



# BCS EXIN Foundation Certificate in Blockchain

**Version 1.0**

**April 2020**

This professional certification is not regulated by the following United Kingdom Regulators – Ofqual, Qualification in Wales CCEA or SQA.

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## Change History

This log provides a single point of reference, where a summary of any changes is recorded, to include the date of the amendment and a summary of the changes made.

Version Number	Changes Made
Version 1.0 April 2020	BCS Formatted Syllabus created.

## Introduction

The BCS EXIN Foundation Certificate in Blockchain validates a professional's knowledge about Blockchain as a ledger with potential as a worldwide, decentralised record for the registration, inventory, and transfer of assets: finance, property, products and intangible assets, such as votes, software, health data and ideas. The certification covers the basic concepts of Blockchain, the potential fields of application, the potential value for the organisation and the technology driving Blockchain.

BCS EXIN Foundation Certificate in Blockchain validates a professional's knowledge about:

- Blockchain Basics
- Blockchain Challenges
- Applications of a Blockchain
- Blockchain Innovations

## Target Audience

BCS EXIN Foundation Certificate in Blockchain is tailored to professionals in both business and IT who have, or aim to have, a professional role in Blockchain as a cryptographic and smart contract solution.

## Levels of Knowledge / SFIA Levels

This syllabus will provide candidates with the levels of difficulty / knowledge 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 further explained on the website [www.bcs.org/levels](http://www.bcs.org/levels).

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

## Learning Outcomes

Candidate will be able to demonstrate knowledge and understanding of the basic concepts of Blockchain in the following areas:

1. Blockchain Basics
2. Blockchain Challenges
3. Applications of a Blockchain
4. Blockchain Innovations

## Study Format and Duration

BCS recommends that for full coverage of the syllabus to be achieved, training courses leading to the certificate should normally run for a minimum 14 hours. This number includes group assignments, exam preparation, and short breaks. Not included are homework, logistics for exam preparation and lunch breaks.

**Candidates should spend about 60 hours on self-study, depending on existing knowledge.**

## Eligibility for the Examination

There are no specific pre-requisites for entry to the examination although accredited training is strongly recommended.

## Examination Format and Duration

Type	40 Multiple Choice questions
Duration	60 minutes
Supervised	Yes
Open Book	No (no materials can be taken into the examination room)
Passmark	26/40 (65%)
Delivery	Digital or paper based.

## Additional Time

### For Candidates Requiring Reasonable Adjustments Due to a Disability.

Please refer to the [reasonable adjustments policy](#) for detailed information on how and when to apply.

### For Candidates Whose Language is Not the Language of the Examination

If the examination is taken in a language that is not the candidate's native/official language, then they are entitled to:

- 25% extra time.
- 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 Accredited Training Organisations

Each major subject heading in this syllabus is assigned a percentage weighting. The purpose of this is:

- 1) Guidance on the proportion of content allocated to each topic area of an accredited course.
- 2) Guidance on the proportion of questions in the exam.

Courses do not have to follow the same order as the syllabus and additional exercises may be included, if they add value to the training course.

## Question Weighting

Learning Objectives		Weight
<b>1. Blockchain Basics</b>		<b>37.5%</b>
	1.1 Blockchain Technology	15%
	1.2 Additional Blockchain Elements	12.5%
	1.3 Structure of a Blockchain Network	10%
<b>2. Blockchain Challenges</b>		<b>17.5%</b>
	2.1 Challenges for a Blockchain	10%
	2.2 Blockchain Risk Mitigation	7.5%
<b>3. Applications of a Blockchain</b>		<b>32.5%</b>
	3.1 Blockchain Use Case	2.5%
	3.2 Blockchain Technology Supporting Businesses	7.5%
	3.3 Blockchain Technology Supporting People	10%
	3.4 Expanding Blockchain Applications	7.5%
	3.5 Blockchain and the World Economy	5%
<b>4. Blockchain Innovations</b>		<b>12.5%</b>
	4.1 Innovations in Blockchain Technology	12.5%
<b>Total</b>		<b>100%</b>

