

Qualification Specification for the Knowledge Modules that form part of the BCS Level 3 Infrastructure Technician Apprenticeship

**BCS Level 3 Award in Networking and Architecture
BCS Level 3 Award in Mobile and Operating Systems
BCS Level 3 Award in Cloud Services
BCS Level 3 Award in Coding and Logic
BCS Level 3 Award in Business Processes**

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1. About BCS

Our mission as BCS, The Chartered Institute for IT, is to enable the information society. We promote wider social and economic progress through the advancement of information technology science and practice. We bring together industry, academics, practitioners and government to share knowledge, promote new thinking, information the design of new curricula, shape public policy and inform the public.

Our vision is to be a world class organisation for IT. Our 70,000 strong membership includes practitioners, businesses, academics and students in the UK and internationally. We deliver a range of professional development tools for practitioners and employees. A leading IT qualification body, we offer a range of widely recognised qualifications.

2. Equal Opportunities

BCS wishes to ensure good practice in the area of Equal Opportunity. Equality of opportunity extends to all aspects for the provision of BCS qualifications.

3. Introduction to the qualification

3.1 Qualification summary

Qualification Title	QAN	Accreditation Start
BCS Level 3 Award in Networking and Architecture	603/0686/5	October 2016
BCS Level 3 Award in Mobile and Operating Systems	603/0134/X	July 2016
BCS Level 3 Award in Cloud Services	603/0218/5	August 2016
BCS Level 3 Award in Coding and Logic	603/0523/X	September 2016
BCS Level 3 Award in Business Processes	603/0297/5	August 2016

The five knowledge module qualifications listed above have been developed based on the requirements set out in the Standard issued by Tech Partnership and approved by the Government, details of which can be located in the Assessment Plan ([Click here](#)) and Occupational Brief ([Click here](#)) documents.

Apprentices must achieve one knowledge module or vendor/ professional qualification from each of the five sections in the list below.

Knowledge Modules Vendor or Professional Qualifications.

BCS qualification	Vendor certification alternative chosen
BCS Level 3 Award in Networking and Architecture	CCNA 1 MTA Network Fundamentals Network + A + CIW Network Technology Associate
BCS Level 3 Award in Mobile and Operating Systems	CCNA Security MCP Managing and Maintaining Windows 8 * MCP Configuring Windows 8 * MTA Mobility and Devices Fundamentals Security + Mobile + CIW – Internet Business Associate CIW – Mobile Application Development
BCS Level 3 Award in Cloud Services	MTA Server Admin * Enabling Office 365 Services Enabling Office 365 Identities and Requirements MTA Cloud Fundamentals Install Configure Windows Server 2012 * Administration of Windows Server 2012 * Configure Advanced Windows Server 2012 Services *

BCS Level 3 Award in Coding and Logic	MTA Software Development Fundamentals App Development
BCS Level 3 Award in Business Processes	CIW – Internet Business Associate ITIL Foundation Level

All BCS qualifications are subject to our quality assurance and validation process. This ensures that new and revised qualifications are fit for purpose. Qualifications are reviewed to ensure the alignment of the qualification with agreed design principles, regulatory requirements and to ensure accuracy and consistency across units and qualifications. Through our quality assurance and validation process, we ensure the qualification, its units and assessments, are fit for purpose and can be delivered efficiently and reasonably by Training Providers.

3.2 Purpose of the qualifications

The qualifications are designed for apprentices enrolled on the Level 3 Infrastructure Technician Digital IT Apprenticeship, to provide them with the technical knowledge and understanding they require for their role detailed below:

An Infrastructure Technician provides support to internal and external customers, helping them to be productive when using technology to do their own jobs, by using tools to problem solve and trouble shoot non routine problems. The Infrastructure Technician sets people up on systems and provides support when they need it, rectifying issues to maintain the organisations productivity.

3.3 Structure of the qualifications

This document covers the following qualifications which are used towards the Level 3 Infrastructure Technician Apprenticeship. The qualifications can be taken in any order however it is recommended that they be completed in the following sequence:

1. BCS Level 3 Award in Networking and Architecture
2. BCS Level 3 Award in Mobile and Operating Systems
3. BCS Level 3 Award in Cloud Services
4. BCS Level 3 Award in Coding and Logic
5. BCS Level 3 Award in Business Processes

Qualification Level 3 Descriptor	
Knowledge descriptor (the holder...)	Has factual, procedural and theoretical knowledge and understanding of a subject or field of work to complete tasks and address problems that while well-defined, may be complex and non-routine. Can interpret and evaluate relevant information and ideas. Is aware of the nature of the area of study or work. Is aware of different perspectives or approaches within the area of study or work.

