



Programme Guide

**DEVOPS
ENGINEER** LEVEL 4

DIGITAL AND DEGREE APPRENTICESHIPS

Building tech careers in the workplace

We offer digital and degree apprenticeships that focus on the most in-demand tech skills including; cyber, IT, software development, data and digital marketing, along with others in project management and senior leadership.

With programme pathways from Level 3 – Level 7, we help learners to progress and grow within your company, helping you retain talent and build capabilities.

Our award-winning approach to blended learning enables apprentices to develop further and faster, adding immediate value to their roles, whilst our interactive portal with real-time dashboards and trigger alerts enable managers to effectively and efficiently track progress.



Experience: 30,000 apprenticeships placed



An unrivalled talent pool: 100,000 apply to join our programmes every year



Award-winning: Recipient of the Gold Award at the Learning Tech Awards 2020 for our apprenticeship delivery model



Proven: We have the highest overall pass rate among UK tech training providers*

*based on end-point assessments by the BCS 2020

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ROLE PROFILE

DEVOPS ENGINEER

DevOps Engineers are focused on implementing and facilitating the use of DevOps practices within a business. This encompasses multiple stages of the software development life cycle, automating processes around development, testing and release for continuous integration of new features, and subsequent continuous delivery of a product.

DevOps Engineers will typically work as part of a larger team and will need context of both the development and technical operations aspects of a project in order to streamline communication between teams.

They are expected to interpret design documentation and specifications defined and delivered by specialist members of the team, such as a business analyst or technical architect.

DevOps Engineers need:

- Strong logical reasoning and problem-solving skills
- A methodical, step-by-step approach
- Attention to detail
- Business skills like effective communication, teamwork and task/time management
- The ability to troubleshoot issues where needed
- The ability to work under direction, use discretion and determine when to escalate issues

JOB ROLE SUITABILITY

As an employer is it important to assess whether a candidate (a new hire or existing employee) is working in a suitable job role to successfully complete their programme.

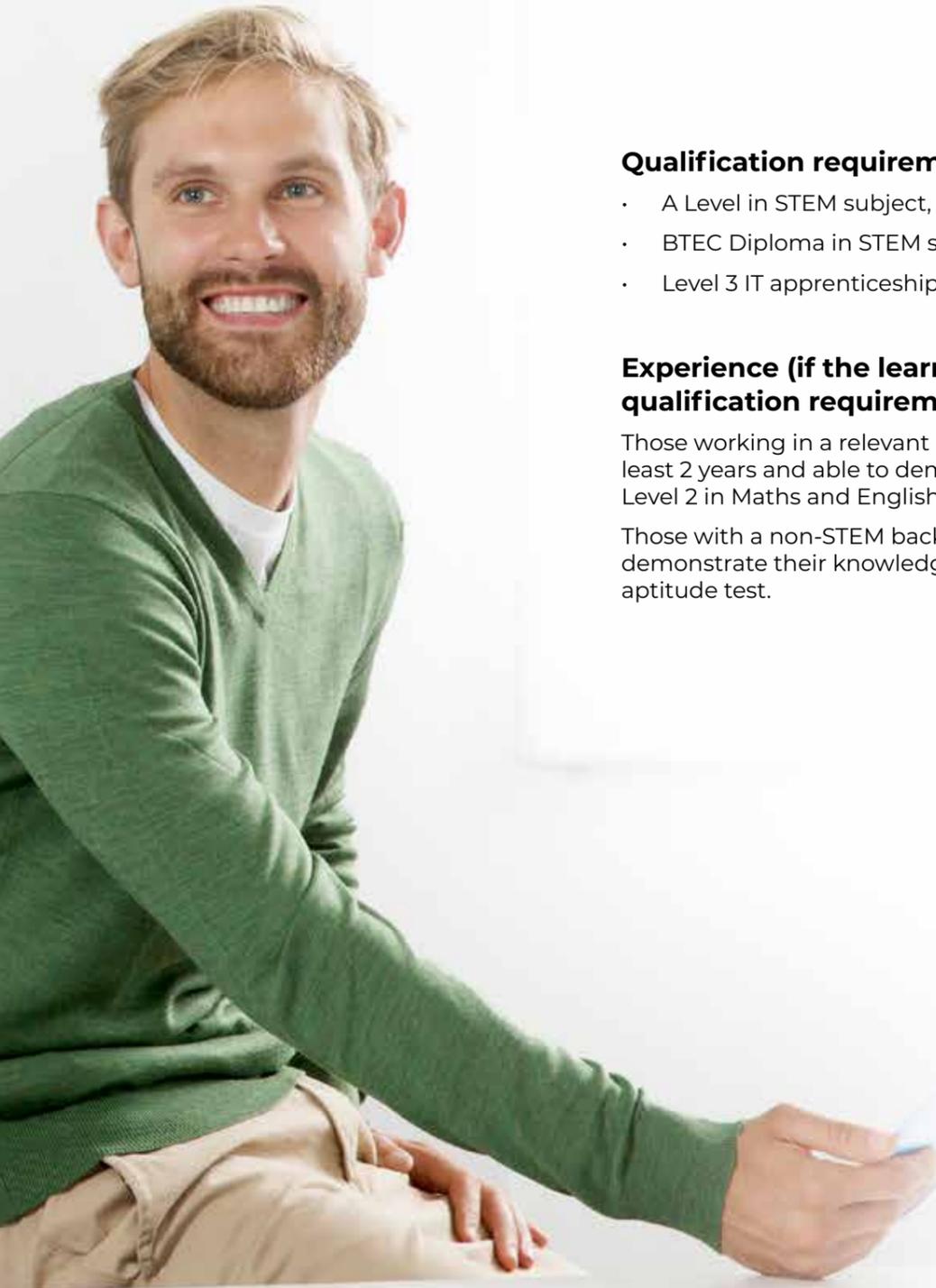
The checklist has been created to help you assess whether your apprentice will be in a position to demonstrate all of the following DevOps Engineer's duties, during their programme.