## Trainer Criteria

Criteria	<ul style="list-style-type: none"><li>• Hold the BCS EXIN Foundation Certificate in Blockchain</li><li>• Have a minimum of 2 years' training experience or 1 year with a recognised qualification</li><li>• Have a minimum of 3 years' practical experience in the relevant subject area</li></ul>
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## Classroom Size

Maximum recommended trainer to candidate ratio	1:16
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## Excerpts from BCS Books

Accredited Training Organisations may include excerpts from BCS books in the course materials. If you wish to use excerpts from the books you will need a license from BCS to do this. If you are interested in taking out a licence to use BCS published material, you should contact the Head of Publishing at BCS outlining the material you wish to copy and the use to which it will be put.

# Syllabus

## Learning Objectives

### 1. Blockchain Basics (37.7%)

#### 1.1 Blockchain Technology

Candidate will be able to:

- 1.1.1 Explain how a Blockchain works.
- 1.1.2 Explain what a node is.
- 1.1.3 Identify the role of a node in a network.
- 1.1.4 Explain what tokens are.
- 1.1.5 Differentiate between public, private and hybrid Blockchains.

#### 1.2 Additional Blockchain Elements

Candidate will be able to:

- 1.2.1 Explain how cryptography is used in a Blockchain.
- 1.2.2 Explain how private and public keys are used in a Blockchain.
- 1.2.3 Explain how hashes are used in a Blockchain.
- 1.2.4 Explain the purpose ledgers have in a Blockchain.
- 1.2.5 Explain the role mining has in a Blockchain.

#### 1.3 Structure of a Blockchain Network

Candidate will be able to:

- 1.3.1 Recognise the types of consensus algorithms from a description.
- 1.3.2 Identify advantages and disadvantages of different consensus algorithms.

### 2. Blockchain Challenges (17.5%)

#### 2.1 Challenges for a Blockchain

Candidate will be able to:

- 2.1.1 Identify Blockchain vulnerabilities.
- 2.1.2 Identify the risks community fractures and feuds pose to a Blockchain.
- 2.1.3 Identify the risks fraud and scams pose to a Blockchain.

#### 2.2 Blockchain Risk Mitigation

Candidate will be able to:

- 2.2.1 Explain how the additional Blockchain elements can be used to mitigate Blockchain risks.
- 2.2.2 Explain the role of the public witness in a Blockchain.

### 3. Applications of a Blockchain (32.5%)

#### 3.1 Blockchain Use Case

Candidate will be able to:

- 3.1.1 Explain in which scenarios a Blockchain is useful.

#### 3.2 Blockchain Technology Supporting Businesses

Candidate will be able to:

- 3.2.1 Explain how cryptocurrencies are used.
- 3.2.2 Identify the Blockchain technology used in a scenario.



- 3.2.3 Differentiate between Blockchain networks.
- 3.3 Blockchain Technology Supporting People  
Candidate will be able to:
  - 3.3.1 Explain the use of smart contracts.
  - 3.3.2 Explain the use of Decentralised Applications (DApps).
  - 3.3.3 Explain the role of Decentralised Autonomous Organisations (DAO) and Sophisticated smart contracts.
- 3.4 Expanding Blockchain Applications  
Candidate will be able to:
  - 3.4.1 Describe possible applications for a Blockchain with regard to identity.
  - 3.4.2 Identify the possibilities of combining a Blockchain with Internet of Things (IoT) or Artificial Intelligence (AI).
  - 3.4.3 Identify the use of decentralised marketplaces and exchanges facilitated by Blockchain technology.
- 3.5 Blockchain and the World Economy  
Candidate will be able to:
  - 3.5.1 Describe the role a Blockchain can play in the supply chain.
  - 3.5.2 Describe the role a Blockchain can play in cross-border money transfers.