Skills descriptor (the holder can...)	Identify, select and use appropriate cognitive and practical skills, methods and procedures to address problems that while well- defined, may be complex and non-routine. Use appropriate investigation to inform actions. Review how effective methods and actions have been.
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3.4 Prior learning

The only pre-requisite to take the qualifications is enrolment on the Level 3 Infrastructure Technician Digital IT Apprenticeship.

Individual employers will set the selection criteria for enrolment onto the Apprenticeship, but this is likely to include five GCSEs, (especially English, Mathematics and a Science or Technology subject); a relevant Level 2 Apprenticeship; other relevant qualifications and experience; or an aptitude test with a focus on IT skills.

3.5 Learner progression

This document covers the qualifications that are part of the Level 3 Infrastructure Technician apprenticeship. The qualifications must be completed to allow the apprentice to progress onto the End-Point-Assessment, detailed below:

The final, end point assessment is completed in the last few months of the apprenticeship. It is based on

- *a portfolio – produced towards the end of the apprenticeship, containing evidence from real work projects which have been completed during the apprenticeship, usually towards the end, and which, taken together, cover the totality of the standard, and which is assessed as part of the end point assessment*
- *a project - giving the apprentice the opportunity to undertake a business-related project over a one-week period away from the day to day workplace*
- *an employer reference*
- *a structured interview with an assessor - exploring what has been produced in the portfolio and the project as well as looking at how it has been produced*

An independent assessor will assess each element of the end point assessment and will then decide whether to award successful apprentices with a pass, a merit or a distinction.

4. Units

4.1 Guidance on the qualifications' content

The content for each qualification has been developed based on the criteria set out in the Occupational Brief.

Qualification Title	TQT (Guided Learning + Direct Study + Assessment)
BCS Level 3 Award in Networking and Architecture	98.5h (37.5h + 60h + 1h)
BCS Level 3 Award in Mobile and Operating Systems	77.5h (51h + 25.5h + 1h)
BCS Level 3 Award in Cloud Services	82h (54h + 27h + 1h)
BCS Level 3 Award in Coding and Logic	34.5h (19h + 15h + 0.5h)
BCS Level 3 Award in Business Processes	80h (53h + 26.5h + 0.5h)

4.2 Learning outcomes and assessment criteria

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
BCS Level 3 Award in Networking and Architecture	Gain a working knowledge of a range of cabling and connectivity, the various types of antenna and wireless systems and IT test equipment.	<p>Explain the key differences between cables and connector types.</p> <ul style="list-style-type: none"> • copper; <ul style="list-style-type: none"> o 10Base2; o xBaseT; • fiber – glass / plastic; <ul style="list-style-type: none"> o multi-mode; o single-mode; • connectors; <ul style="list-style-type: none"> o RJ45; o BNC; o Straight Tip (ST); o Subscriber Connector (SC); o Local Connector (LC).
		<p>Describe the key features of Cat1-6 cables.</p> <ul style="list-style-type: none"> • identify Cat1-4 cable as older types of cable; • describe the main features of Cat5, 5A, 6, 6A; <ul style="list-style-type: none"> o capacity; o maximum distance; o network application; <ul style="list-style-type: none"> ▪ 10BastT; ▪ 100Base-TX; ▪ 1000Base-T; ▪ 10GBase-T.
		<p>Explain the different antennas types.</p> <ul style="list-style-type: none"> • directional; • omni directional; • point-to-point; • point-to-multipoint; • mobile.