Job roles this programme is a great match for:

- Automation engineer
- Build and release engineer
- Deployment engineer
- DevOps engineer
- Full stack developer
- Infrastructure engineer
- Platform engineer
- Reliability engineer
- Site reliability engineer

Checklist

- | | |
|----|--|
| 1 | Will they be coding in at least one general purpose language and at least one domain-specific language? |
| 2 | Will they initiate and facilitate knowledge sharing and technical collaboration with teams and individuals? |
| 3 | Will they engage in productive pair/mob programming to underpin the practice of peer review? |
| 4 | Will they work as part of an agile team, and explore new ways of working whilst rapidly responding to changing user needs? |
| 5 | Will they build and operate a Continuous Integration (CI) capability, employing version control of source code and related artefacts? |
| 6 | Will they implement and improve release automation & orchestration as part of a continuous delivery and continuous deployment pipeline? |
| 7 | Will they provision cloud infrastructure using APIs and continually improve infrastructure-as-code? |
| 8 | Will they be involved with the evolution and definition of architecture, utilising the knowledge and experience of the team to design in an optimal user experience, scalability, security, high availability and optimal performance? |
| 9 | Will they apply security practices throughout the Software Development Lifecycle? |
| 10 | Will they implement a good coverage of monitoring (metrics, logs), ensuring that alerts are visible, tuneable and actionable? |
| 11 | Will they keep up with cutting edge by committing to continual training and development - utilise web resources for self-learning? |
| 12 | Will they look to automate any manual tasks that are repeated? |
| 13 | Will they accept ownership of changes; embodying the DevOps culture of 'you build it, you run it'? |



ENTRY REQUIREMENTS

Qualification requirements:

- A Level in STEM subject, or
- BTEC Diploma in STEM subject, or
- Level 3 IT apprenticeship

Experience (if the learner can't meet the qualification requirements):

Those working in a relevant IT or Software role for at least 2 years and able to demonstrate working towards Level 2 in Maths and English.

Those with a non-STEM background must demonstrate their knowledge by passing an aptitude test.

FINDING NEW TALENT

We offer an extensive attraction and recruitment service for employers who are looking to use apprenticeships to bring new talent into their organisation.

We use multiple channels and tactics to attract people who are interested in and are passionate about building a career in tech. Our recruitment model combines vigorous AI assessments with 1-2-1 interviews to ensure we select apprentices of the highest calibre.

