

BCS LEVEL 5 DIPLOMA IN IT

PRINCIPLES OF INTERNET

TECHNOLOGIES

SYLLABUS



September 2021 v3.0

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

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Introduction

The second stage within the BCS three-stage Higher Education Qualification programme, the Level 5 Diploma enables candidates who have already achieved the Level 4 Certificate in IT to progress to higher levels of knowledge and competency.

This internationally-recognised qualification introduces you to the business-related aspects of the IT industry, developing your technological expertise while also considering the potential challenges of the day-to-day running of an organisation, such as legal obligations and intellectual property.

Our modules have been created in-line with the latest developments in the industry, giving you a competitive edge in the IT job market. You will have the opportunity to learn about object-oriented programming, user experience, systems analysis and design, as well as to build upon knowledge and skills developed during the Level 4 Certificate.

To successfully achieve the qualification, candidates need to complete:

- One core module
- Three optional modules
- One Professional Project in IT

Candidates who wish to progress onto the next stage will need to complete the Project at end of the Level 6 Professional Graduate Diploma in IT.

Principles of Internet Technologies Optional Module

The Principles of Internet Technologies module is an optional module that forms part of the Level 5 Diploma in IT – the second stage within the BCS three-stage Higher Education Qualification programme.

Candidates will take a journey of discovery to uncover how the internet and the world wide web have evolved over time and what their practical applications are. Candidates will learn about processes, standards and protocols, and explore security and performance aspects.

Qualification Suitability and Overview

Candidates must have achieved the Certificate in IT or have an appropriate exemption to be entered for the Diploma in IT. Candidates can study for this diploma by attending a training course provided by a BCS accredited Training Provider or through self-study, although it is strongly recommended that all candidates register with an approved centre. Studying with an approved centre will deliver significant benefits.

Candidates are required to become a member of BCS, The Chartered Institute for IT, to sit and be awarded the qualifications. Candidates may apply for a four-year student membership that will support them throughout their studies.

The Level 5 Diploma is suitable for professionals wishing to gain a formal IT qualification, and this module may be particularly relevant for candidates with a special interest in the foundation blocks of internet technologies such as the various access methods and protocols, static and dynamic HTML, and security of hardware and software.

Total Qualification Time (Certificate)	Guided Learning Hours (Module)	Assessment Time (Exam)
1086 hours	225 hours	Two hours

SFIA Levels

This award provides candidates with the level of knowledge highlighted within the table, enabling candidates to develop the skills to operate successfully at the levels of responsibility indicated.

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

SFIA Plus

This syllabus has been linked to the SFIA knowledge skills and behaviours required at Level 5.

ICPM3

Coordinates content management processes to meet the needs of users, including those with disabilities. Uses content publishing systems to manage published content across different channels. Takes into account any legal issues related to publishing, including that associated copyright concerns are adequately managed.

SCTY3

Communicates information security risks and issues to business managers and others. Performs basic risk assessments for small information systems. Contributes to vulnerability assessments. Applies and maintains specific security controls as required by organisational policy and local risk assessments. Takes action to respond to security breaches in line with security policy and records the incidents and action taken.

Further detail around the SFIA Levels can be found at www.bcs.org/levels.

Learning Outcomes

Upon completion of this module, candidates will be able to:

- Describe the evolution of the Internet.
 - Understand the protocols and standards used throughout the Internet.
 - Discuss a variety of Internet and WWW applications and related technologies.
 - Evaluate the opportunities and threats created by interconnecting computers via the Internet.
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Syllabus

1. The internet and world wide web

Learners will be able to:

1.1 Describe the evolution of the internet

Indicative content

- a. Key stages in the development of the internet and world wide web
- b. Purposes and uses of the web

Guidance

Candidates should be familiar with the context of the growth of the web, the way the web has developed and its developmental milestones. Candidates should have an awareness of the rate of development in different parts of the world. This area is likely to form a fragment/element of another question, e.g. a question on access methods.

1.2 Explain the client-server model.

Indicative content

- a. TCP/IP
- b. SMTP
- c. POP3
- d. Other examples of client-server protocols

Guidance

Candidates should understand the operation of the client-server model and be able to discuss some examples, e.g. TCP/IP, SMTP, POP3, etc., although this is not an exhaustive list. Candidates will be expected to produce an annotated diagram. Candidates should understand how this links to section 2 (Process, standards and protocols).

