



BCS Foundation Level Certificate in DevOps Syllabus

**Version 1.0
August 2018**

This professional certification is not regulated by the following United Kingdom Regulators - Ofqual, Qualifications 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 are recorded, to include the date of the amendment and a summary of the changes made.

Version Number	Changes Made
Version 1.0 August 2018	Syllabus made live.
Version 0.3 July 2018	Product Manager sign off on comments.
Version 0.2 July 2018	BCS template and formatting applied.
Version 0.1 July 2018	Syllabus created.

Introduction

The BCS Foundation Level Certificate in DevOps is a great starting point for an individual or organisation wishing to embark upon the DevOps journey. A core understanding of fundamental DevOps values, practices and techniques is essential learning, as candidates move towards improved workflows and faster deployments. The Foundation Certificate in DevOps promotes framework-agnostic learning; core DevOps values will be at the heart of all discussions, citing specific textbook examples to support these values.

Levels of Knowledge / SFIA Levels

This syllabus will provide candidates with the levels of difficulty highlighted within the following table, also enabling them to develop the skills to operate at the highlighted level of responsibility (as defined within the SFIA framework) within their workplace. The levels of knowledge and SFIA levels are further explained on the website www.bcs.org/levels.

Level	Levels of Knowledge	Levels of Skill and Responsibility (SFIA)
7		Set strategy, inspire and mobilise
6	Evaluate	Initiate and influence
5	Synthesise	Ensure and advise
4	Analyse	Enable
3	Apply	Apply
2	Understand	Assist
1	Remember	Follow

Learning Outcomes

Candidates should be able to demonstrate knowledge, understanding and some basic application of the following aspects of DevOps:

1. Origins.
2. Benefits.
3. Culture and Teams.
4. Automation.
5. Lean.
6. Measurement.
7. Sharing.
8. Common Roles.
9. Practices and Techniques.
10. Methods and Approaches for Teams.

Course Format and Duration

Candidates can choose to study for this certificate from one of two ways: by either attending a training course provided by a BCS Accredited Training Organisation, or by self-study.

BCS recommends that for full coverage of the syllabus to be achieved, training courses leading to the certificate should normally run for a minimum of 12 hours over 2 days.

Eligibility for the Examination

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

Examination Format and Duration

Type	Multiple choice.
Duration	60 minutes.
Supervised	Yes.
Open Book	No.
Pass Mark	26/40 (65%)
Calculators	Calculators cannot be used during this examination.
Delivery	Digital only.

Additional Time

For Candidates Requiring Reasonable Adjustments Due to a Disability

Please refer to the [reasonable adjustments policy](#) for 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 an allocated percentage of study time. The purpose of this is:

- 1) Guidance on the proportion of time allocated to each section 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.

Excerpts from BCS Books

Accredited Training Organisations may include excerpts from BCS books in course materials. To use excerpts from the books, a license from BCS is required, which can be obtained by contacting the Head of Publishing at BCS.

Syllabus

Learning Objectives

1 Introducing DevOps 5%

Candidates will be able to:

- 1.1 Understand the traditional IT challenges that exist, which have allowed DevOps to emerge as the most logical way to operate in an IT environment.
- 1.2 Recall the history of DevOps and associated key events.
- 1.3 Understand what is involved when an organisation embarks on an Agile and DevOps transformation journey.
- 1.4 Understand what the business case justification is for a DevOps transformation.

2 Benefits of DevOps 10%

Candidates will be able to:

- 2.1 Show understanding of the various Agile practices that compliment a DevOps way of working.
- 2.2 Understand why an organisation should focus on products and services and how DevOps allows the benefits of these to thrive.
- 2.3 Understand why autonomous teamwork is vital for DevOps to be successful, relying on teams to deliver sustainable value.
- 2.4 Understand the CALMS model and the impact it has on a DevOps transformation.

3 Culture 15%

Candidates will be able to:

- 3.1** Understand the various models that explain how teams operate differently, depending on the circumstances and context, and how teams may be better equipped to succeed within the right culture.
- 3.2** Explain that team agility is a mindset: a common understanding within a team of how to operate in as lean a way as possible, which should not become a set of processes.
- 3.3** Explain why cross-functional teams are mandatory to allow for commitment-based delivery and fully autonomous teams.
- 3.4** Understand the key differences between motivators and de-motivators that ultimately lead to job satisfaction.
- 3.5** Explain the differences between servant leadership and traditional management techniques, understanding which is more appropriate for modern IT delivery.

4 Automation 15%

Candidates will be able to:

- 4.1** Explain what Continuous Integration (CI) is and why it is vital for any organisation looking to reduce their time to market, with a regular cadence of deliverable working software.
- 4.2** Improve agility and automation via the application of various environmental management practices and techniques.
- 4.3** Understand how to apply critical release management activities; planning, scheduling and controlling a software build through different stages and environments.
- 4.4** Explain that test automation is the use of software to control the execution of tests, allowing for the comparison of actual outcomes with predicted outcomes.
- 4.5** Explain how deployments in DevOps allow changes to travel the entire pipeline and get promoted into production automatically, resulting in multiple deployments daily.
- 4.6** Understand how to use data and data management to ensure code is ready for production.

