**Making IT good for society**

# BCS Level 4 Award in Server Syllabus 603/3254/2

## Version 1.0
## May 2018

This is a United Kingdom government regulated qualification which is administered and approved by one or more of the following: Ofqual, Qualification in Wales, CCEA or SQA.

# BCS Level 4 Award in Server Syllabus

## Contents

# Change History

Any changes made to the syllabus 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 | Changes Made |
|---|---|
| V1.0 May 2018 | Document created. |
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# Introduction

This award is the first module of four knowledge modules that are applicable to the level 4 Unified Communications Trouble Shooter apprenticeship. It covers the range of concepts, approaches and techniques that are applicable to servers, for which apprentices are required to demonstrate their knowledge and understanding.

# Objectives

Apprentices should be able to demonstrate an understanding of modern computer networks. Key areas are:

1.  Understands how to administer and manage a server.
2.  Understands domain services.
3.  Understands Internet protocols e.g. V4 / V6.
4.  Understands and has a working knowledge of host configuration, data storage and load balancing.
5.  Understands types of systems failures and their consequences.
6.  Understands and can select the most appropriate troubleshooting tool for their scenarios.
7.  Understands server and client requirements within the architecture of a network.
8.  Understands the architecture required to implement IT systems to meet a business needs.

Evidence of lessons learnt in these key areas should be collected and reflected upon when the apprentice is compiling the summative portfolio as the apprentice could identify how the task might be done better / differently with knowledge subsequently gained.

# Target Audience

This award is relevant to anyone enrolled on the Level 4 Unified Communications Trouble Shooter Apprenticeship programme.

# Course Format and Duration

Apprentices can study for this award by attending a training course provided by a BCS accredited Training Provider. The estimated total qualification time for this award is 99 hours.

# Eligibility for the Examination

Individual employers will set the selection criteria, but this is likely to include 5 GCSEs (especially English, mathematics and a science or technology subject); other relevant qualifications and experience; or an aptitude test with a focus on IT skills.
Level 2 English and Maths will need to be achieved, if not already, prior to taking the endpoint assessment.

# Duration and Format of the Examination

The format for the examination is a one-hour multiple-choice examination consisting of 40 questions. The examination is closed book (no materials can be taken into the examination room). The pass mark is 26/40 (65%).

# Additional Time for Apprentices Requiring Reasonable Adjustments Due to a Disability

Apprentices may request additional time if they require reasonable adjustments. Please refer to the Access to Assessment policy for detailed information on how and when to apply.

# Additional Time for Apprentices Whose Language Is Not the Language of the Exam

If the examination is taken in a language that is not the apprentice's native / official language, then they are entitled to 25% extra time.

If the examination is taken in a language that is not the apprentice's native / official language, then they are entitled to use their own **paper** language dictionary (whose purpose is translation between the examination language and another national language) during the examination. Electronic versions of dictionaries will **not** be allowed into the examination room.

# Guidelines for Training Providers

Each major subject heading in this syllabus is assigned an allocated time. The purpose of this is two-fold: first, to give both guidance on the relative proportion of time to be allocated to each section of an accredited course and an approximate minimum time for the teaching of each section; second, to guide the proportion of questions in the exam. Training providers may spend more time than is indicated and apprentices may spend more time again in reading and research. Courses do not have to follow the same order as the syllabus. Courses may be run as a single module or broken down into two or three smaller modules.

This syllabus is structured into sections relating to major subject headings and numbered with a single digit section number. Each section is allocated a minimum contact time for presentation. Apprentices should be encouraged to consider their summative portfolio throughout the modules.

# Syllabus

For each top-level area of the syllabus a percentage and K level is identified. The percentage is the exam coverage of that area, and the K level identifies the maximum level of knowledge that may be examined for that area.

## 1   Server Administration Principles (62.5%, K2)

In this topic area, the apprentice will describe and explain server administration principles including storage, print services, group policy, availability, load balancing, failover clustering, back-up and disaster recovery. The successful apprentice should be able to:

1.1  Describe how to administer and manage a server.
- installation;
- maintenance;
- monitoring;
- configuration;
- base lines;
- policies;
- NTFS permissions;
- security;
  - HTTPS;
  - BitLocker;
  - certificates;
  - UEFI / secure boot.

1.2  Explain domain services.
- Active Directory;
- DNS;
- domain names;
- DHCP;
- print server;
- remote desktop services;
- Group Policy.

1.3  Explain internet protocols.
- TCP/IP;
- IPV4;
- IPV6.

1.4  Describe and explain host configuration, data storage and load balancing.
- storage area network (SAN);
- redundant array of independent disks (RAID);
- network-attached storage (NAS);
- direct-attached storage (DAS).