1.3 Describe the architecture of the internet, intranet and extranet.

Indicative content

- a. Internet
- b. Intranet
- c. Extranet

Guidance

Candidates should understand the similarities and differences between the three.

1.4 Explain different access methods.

Indicative content

- a. Dialup
- b. ISDN
- c. ADSL/2+
- d. Cable
- e. LAN
- f. Wifi
- g. Mobile
- h. Satellite

Guidance

Candidates should have an appreciation for the global picture, as well as understanding access methods in their own countries/part of the world..

1.5 Describe proxy servers.

Indicative content

- a. Role of the proxy server
- b. How a proxy server works

Guidance

Candidates should be familiar with reasons for using proxy servers, e.g. schools or colleges controlling internet access for students.

1.6 Explain different application areas.

Indicative content

- a. E-commerce
- b. Working and studying online
- c. Entertainment
- d. Search engines

Guidance

Candidates should be able to discuss different uses for the internet and world wide web. Candidates should have a global awareness of developments in application areas, as well as in their own geographical area.

1.7 Describe the Internet of Things (IoT).

Indicative content

- a. Intuitive technology
- b. Automated technology

Guidance

Candidates should be able to describe examples of IoT.

2. Process, standards and protocols

Learners will be able to:

2.1 Explain the TCP/IP model.

Indicative content

- a. Graphic representation of TCP/IP model

Guidance

Candidates should understand the underlying protocols and architectures which enable the internet and world wide web to function.

2.2 Describe fixed and dynamic IP addressing.

Indicative content

- a. TCP/IP fixed and dynamic IP addressing
- b. IPv4 and IPv6

Guidance

Candidates should understand the operation of TCP/IP, difference between fixed and dynamic IP addressing, as well as differences between IPv4 and IPv6, and the reasons why IPv6 has been introduced.

2.3 Explain DNS and URL.

Indicative content

- a. Graphic representation or diagram of DNS

Guidance

Candidates should understand the component parts of a URL and how DNS mapping works.

2.4 Describe email clients.

Indicative content

- a. Email clients
- b. Server and gateways
- c. SMTP
- d. POP3
- e. IMAP
- f. Webmail

Guidance

Candidates should understand the main protocols for email.

2.5 Explain file transfer protocol (FTP).

Indicative content

- a. File transfer

Guidance

Candidates should be able to show an understanding of the network protocol FTP, conveying its position within the TCP/IP model and how it interacts with the other layers.

2.6 Explain remote log-in methods.

Indicative content

- a. Remote log-in, e.g. telnet
- b. WWW, e.g. http, https
- c. SSL and TLS

Guidance

Candidates should be able to explain how to use remote log-in methods, such as a range of VPNs and the use of these for a variety of purposes, i.e. work, communication, global access. Candidates should also be aware of how to recognise secure access online.

2.7 Explain the role of W3C.

Indicative content

- a. Graphic representation or diagram of DNS

Guidance

Candidates should understand the component parts of a URL and how DNS mapping works.

2.8 Describe accessibility.

Indicative content

- a. Accessibility guidelines
- b. Accessibility standards

Guidance

Candidates should understand how to ensure use of the correct guidelines and standards to enable accessibility. They should also be aware of advantages and disadvantages of these guidelines and standards.

2.9 Explain mobile and ubiquitous computing.

Indicative content

- a. EDGE/HSPA+/4G
- b. GPS
- c. QR codes
- d. RFID
- e. Location and context awareness

Guidance

Candidates should be aware of a variety of connection methods through mobile devices. They should be able to explain the use of different types of applications for different given situations.

3. Website development

Learners will be able to:

3.1 Describe static and dynamic HTML.

Indicative content

- a. Static
- b. Dynamic

Guidance

Candidates will need to be able to code simple examples showing their understanding of static and dynamic HTML.

3.2 Explain fluency in client-side scripting.

Indicative content

- a. Fluency in at least one of the following client-side scripting languages: JavaScript or VBscript

Guidance

Candidates will need to be able to code simple examples using appropriate scripting languages.

3.3 Explain DOM model.

Indicative content

- a. XML
- b. CSS
- c. XSL

Guidance

Candidates should have familiarity with the DOM model and be able to apply it to their code, using appropriate development tools.

3.4 Explain development tools.

Indicative content

- a. Page and site authoring
- b. Delivery
- c. Maintenance tools

Guidance

Candidates should be able to demonstrate page and site authoring, showing awareness of appropriate methods and tools to do this. Candidates should also be able to explain how these tools and methods are used for delivery.