#### **4. Blockchain Innovations (12.5%)**

- 4.1 Innovations in Blockchain Technology  
Candidate will be able to:
  - 4.1.1 Explain what digital fiat currency and disruption in banking and currency are.
  - 4.1.2 Explain how Blockchain technology can change insurance.
  - 4.1.3 Explain the use of Blockchain technology for the protection of intellectual property rights (IP) and providence.
  - 4.1.4 Explain how Blockchain technology may change governments.
  - 4.1.5 Identify applications for Blockchain technology in e-mail and the trust layer for the internet.

## Basic Concepts

Please note that knowledge of these terms alone does not suffice for the exam; the candidate must understand the concepts and be able to provide examples.

Asymmetric Encryption	Hacking	
Artificial Intelligence (AI) <ul style="list-style-type: none"> <li>Strong AI / General AI</li> <li>Weak AI / Narrow AI</li> </ul>	Hash	
	Intellectual Property Rights (IP)	
	Internet of Things (IoT)	
Block header	Lean Governments	
Blockchain <ul style="list-style-type: none"> <li>Hybrid Blockchain</li> <li>Private Blockchain</li> <li>Public Blockchain</li> </ul>	Ledger	
	Mining	
	Near-Field Communication (NFC)	
Connected Device	Node <ul style="list-style-type: none"> <li>Full node</li> <li>Lightweight node / Client</li> </ul>	
Consensus Algorithm <ul style="list-style-type: none"> <li>Delegated Proof of Stake (DPoS)</li> <li>Proof of Authority (PoA)</li> <li>Proof of Burn (PoB)</li> <li>Proof of Capacity (PoC)</li> <li>Proof of Elapsed time (PoET)</li> <li>Proof of Space (PoSpace)</li> <li>Proof of Stake (PoS)</li> <li>Proof of Work (PoW)</li> </ul>		Nonce
	Opcode	
	Peer-to-Peer Network (P2P)	
	Private Key	
	Public Key	
	Public Witness	
	Radio Frequency Identification (RFID)	
	Second Generation Tokens	
	Cryptocurrency	Segregated Witness (SegWit)
	Cryptography	Self-Sovereign Identity
Decentralised Application (DApp)	Smart Contract	
Decentralised Autonomous Organisation (DAO)	Spoofing	
Decentralised Exchange	Stable Coin	
Decentralised Identity	Supply Chain	
Decentralised Marketplace	Token	
Digital Fiat Currency / Central Bank Digital Currency (CBDC)	Trusted Execution Environment (TEE)	
Distributed Ledger Technology (DLT)	Virtual Machine (VM)	
E-Mail Spam	Vulnerabilities	
Externally Owned Account (EOA)		

## Recommended Reading

**Title:** Introduction to Blockchain Technology – The many faces of Blockchain Technology in the 21st century

**Author:** Tiana Laurence

**Publisher:** Van Haren Publishing

**Publication Date:** November 2019

**ISBN:** 978 94 018 0499 8 (hardcopy)

**ISBN:** 978 94 018 0501 8 (eBook)

**ISBN:** 978 94 018 0504 9 (ePub)

## Literature Matrix

Learning Objectives		Reference
<b>1. Blockchain Basics</b>		
	1.1 Blockchain Technology	Chapter 1, Chapter 2
	1.2 Additional Blockchain Elements	Chapter 1, Chapter 2
	1.3 Structure of a Blockchain Network	Chapter 3
<b>2. Blockchain Challenges</b>		
	2.1 Challenges for a Blockchain	Chapter 2, Chapter 4, Chapter 10
	2.2 Blockchain Risk Mitigation	Chapter 2, Chapter 4, Chapter 10
<b>3. Applications of a Blockchain</b>		
	3.1 Blockchain Use Case	Chapter 4, Chapter 5, Chapter 6
	3.2 Blockchain Technology Supporting Businesses	Chapter 1, Chapter 4, Chapter 8
	3.3 Blockchain Technology Supporting People	Chapter 5, Chapter 9
	3.4 Expanding Blockchain Applications	Chapter 6
	3.5 Blockchain and the World Economy	Chapter 7
<b>4. Blockchain Innovations</b>		
	4.1 Innovations in Blockchain Technology	Chapter 8, Chapter 9