1.5  Identify types of systems failures and their consequences.
- load balancing failures;
    - misconfiguration - loss of connection to one / some nodes increasing load on remaining nodes;
    - misconfiguration – loss of connection to all nodes;
    - single / multiple node failures - intermittent connection;
    - all nodes fail - complete outage;
- storage protocol failures;
    - hardware failure - loss of access to local disk(s) and / or corruption of data;
    - loss of single / multiple disks - reduced throughput / loss of data depending on RAID level and number of disk failures;
    - loss of RAID controller - permanent / temporary loss of access to data.
    - misconfigured firewall or protocols (NFS, SMB, TCP/IP, AFS) - complete loss of access to NAS;
    - misconfigured NFS - loss of access for Linux / NAS network shares;
    - misconfigured SMB - loss of access to Windows network shares;
    - misconfigured authentication and/or authorisation - loss of access to some / all NAS / network shares;
    - loss of all Fibre switches - complete loss of access to storage, the standard data network is unaffected;
    - TCP/IP misconfiguration - inability for some / all nodes to access storage;
    - failure of a single network interface controller (NIC) - increased load on remaining NIC on a single node and possible reduced throughput for this node or complete outage if this is the only onboard NIC;
    - incorrect / invalid logical unit number (LUN) - inability to access logical storage device;
- hardware failures;
    - memory component failure - individual node crash;
    - SSD/HDD failure - system crash and possible loss of data;
    - CPU failure - intermittent system crash or failure to boot on a single node;
    - power supply - intermittent system crash or failure to boot on a single node;
    - cooling - intermittent crash or possibly permanent damage to components;
    - NIC failure - loss of access from / to one network node;
    - switch failure - loss of access to LAN or reduction in throughput depending on redundant configuration;
    - router failure - loss of access to WAN or reduction in throughput depending on redundant configuration;
    - firewall - loss of access to some / all network nodes / protocols;
    - web proxy - loss of access to web traffic;
    - wireless - exceeding maximum distance and / or EMI or RFI.

## 2 Server and Client Architecture and Tools (37.5%, K2)

In this topic area, the apprentice will be able to understand the server and client architecture, features, deployment process and troubleshooting tools for client software and applications. The successful apprentice should be able to:

2.1 Identify troubleshooting tools and explain in which circumstance they are to be used.
- U-Boot tests;
- Pc-Check diagnostic tests;
- route utility;
- netstat;
- nslookup;
- ping;
- ipconfig;
- traceroute;
- chkdsk.
Note: Awareness of built in tools for specific software, hardware and applications.

2.2 Describe server and client requirements within the architecture of a network.
- client;
- server;
- LAN;
- WAN;
- wireless.

2.3 Recognise and explain the architecture required to implement IT systems to meet a business needs.
- servers;
- network;
- switch;
- router;
- internet;
- clients;
- firewall;
- WiFi;
- VPN.

# Levels of Knowledge / SFIA Levels

This syllabus will provide apprentices with the levels of difficulty / knowledge skill highlighted within the following table, enabling them to develop the skills to operate at the levels of responsibility indicated. The levels of knowledge and SFIA levels are explained on the website www.bcs.org/levels. The levels of knowledge above will enable apprentices to develop the following levels of skill to be able to operate at the following levels of responsibility (as defined within the SFIA framework) within their workplace:

| Level | Levels of Knowledge | Levels of Skill and Responsibility (SFIA) |
|-------|--------------------|-------------------------------------------|
| K7 | | Set strategy, inspire and mobilise |
| K6 | Evaluate | Initiate and influence |
| K5 | Synthesise | Ensure and advise |
| K4 | Analyse | Enable |
| K3 | Apply | Apply |
| K2 | Understand | Assist |
| K1 | Remember | Follow |

# Question Weighting

| Syllabus Area | Target Number of Questions |
|---------------|---------------------------|
| 1. Server Administration Principles | 25 |
| 2. Server and Client Architecture and Tools | 15 |
| **Total** | **40 Questions** |

# Format of Examination

| Type | 40 Question Multiple Choice. |
|---|---|
| Duration | 1 hour. An additional 15 minutes will be allowed for apprentices sitting the examination in a language that is not their native / mother tongue. |
| Pre-requisites | Training from a BCS accredited training provider is strongly recommended but is not a pre-requisite. |
| Supervised | Yes. |
| Open Book | No. |
| Pass Mark | 26/40 (65%). |
| Calculators | Calculators cannot be used during this examination. |
| Total Qualification Time (TQT) | 99 Hours, 67.5 GLH recommended. |
| Delivery | Online. |

# Trainer Criteria

| Criteria | <ul><li>Have 10 days' training experience or have a Train the Trainer qualification.</li><li>Have a minimum of 3 years' practical experience in the subject area.</li></ul> |
|---|---|

# Classroom Size

| Trainer to apprentice ratio | 1:16 |
|---|---|