		<p>Understand the types of wireless systems.</p> <ul style="list-style-type: none">• Bluetooth;<ul style="list-style-type: none">o features;<ul style="list-style-type: none">▪ radio communication;▪ medium range (1-10m);o typical purpose;<ul style="list-style-type: none">▪ wireless peripheral connection;• Near-field communication (NFC);<ul style="list-style-type: none">o features;<ul style="list-style-type: none">▪ radio communication;▪ very short range (6cm);o typical purpose;<ul style="list-style-type: none">▪ contactless payments;• IrDA / IR;<ul style="list-style-type: none">o features;<ul style="list-style-type: none">▪ uses infrared radiation;▪ typically short range communication (1-3m);▪ typically slow speed;▪ line of site;o typical purpose;<ul style="list-style-type: none">▪ communication link for older devices;▪ control TV / setup box remote controls;• WiFi;<ul style="list-style-type: none">o features;<ul style="list-style-type: none">▪ radio communication;▪ longer range (up to 100m);▪ faster;o typical purpose;<ul style="list-style-type: none">▪ wireless network for tablet / phones / computers;• describe the key types of WiFi networking security;<ul style="list-style-type: none">o WEP;o WPA;o WPA2;<ul style="list-style-type: none">▪ satellite;o features;<ul style="list-style-type: none">▪ typically uses a microwave link;▪ high latency;
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Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		<ul style="list-style-type: none"> ▪ expensive; ▪ long range; o typical purpose; ▪ where other communication links not available.
	Understand maintenance processes and apply them in working practices.	<p>Identify testing equipment used with wired and wireless networks.</p> <ul style="list-style-type: none"> • wired; <ul style="list-style-type: none"> o multimeter; o wire map tester; o cable testers; o tone generator and probe; o loopback plug; • wireless; <ul style="list-style-type: none"> o wireless locator / WiFi analyser; o wireless heat maps. <p>Describe the typical information stored in maintenance work records.</p> <ul style="list-style-type: none"> • customer name; • company name; • system / device model and make; • system ID / serial number; • date; • engineer name; • description of maintenance activity; • purpose of the maintenance activity; • parts needed (if required). <p>Explain the purpose of maintenance work records.</p> <ul style="list-style-type: none"> • record of the work completed for customers; • help with scheduling periodic routine maintenance; • to improve quality of future maintenance work; • identify trends that will help prevent future disruption.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		<p>Explain how to use fault related information and business process information / SLA to select the correct outcome considering.</p> <ul style="list-style-type: none"> • the priority of the fault; • time the fault has been outstanding; • any required escalation. <p>Explain the consideration required when undertaking a task given at short notice.</p> <ul style="list-style-type: none"> • ensuring task is recorded / logged in line with organisational guidelines; • reprioritisation of all tasks in line with SLA's; • potential business impact of undertaking / not undertaking short notice task. <p>Describe typical status sequences of maintenance tasks.</p> <ul style="list-style-type: none"> • open – initial recording of task; <ul style="list-style-type: none"> o customer details; o description of task; o time; o business impact; o system(s) impacted; • pending – awaiting further input or information needed to progress; • fixed – awaiting confirmation an issue is resolved; • escalation – send the task to a more technically specialised team or more senior member of staff; • closed - confirmed complete with documented diagnosis and fix.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		<p>Describe the purpose and use of the following maintenance tools when maintaining systems.</p> <ul style="list-style-type: none"> • systems backups; • system event logging; • antivirus; <ul style="list-style-type: none"> o software and antivirus pattern updates; o regular system scans; o monitoring of quarantined and uninfected items; • general tools; <ul style="list-style-type: none"> o scheduling through Task Scheduler; o Windows Control Panel – services. <hr/> <p>Describe the purpose of updates and how to manage updates for the following:</p> <ul style="list-style-type: none"> • system updates: <ul style="list-style-type: none"> o application updates; o system updates; o security patches; o Windows Server Update Service; • firmware updates. <hr/> <p>Describe how the following tools are used to manage local storage.</p> <ul style="list-style-type: none"> • monitoring disk space through drive properties; • Check Disk (chkdsk); • Disk Defragmentation; • 'disk clean-up' utility; • disk format; <ul style="list-style-type: none"> o FAT32; o NTFS.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		Describe how the following tools are used to monitor system performance. <ul style="list-style-type: none"> • Windows Event Viewer; • Linux - /var/log/messages; • Task Manager; • Windows Resource Monitor; • netstat -e; • SMART monitoring tools.
	Understand and apply the basic elements and architecture of computer systems and business IT architecture.	Explain the features and purpose of basic computer systems components. <ul style="list-style-type: none"> • CPU; • motherboard; • processor; • memory; • hard drive; • NIC; • power supply; • fan.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		Explain the purpose of: <ul style="list-style-type: none"> • operating system – software used to manage the basic functions of a computer; • applications – software designed to provide a specific task normally for end users; • databases – used to storage and rapid retrieval of information; • • servers – provide systems resources that other computers can access; <ul style="list-style-type: none"> o Active Directory; o DNS; o web proxy server; o file and print; o email; o database; o virtualisation; • networking - provide managed communication links between computers; • security – maintaining the integrity of systems and data; • services – Infrastructure as a Service (IaaS), Platform as a Service (PaaS), Software as a Service (SaaS).
	Understand where to apply the relevant numerical skills.	Describe the configuration and use of: <ul style="list-style-type: none"> • IPV4 address; • netmask; • default gateway; • DNS server. Describe key features of IPv6. <ul style="list-style-type: none"> • much larger address space; • 128 bits in size; • 64 bits used for host address; • 64 bits used for network address. Identify which part of an IPv4 address refers to the network and which to the host. Apply logical AND/OR on two 8 bit binary numbers.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
	Understand the relevant networking skills necessary to maintain a secure network.	Apply a binary to decimal conversion on binary numbers up to 8 bits in length.
Apply decimal to binary number conversion on decimal numbers up to 255.		
Identify the purpose of types of data communication platforms used in networking. <ul style="list-style-type: none"> • video; <ul style="list-style-type: none"> o typically requires more bandwidth than voice or data; o individual packets can be lost and communication still works but at reduced quality; o impacted by jitter; • voice; <ul style="list-style-type: none"> o typically requires greater bandwidth than data less than video; o individual packets can be lost and communication still works but at reduced quality; o impacted by jitter; • data; <ul style="list-style-type: none"> o typically requires less bandwidth than video or voice; o typically, a whole message must be received for the file to be uncorrupted. 		
Explain the settings needed to configure IP. <ul style="list-style-type: none"> • IP address; • netmask; • default gateway; • static / dynamic; • public / private. 		
Explain the purpose of a DNS server. <ul style="list-style-type: none"> • name resolution; • storage of network records; • CNAME; • A. 		

