 3,500 word report.

The learner will be assessed against a set of pass and distinction criteria for the project. These criteria have been designed in line with the occupational standard.

NOTE: Each learner will need to undertake the assessments above within 12 months of each other from the date of undertaking their first assessment e.g. the Digital Core digital assessment. This should not influence the length of the learning programme, however providers should plan for when the first assessment should be undertaken to ensure all assessments are completed within 12 months.

NOTE: Learners undertaking the DMP as part of an apprenticeship do not have to undertake the work-oriented project as their competence against the occupational standard will be assessed through End Point Assessment.

Grading

The overall grading for the qualifications is Distinction, Pass, Fail. This is split across the assessment methods in the following ways:

Digital Assessment

There are 40 questions per assessment. The pass mark is set at 65%, with distinction set at 85%. The learner will be assessed against the criteria set within the Digital Core and their chosen occupationally focused module.

Work-Oriented Project

All pass criteria should be met in order for the learner to demonstrate their competence against the specified knowledge, skills, and behaviours within the related occupational standard. For a distinction grade all pass and distinction criteria must be met.

Digital Assessment (Core)	Digital Assessment (occupational)	Project	Overall Grade
Pass	Pass	Pass	Pass
Pass	Pass	Distinction	Pass
Pass	Distinction	Pass	Pass
Pass	Distinction	Distinction	Pass
Distinction	Distinction	Distinction	Distinction
Distinction	Pass	Pass	Pass
Distinction	Pass	Distinction	Pass
Distinction	Distinction	Pass	Pass
Fail	Fail	Fail	Fail
Fail	Pass	Pass	Fail
Fail	Pass	Distinction	Fail
Fail	Distinction	Pass	Fail
Fail	Distinction	Distinction	Fail

Reasonable Adjustments

Centres will receive guidance on reasonable adjustments in accordance with Equalities Law including, but not exclusively, ensuring there is an environment which will allow access by a disabled learner or to make alternative arrangements such as a different venue or different equipment suitable for the learner.

Appeals

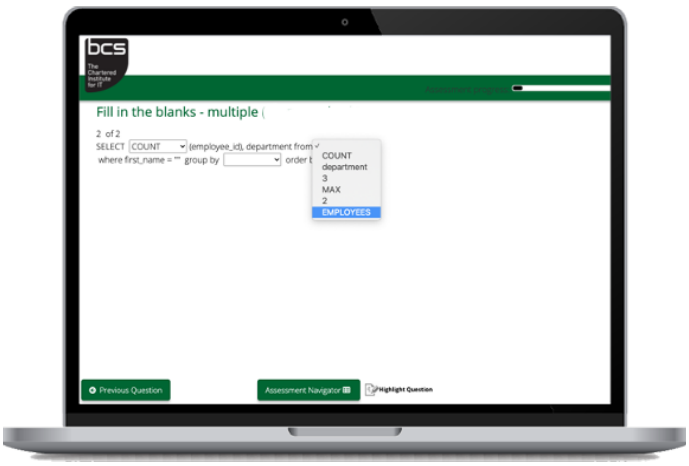
If situations arise that call into the question the validity of an awarding decision, for example, via an appeal or an enquiry in accordance with our Appeals Policy, or an error has been made and a learner has incorrectly been awarded, or not awarded, a qualification achievement issue will be brought to the attention of the Service Delivery Manager - Qualifications. Our Appeals Policy is available from the Approved Centre Forum.

Accessing the Online Assessments

All assessments will be completed via the Questionmark online platform. Learners can access Questionmark using their BCS log-in.

More information about how learners access Questionmark is available within our Remote Proctor Guidance for Learners.

Learners should log in to QM at least 24 hours before their exam to make sure that their system is set up correctly for the assessment.



System Requirements

SYSTEM CHECK	REQUIREMENTS	ADDITIONAL INFORMATION
Operating System	Windows Mac	**Version Information** The latest version for Questionmark Secure for Windows is 6.1.34.2. (Details for Mac, iPhone and iPad users can be found on the app store.) **Internet speed** Ensure that your internet speed is at least 2 Mbps for download and 2 Mbps for upload.
Browser	Internet Explorer 9/10/11 Firefox Google Chrome Microsoft Edge Safari 9/10/11	**Installation** Step 1 - Install Questionmark Secure for Windows. (Requires Windows 8, 10 or 11.) OR - Install Questionmark Secure for Mac. (Requires Mac OS X 10.13 or later - 64-bit processor.) Step 2 It is always a good idea to test the tools you need before the actual exam. (You cannot test Questionmark Secure by simply opening it, as it is not designed to run on its own.) To help you, we recommend you test your installation using this sample assessment. QUESTIONMARK SAMPLE ASSESSMENT

Frequently Asked Questions

Q) What is GLH and TQT?

A) Guided Learning Hours (GLH) indicates the approximate time (in hours) that the learner will be supervised during any teaching, learning or assessment activities. Total Qualification Time (TQT) is a predication of the total time a learner with no prior knowledge might need to complete the course. TQT is made up of two elements: GLH, and all other hours (an estimate of the number of hours a learner will reasonably spend on any unsupervised learning or assessment activities including homework, research, exam preparation and formal assessment) so that they can successfully achieve the qualification.

Q) How long does this qualification take to complete?

A) GLH and TQT will vary depending on the specialism modules chosen by the learner, as each module has its own GLH. Guidance on the GLH and TQT can be found on pages 3 and 4 of this document.

Q) What learning materials or courseware are available?

A) Sample papers will be made available via the BCS website.

Q) Can I self study?

A) In time, learners will have access to online courseware and assessment, so it will be possible to deliver this qualification remotely in the future, with appropriate guidance and supplementary support from providers. However, for now, DMP will be provider-led only.

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