3.5 Demonstrate and explain JavaScript frameworks and libraries.

Indicative content

- a. jQuery, React, View.JS
- b. Functionalities of a JavaScript-based application
- c. JavaScript libraries appropriate for user experience

Guidance

Candidates should show an awareness of a variety of JavaScript frameworks and libraries. They should be able to recognise the appropriate library or framework to use for specific functionalities of an application.

3.6 Explain the mobile web.

Indicative content

- a. Page and site authoring
- b. Delivery
- c. Maintenance tools

Guidance

Candidates need to be aware of the particular needs for developing for mobile devices.

3.7 Describe usability issues.

Indicative content

- a. A variety of devices
- b. A variety of access methods

Guidance

Candidates need to be able to apply the W3C guidelines for usability.

4. Security and performance

Learners will be able to:

4.1 Explain security policies.

Indicative content

- a. Privacy
- b. Identification
- c. Authentication
- d. Access control

Guidance

Candidates need to understand the main vulnerabilities posed by hackers and other forms of attack, showing awareness of a variety of methods to defend and prevent attacks.

4.2 Explain security of hardware and software.

Indicative content

- a. Risk assessment
- b. Vulnerabilities

Guidance

Candidates need to be able to understand the place of a risk assessment within maintaining secure access to hardware and software, showing awareness of potential vulnerabilities.

4.3 Describe and explain threats and attack methods.

Indicative content

- a. Viruses
- b. Spam
- c. Root kits
- d. Phishing
- e. Firewalls
- f. Spyware plug-ins

Guidance

Candidates need to be able to identify a variety of threats and attack methods, and the impact these have on applications, users and operability.

4.4 Explain performance methods.

Indicative content

- a. Speed
- b. Reliability
- c. Downtime
- d. Bandwidth
- e. Use of network utility tools to discover performance issues

Guidance

Candidates should understand how tools can be used to monitor network performance and diagnose problems.

Examination Format

This module is assessed through completion of an invigilated written exam.

Type	Four written questions from a choice of six, each with equal marks
Duration	Two hours
Supervised	Yes
Open Book	No (no materials can be taken into the examination room)
Passmark	10/25 (40%)
Delivery	Paper format only

Adjustments and/or additional time can be requested in line with the [BCS reasonable adjustments policy](#) for candidates with a disability or other special considerations.

Question Weighting

Candidates will choose four questions from a choice of six. All questions are equally weighted and worth 25 marks.

Recommended Reading

Primary texts

Title: How the Internet Works (8th edition)
Author: P. Gralla and M. Troller
Publisher: Que
Date: 2006
ISBN: 978-0789736260

Title: The Internet – Illustrated (6th edition)
Author: G. Schneider, J. Evans and K. T. Pinard
Publisher: Cengage Learning
Date: 2009
ISBN: 978-0538750981

Additional texts

Title: Web 2.0 and Beyond: Principles and Technologies
Author: P. Anderson
Publisher: Chapman & Hall/CRC Textbooks in Computing
Date: 2012
ISBN: 978-1439828670

Title: Internet of Things: A Hands-On Approach
Author: A. Bahga and V. Madisetti
Publisher: VPT
Date: 2014
ISBN: 978-0996025515

Title: Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web by Its Inventor
Author: T. Berners-Lee and M. Fischetti
Publisher: Harper Business
Date: 2000
ISBN: 978-0062515872

Title: Sams Teach Yourself TCP/IP in 24 Hours (5th edition)
Author: J. Casad
Publisher: Sams
Date: 2014
ISBN: 978-0672335716

Title: Head First JavaScript Programming
Author: E. Freeman and E. Robson
Publisher: O'Reilly
Date: 2014
ISBN: 978-0596527747

Title: Internet Literacy (4th edition)
Author: F. T. Hofstetter
Publisher: McGraw Hill
Date: 2005
ISBN: 978-0072260618

Title: Beginning JavaScript (5th edition)
Author: J. McPeak
Publisher: Wrox
Date: 2015
ISBN: 978-1118903339

Title: HTML, CSS, and Javascript All in One (third edition)
Author: J. C. Meloni and J. Kyrynin
Publisher: Sams
Date: 2018
ISBN: 978-0672338083

Title: Learning Web Design (5th edition)
Author: J. Robbins
Publisher: O'Reilly
Date: 2018
ISBN: 978-1491960202

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Document 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
Version 1.0 July 2021	Document Creation

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