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		<p>Explain the purpose of configuring the IP address of DNS server on a client.</p> <ul style="list-style-type: none"> • enables DNS name resolution. <hr/> <p>Explain how to create and configure virtual networks.</p> <ul style="list-style-type: none"> • VLAN; • VPN; • virtualised switch. <hr/> <p>Describe how to configure and support networks by editing key settings.</p> <ul style="list-style-type: none"> • IP address / netmask / default gateway; • primary and secondary DNS; • firewall enabling / disabling; <ul style="list-style-type: none"> o the entire firewall; o ports; <ul style="list-style-type: none"> ▪ dhcp; ▪ dns; ▪ ftp; ▪ http; ▪ https; ▪ imap; ▪ pop3; ▪ RDP; ▪ smtp; ▪ ssh; ▪ telnet; o applications.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		<p>Explain the main configuration tools, what their functions are and how they are used to maintain security.</p> <ul style="list-style-type: none"> • personal firewall; • perimeter firewall; • directory services (Active Directory); <ul style="list-style-type: none"> o users; o groups; • policies (group policy); <ul style="list-style-type: none"> o password policies; o hardware restrictions; o application and utility restrictions. <hr/> <p>Describe how to configure remote support of systems using:</p> <ul style="list-style-type: none"> • RDP; • VNC; • SSH. <hr/> <p>Describe the key purposes of domain controllers.</p> <ul style="list-style-type: none"> • centralise the management of directory services; • centralise the management of security policies. <hr/> <p>Describe the major steps required to install a domain controller.</p> <ul style="list-style-type: none"> • install Windows Server; • configure networking; • install Active Directory; • configure a domain name. <hr/> <p>Describe the purpose of creating and managing users and computer records within Active Directory:</p> <ul style="list-style-type: none"> • users – centralised management of user access to organisational network; • computers – centralised management of which computer can access a domain and domain resources. <hr/> <p>Describe how to create, update and delete within Active Directory.</p> <ul style="list-style-type: none"> • organisational unit (OU); • users; • computers.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
BCS Level 3 Award in Mobile and Operating Systems	Gain an understanding and working knowledge of current operating systems.	Describe different operating system platforms. <ul style="list-style-type: none"> • Windows Server; • Windows Desktop; • Linux servers; • Android; • Apple iOS.
		List and order the basic process of building a PC. <ul style="list-style-type: none"> • component selection; • order of component assembly; • environment precautions.
		Describe the process for installing a software operating system. <ul style="list-style-type: none"> • obtaining installation media; • identifying suitable hardware; • installing software; • configuring for first use.
		List and describe the order of tasks required for end-to-end testing of an operating system to ensure it works as intended (Windows, Linux). <ul style="list-style-type: none"> • perform a log in as an administrative user; • test remote management; • perform a log in as a normal user; • verify that a normal user cannot use admin tools requiring elevated permissions; • verify that connectivity to network resources and internet services works correctly.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		<p>Summarise the native applications for different operating systems.</p> <ul style="list-style-type: none"> • IOS <ul style="list-style-type: none"> o Safari; o Maps; o App Store; • Windows; <ul style="list-style-type: none"> o IE; o Edge; o Notepad; o Paint; o Command Prompt; • Linux; <ul style="list-style-type: none"> o Nano; o Terminal; • Android; <ul style="list-style-type: none"> o Chrome; o Maps; o Play Store. <p>Explain the security principles when running an operating system running on a platform; with a focus on physical hardware, virtual servers and cloud services.</p> <ul style="list-style-type: none"> • secure configuration following recommended good practice; • user access control; • malware protection; • patch management.
	Understand the importance of disaster recovery, how a disaster recovery plan works and their role within it.	<p>Describe the top-level tasks required to deploy a VPN.</p> <ul style="list-style-type: none"> • configure VPN client settings; • receive IP; • configure WAN link; • connect to remote server; • encrypt traffic. <p>Describe how HTTPS provides secure access to web applications.</p>