5 Lean 10%

Candidates will be able to:

- 5.1 Apply techniques to maximise flow optimisation within a team.
- 5.2 Understand why Work In Progress (WIP) is potentially extremely wasteful and apply various techniques to help to limit WIP, allowing for a better workflow.
- 5.3 Know the Theory of Constraints (TOC) and recall basic constraint management practices.
- 5.4 Explain the 8 Types of Waste according to Lean guidelines and why each type may be considered to have a negative effect on productivity.

NB: there is no requirement to understand *include* or *extend* constructs.

- 5.5 Understand that a customer focus, which provides the customer with a better product or service, should always be the driving factor of a DevOps team.

6 Measurement 10%

Candidates will be able to:

- 6.1 Understand how product goals should be clearly aligned with business goals, to ensure that value is being added.
- 6.2 Understand the different metrics that can be used to determine a successful delivery.
- 6.3 Understand the different metrics that can be used to ensure the business operations are working as effectively as possible.
- 6.4 Understand how captured metrics may be analysed to ensure that feedback is used appropriately and efficiently.
- 6.5 Explain the differences between Lead Time and Cycle Time; specifically, that Lead Time ends at delivery, whereas Cycle Time is when the item is ready for delivery.

7 Sharing 10%

Candidates will be able to:

- 7.1 Explain why collaboration is vital for DevOps success and what can be done to ensure that collaboration remains consistent throughout a product delivery.
- 7.2 Explain the reasons for implementing feedback loops wherever possible, focusing on the key benefits around agility and flexibility, to build the *right* product which is fit for purpose.
- 7.3 Explain the benefits of visualising aspects such as work, workflow and blockers and be able to highlight why visualising encourages further ad-hoc collaboration.
- 7.4 Understand why the Business and IT teams must work together daily, to ensure that all goals are clearly aligned.
- 7.5 Understand why high performing teams are always looking for opportunities to cross-learn and develop new skills.

8 Common DevOps Roles 5%

Candidates will be able to:

- 8.1 Understand the key duties and responsibilities of the following distinct roles within a DevOps team:
 - 8.1.1 DevOps Evangelist.
 - 8.1.2 Automation Architect.
 - 8.1.3 Cloud Infrastructure Engineer.
 - 8.1.4 Software Developer.
 - 8.1.5 Software Tester.
 - 8.1.6 Security Engineer.
 - 8.1.7 Database Administrator.
 - 8.1.8 Product Owner.

9 Common DevOps Practices and Techniques 10%

Candidates will be able to:

- 9.1 Explain the practices of both Continuous Integration (CI) and Testing and Deployment, detailing how they work together to formulate the technical excellence required for DevOps delivery teams.
- 9.2 Explain that Infrastructure as Code (IaC) is the process of managing and provisioning data centres through definition files, rather than physical hardware configuration tools.
- 9.3 Explain the importance of Test Driven Development (TDD) and why this practice allows delivery teams to focus on developing the simplest, most robust solutions possible.
- 9.4 Understand that a toolchain is a combined set of programming tools, which can be used to perform a complex software development task.
- 9.5 Understand that distributed version control is a form of version control, where the complete codebase is mirrored on every engineer's machine.
- 9.6 Understand the various tools that can be used to ensure effective production monitoring.
- 9.7 Understand the key differences between public, private and hybrid cloud technologies.

10 Relevant Methods and Approaches for DevOps Teams 10%

Candidates will be able to:

- 10.1 Explain what DevOps topologies and Target Operating Models (TOM) are and why an organisation might use them as part of their DevOps transformation.
- 10.2 Explain what scrum development delivery is and why this Agile development framework is particularly appropriate for delivery teams within a DevOps-focused organisation.
- 10.3 Explain how Kanban workflow can be used to identify bottlenecks, improve the overall delivery process and visualise the workflow.
- 10.4 Understand that transformational leadership is required at all levels of the organisation to successfully transform to a DevOps environment.
- 10.5 Explain what full stack engineering is and understand the benefits of building delivery teams consisting of full stack engineers.
- 10.6 Understand how collective ownership can form strong teams with focused, shared goals.
- 10.7 Understand why Continuous Experimentation is vital to ensure that creative solutions are always sought to solve problems presented by the business and that Continuous Experimentation allows for early and safe failure.

Recommended Reading List

Title: The Phoenix Project: A Novel About IT, DevOps, and Helping Your Business Win

Author: Gene Kim, George Spafford, and Kevin Behr

Publisher: Trade Select; 3rd Edition

Publication Date: 16 April 2018

ISBN: ISBN-10 - 1942788290