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		<p>Describe how VOIP provides voice communication over IP.</p> <p>Describe how using encryption technologies can securely transport data across mobile or wireless networks.</p> <ul style="list-style-type: none"> • HTTPS; • VPN technologies; • wireless. <p>Describe the key features of mobility.</p> <ul style="list-style-type: none"> • bring your own device; • extends the corporate network to mobile devices; • extends the implementation and enforcement of organisational security policies. <p>Explain how tools can be used to remotely manage devices or provide assistance to remote users.</p> <ul style="list-style-type: none"> • Remote Desktop / Remote Assistance; • Secure Shell. <p>Describe how each item in the list would help secure a mobile device.</p> <ul style="list-style-type: none"> • device encryption; • strong device passwords / biometric checks; • transport encryption such as HTTPS / VPN. <p>Explain the top-level configuration required for:</p> <ul style="list-style-type: none"> • connections that support secure remotely LAN access; <ul style="list-style-type: none"> o https; o VPN; • mobility options supported by mobile device management software; <ul style="list-style-type: none"> o remote wipe; o system / software updates; o phone tracking; o data encryption; o security policy enforcement; • security of mobile devices; <ul style="list-style-type: none"> o mobile security policy enforcement; o encryption at rest and in transit (on the wire).

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		Identify the benefits of device encryption and a strong passcode on a user's mobile device. <ul style="list-style-type: none"> • if a device is lost or stolen, the data is encrypted; • a strong passcode to help prevent unauthorised access to data.
BCS Level 3 Award in Cloud Services	Gain an understanding and working knowledge of the Cloud and cloud services.	Describe the key steps required for creating a virtual machine. <ul style="list-style-type: none"> • resource allocation; <ul style="list-style-type: none"> o memory; ▪ static and dynamic; o storage; o compute (CPU); o network. Explain and summarise the key purposes of hosted applications. <ul style="list-style-type: none"> • email; • servers; • storage; • desktops. Summarise and explain how multi-tenant cloud platforms allow for separately provisioned tenants (i.e. multiple customers to operate on the same service, but not share or interfere with each other). Understand factors required for secure password. <ul style="list-style-type: none"> • set a strong password policy; • use multifactor / two-factor authentication where available. List the pros and cons of password management tools and services. <ul style="list-style-type: none"> • all passwords in one place; • access on multiple device; • password generation. Identify the key steps required to manage users and / or identities, and groups within cloud tenants. <ul style="list-style-type: none"> • create users / identities; • create security groups of users with common security access requirements; • allocate users to security groups; • authorise access to resources using security groups.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		<p>Describe the importance of separating users into groups and managing what information / resources they have access to.</p> <p>List and describe the key DNS resource record types and what they're used for in relation to cloud services.</p> <ul style="list-style-type: none"> • A Record; • AAAA Record; • CNAME; • MX. <p>Describe how a client could be connected into a cloud service.</p> <ul style="list-style-type: none"> • client configured to enable network access; • user account / identity created; • user authorised to access resources.
	Understand the importance of disaster recovery, how a disaster recovery plan works and their role within it	<p>Describe backup and recovery options and their benefits.</p> <ul style="list-style-type: none"> • data and / or system; <ul style="list-style-type: none"> o data and system; <ul style="list-style-type: none"> ▪ take longer to backup; ▪ take up more media space; ▪ simplify restores - no need to install and configure OS; o data; <ul style="list-style-type: none"> ▪ quicker to backup; ▪ OS must be installed and configured when complete system is lost; • full; <ul style="list-style-type: none"> o backs up all data; o easy to restore and manage; • incremental; <ul style="list-style-type: none"> o backs up changes since last backup; o quicker to back up; o harder to restore - may require many restore sets; • differential; <ul style="list-style-type: none"> o backs up changes since last full backup; o quicker to back up the full image; o easier to restore than incremental - may require less restore sets.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		Describe the importance of testing backups and performing test restores. <ul style="list-style-type: none"> • backup may have failed; • restore method may fail.
		Describe the purpose of a disaster recovery plan. • to document the steps that will be implemented in the event of business disruption.
		Identify where a disaster recovery plan can be found. <ul style="list-style-type: none"> • paper copies available to key personnel; • available on a company Intranet; • available from Information Systems Manager or IT Director.
		Describe an infrastructure technician's role within a disaster recovery plan. <ul style="list-style-type: none"> • understand role as stated in the disaster recovery plan; • undertake steps as defined in disaster recovery plan.
		List the typical items that should be contained within a disaster recovery plan. <ul style="list-style-type: none"> • risk assessment; • Business Impact Analysis (BIA); • business continuity and recovery strategy; • business process priorities; • roles and responsibilities; • test plan.
		Explain when disaster recovery plan can be tested. <ul style="list-style-type: none"> • tested / practiced when stated in test plan; • maximum amount time that can elapse before testing.
		Explain how disaster recovery plan can be tested. <ul style="list-style-type: none"> • simulation; • disaster recovery failover.
		Explain how to implement recovery following the steps outlined in the disaster recovery plan. <ul style="list-style-type: none"> • system recovery - data and system restore from backup; • switch to redundant systems; • switch to hot / cold standby sites.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		<p>Explain the purpose of a three-two-one backup policy.</p> <ul style="list-style-type: none"> • three different backups; • two different types of media; • one backup off site. <p>Explain the difference between a data and system restore.</p>

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
BCS Level 3 Award in Coding and Logic	Gain a general overview of command line scripts.	<p>Explain what scripts are and what purpose they serve.</p> <ul style="list-style-type: none"> • Commonly used scripting languages. <ul style="list-style-type: none"> o DOS shell / Batch; o PowerShell; o Bash. • Automating tasks in Windows and Linux. • Command line interface (CLI) and what purpose they serve. <ul style="list-style-type: none"> o Performing systems administration tasks in Windows. <ul style="list-style-type: none"> ▪ ipconfig ▪ dir ▪ netstat /ob ▪ ping ▪ mkdir ▪ cd ▪ del(ete) ▪ ren(ame) ▪ copy ▪ move ▪ systeminfo o Performing systems administration tasks in Linux. <ul style="list-style-type: none"> ▪ ifconfig eth0 / ip addr show eth0 ▪ ls ▪ netstat -a ▪ ping ▪ mkdir ▪ cd ▪ rm (remove) ▪ mv (move) - moves and renames ▪ lscpu - CPU info ▪ free -m ▪ top ▪ tail

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		<p>Explain what the command line interface is and how it can be used in an infrastructure capacity.</p> <ul style="list-style-type: none"> • Use of commands, command line switches and command line arguments, their purpose and what each term means. <ul style="list-style-type: none"> o General format of commands is <command> <switch> <argument> o Linux: <ul style="list-style-type: none"> ▪ ls -l / ▪ ls * ▪ ls o Windows: <ul style="list-style-type: none"> ▪ dir /b \ ▪ dir * ▪ dir
	Learn the common commands and uses of scripts	<p>Recognise file and directory operations in Windows and Linux.</p> <ul style="list-style-type: none"> • Copy; • Rename; • Move; • Delete. <p>Identify diagnostics for networking, file systems, security and processes.</p> <ul style="list-style-type: none"> • Windows: <ul style="list-style-type: none"> o ipconfig o ping o nslookup o tracert o chkdsk o netstat • Linux: <ul style="list-style-type: none"> o ifconfig o ping o nslookup o traceroute o fsck o netstat

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		<p>Explain how to achieve the running of scheduling tasks automatically at a set time.</p> <ul style="list-style-type: none"> • Windows - through Windows Scheduler; • Linux - though CRON. <hr/> <p>Recognise Directory listings in Windows and Linux.</p> <ul style="list-style-type: none"> • time based sort; • alphanumeric based sort. <hr/> <p>Recognise file and directory permissions.</p> <ul style="list-style-type: none"> • Linux: <ul style="list-style-type: none"> o viewing; o changing. • Windows: <ul style="list-style-type: none"> o icacls. <hr/> <p>Recognise login script types.</p> <ul style="list-style-type: none"> • Windows: <ul style="list-style-type: none"> o Bat; o PS1. • Linux: <ul style="list-style-type: none"> o Bash. <hr/> <p>Explain how to compress and decompress files.</p> <ul style="list-style-type: none"> • Windows: <ul style="list-style-type: none"> o Zip.ps1 o Compress-archive • Linux: <ul style="list-style-type: none"> o gzip <hr/> <p>Explain how to list and stop running processes.</p> <ul style="list-style-type: none"> • Windows: <ul style="list-style-type: none"> o net stop o net start • Linux: <ul style="list-style-type: none"> o ps o kill

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
	Understand and recognise different coding and language.	Recognise the syntax of scripting languages; with a focus on PowerShell, Windows DOS command line and Linux shell commands. <ul style="list-style-type: none"> • common scripting language features; <ul style="list-style-type: none"> o instructions; o data types; <ul style="list-style-type: none"> ▪ strings; ▪ integers; ▪ arrays; ▪ floating point; o operators; <ul style="list-style-type: none"> ▪ comparison; ▪ arithmetic and logical; • mathematical +-* / • comparison; o equal; o not equal; o greater than; o less than; • functions; • output; <ul style="list-style-type: none"> o log file; o screen; o argument feeding another script; o redirect to a file; • Constructs; <ul style="list-style-type: none"> o for loops; o while loops; o do while loops; o if / else.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
	Understand application lifecycle management.	Describe the primary steps required for scripting / software development. <ul style="list-style-type: none"> • Plan - Investigate and understand the purpose of the script and the problem it will solve. • Design - Create a document detailing how the script will operate including any data flow. • Develop / Build - Create the script, complete with comments. • Test - Debug and test the script, preferably in a proper test environment (not live production, ideally a “model office”). • Maintain - Document any changes made to the script and update and version the script as required, logging changes at the top of the script.
	Understand algorithms and data structures.	Explain the common algorithms that may be used on a day to day basis by an infrastructure technician. <ul style="list-style-type: none"> • Searches; <ul style="list-style-type: none"> o log file searches; o file searches, file matching; o in file searches; <ul style="list-style-type: none"> ▪ Windows – find ▪ Linux – grep • sorting and filtering; <ul style="list-style-type: none"> o file filtering using wildcards; o log file filtering using wildcards; o file sorting using command line switches; <ul style="list-style-type: none"> ▪ Windows - DIR ▪ Linux - ls

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		<p>Describe the following data structures, how they are composed and an example of their usage.</p> <ul style="list-style-type: none"> • The purpose of delimiters and why they are sometimes (but not always) required in data structures. • data structure types; <ul style="list-style-type: none"> o int; o float; o string; o array; • data files; <ul style="list-style-type: none"> o CSV; o XML. <p>Explain that 'NULL' is used to represent no value in data structures.</p> <ul style="list-style-type: none"> • The “null” expression is used to signify that no value has been assigned to a specific field in an SQL or other database field. Some scripting languages also assign null values to variables when they are created.
	Understand the fundamentals of web page development.	<p>Recognise HTML (Hypertext Mark-up Language).</p> <ul style="list-style-type: none"> • basic tags <, <html><body><head><h1><h2>, <A> <p>Explain how basic Cascading Style Sheets (CSS) is used to provide common look across pages.</p> <p>Describe the components, methods and protocols used to host a web site.</p> <ul style="list-style-type: none"> • FTP / FTPS (File Transfer Protocol); • HTTP / HTTPS. <p>Recognise the purpose of the OWASP Top 10.</p>
BCS Level 3 Award in Business Processes	Gain an understanding of business processes and how to comply with them.	<p>Identify common security legislation / standards.</p> <ul style="list-style-type: none"> • ISO 27001; • Computer Misuse Act; • Data Protection Act 1998; • GDPR.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		Discuss how principles from legislation apply to daily operational scenarios. <ul style="list-style-type: none"> • ISO 27001; • Computer Misuse Act; • Data Protection Act 1998; • GDPR
		Define what should and should not be classed as confidential material.
		Understand the necessity and use of: <ul style="list-style-type: none"> • standard operating procedures (SOPs); • disaster recovery plans.
		Identify relevant legislation / standards. <ul style="list-style-type: none"> • Data Protection Act 1998; • Freedom of Information Act 2000; • GDPR.
		Summarise the 8 data protection principles. Identify the exceptions to the principles. <ul style="list-style-type: none"> • national security; • crime prevention.
		Identify who enforces the Data Protection Act and what penalties they can enforce. <ul style="list-style-type: none"> • fines; • prison sentences; • enforcement notices.
	Gain a working knowledge of business IT skills that are relevant to the organisation.	Understand an organisation's IT requirements and how they relate to business strategy. <ul style="list-style-type: none"> • network availability; • asset management; • security; • maintenance.
		Recognise the difference between on premise and off premise.

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		<p>Recognise the IT systems used for:</p> <ul style="list-style-type: none"> • Finance; • HR; • Sales and Marketing; • IT Service Help Desk.
		<p>Define the following terms:</p> <ul style="list-style-type: none"> • Infrastructure as a Service [IaaS]; • Software as a Service [SaaS]; • Platform as a Service [PaaS].
		<p>Recognise the requirements of the following roles:</p> <ul style="list-style-type: none"> • HR; <ul style="list-style-type: none"> o support and communication; • Finance; <ul style="list-style-type: none"> o analytics and governance; • Sales and Marketing; <ul style="list-style-type: none"> o design and communication; • IT service Help Desk; <ul style="list-style-type: none"> o Technical advice and guidance.
		<p>Summarise the difference between Agile and Waterfall methods of software development.</p> <ul style="list-style-type: none"> • design; • build; • test; • maintain.
		<p>Recognise common types of desktop applications.</p> <ul style="list-style-type: none"> • word processor; • spreadsheets; • database; • email; • presentation software.
		<p>Recognise different messaging clients and the benefit they can bring for team working / collaboration instead of email.</p>

Qualification Name	Learning outcomes The learner will....	Assessment Criteria The learner can...
		Discuss good principles of document management. <ul style="list-style-type: none"> • revision numbers; • separate authors and reviewers; • backups; • consistent folder structure.

5. Assessment

5.1 Summary of assessment methods

The qualification is assessed in controlled exam conditions. The award in Networking and Architecture, the award in Mobile and Operating Systems and the award in Cloud Services use a one-hour multiple-choice examination consisting of 40 questions. The award in Coding and Logic and the award in Business Principles use a 30-minute multiple-choice examination consisting of 20 questions.

The exams are externally marked.

5.2 Availability of assessments

To be able to offer BCS Qualifications you need to become a BCS Approved Training Provider.

All staff members who are involved in the management, invigilation and training must be registered with BCS. Suitably qualified individuals may be registered for more than one role. At least two members of staff must be registered with BCS in one of the roles in order for the Training Provider to retain Training Provider approval.

5.3 Grading

The exam has a pass mark of 65%.

Please note: Whilst BCS would not normally want to make changes to either grade thresholds or grading algorithms there is potential for them to change in order to maintain standards.

5.4 Externally assessed units

External tests from BCS come in the form of automated tests. The tests offer instant results to the learner.

5.5 Specimen assessment materials

A sample test is available on the BCS Website.

5.6 Support materials

BCS provides the following resources specifically for these qualifications:

Description	How to access
Syllabus	Available on website
Sample tests	Available on website

5.7 Access to Assessment

BCS seeks to provide equal Access to Assessment for all learners, ensuring that there are no unnecessary barriers to assessment and that any reasonable adjustments for learners preserve the validity, reliability and integrity of the qualification.

We will consider requests from BCS approved Training Providers for reasonable adjustments and special considerations to be approved for a learner. The decision will be based on the individual needs of the learner as assessed by suitably qualified professionals. In promoting this policy, BCS aims to ensure that a learner is not disadvantaged in relation to other learners and their certificate accurately reflects their attainment.

6. Contact Points

BCS Qualifications Client Services is committed to providing you with professional service and support at all times through a single, dedicated point of contact. With a flexible and proactive approach, our team will work together with you to ensure we deliver quality solutions that are right for you.

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Swindon,
SN1 1BY

T: +44 (0) 1793 417 424

W: www.bcs.org/qualifications

If you require this document in accessible format, please call +44 (0) 1793 417 424

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