We are committed to increasing diversity in tech and to help achieve this, we work closely with special interest groups including; Code First: Girls, Stemettes and Young Professionals to ensure apprentices from all backgrounds are given the same opportunities, and to support us to close the gender and diversity gap in tech.





Proactively engaged with over **4,000** sixth forms/colleges and universities, attending careers fairs to ensure we reach talent first



QA attracts **100,000 applicants** a year for its apprenticeship and tech academy roles and has nearly 200,000 in its candidate database



Significantly higher than average gender balance with **37%** of our apprenticeship starts being female, compared to an industry average of 19%



14.2% of our applicant pool indicated they have a BAME background - higher than the industry average of 13.3%

DIVERSITY AND INCLUSION

We're passionate about diversity in tech

It's our mission to help eradicate the gender gap, and make sure equal opportunities are given to applicants from all backgrounds. We do this through our long-standing partnerships, QA-driven initiatives and use of trending tools and software.

Diversity-first candidate attraction

We've invested in using augmented copy checking tools to ensure language is inclusive, open to all and free from bias.

We use inclusive imagery throughout our campaigns – producing visual content that promotes diversity and inclusion.

Promoting inclusivity

We nurture relationships with influencers, schools, colleges and universities via events and interactive sessions to ensure learners from all backgrounds are given the same opportunities.

Diversity partnerships

We forge partnerships with like-minded organisations who share our vision on STEM gender equality including Code First: Girls, Stemettes and Young Professionals.

Skills Scans

Every candidate goes through Skills Scans where their knowledge and skills are measured and mapped against apprenticeship standards. This process ensures the right learner is placed on the right programme at the right time, which we know contributes towards a successful completion and a good learner experience.

We make tech skills accessible to all

We run free tech workshops including 'Teach the Nation to Code' and 'Teach the Nation to Cloud' so anyone can explore technology career opportunities.

A BLENDED APPROACH TO LEARNING

How we deliver

QA apprenticeships are designed to immerse the apprentice in their job role and provide more flexibility for the employer.

Allowing individuals to learn through a combination of project and lab work, live events, self-research, self-paced learning and peer-to-peer learning.

The required 20% off-the-job training is a crucial part of the competency development. The latest apprenticeship standard can also now contribute to the off-the-job training, helping to ensure a positive ROI is achieved in relation to salary costs, productivity, efficiency and innovation.



LEARNER SUPPORT



Safeguarding at QA

Safeguarding means ensuring the safety and wellbeing of our learners.

At QA, this means ensuring our policies and processes promote and protect learner wellbeing and that while you are on programme, and that while on programme, we teach learners about the types of risk facing modern day British citizens.

This includes cyber risks, mental and physical health information, risks of radicalisation or grooming and much more.

Ways to access support if you are worried for yourself or someone else:

- Call us – anytime 07808 050273
- Email: safeguarding@qa.com
- Contact your Digital Learning Consultant (DLC), tutor or account manager
- Speak to any member of QA staff onsite



Prevent at QA

Prevent is part of the Government's counter-terrorism strategy.

At QA, this means we teach our staff and learners about the four British values: democracy, rule of law, individual liberty and respect and tolerance.

We also work with Prevent partners to identify people at risk of being or causing terror related harm.



Mental Health at QA

Emotional and mental wellbeing is an important component of successful learning.

Understanding how to protect mental health and promote emotional wellbeing is part of modern British citizenship.



DIGITAL BY DESIGN APPRENTICESHIP PROGRAMMES

Digital by Design programmes

QA Digital by Design apprenticeships provide a greater focus on online learning together with using live interaction where it adds the most value for learners.

It means that there is a single learner journey which brings teaching, coaching, learning and assessment into a single, repeatable flow for every module. This ensures that from the beginning of the programme there is a clear focus on successful completion of the end-point assessment (EPA).

In Digital by Design, these three elements will work together:

- The content
- The service and support
- The technology

Discover, practise and apply

All QA apprenticeships use a guided discovery approach to learning, as opposed to traditional methods of delivery such as live events. This shifts the emphasis from content delivery to our learners and their context, resulting in the apprentice feeling empowered to take ownership of their learning experience through the “Discover, Practise, Apply” model.



DISCOVER

Learners will learn the theory, by exploring subjects online and in the live events.



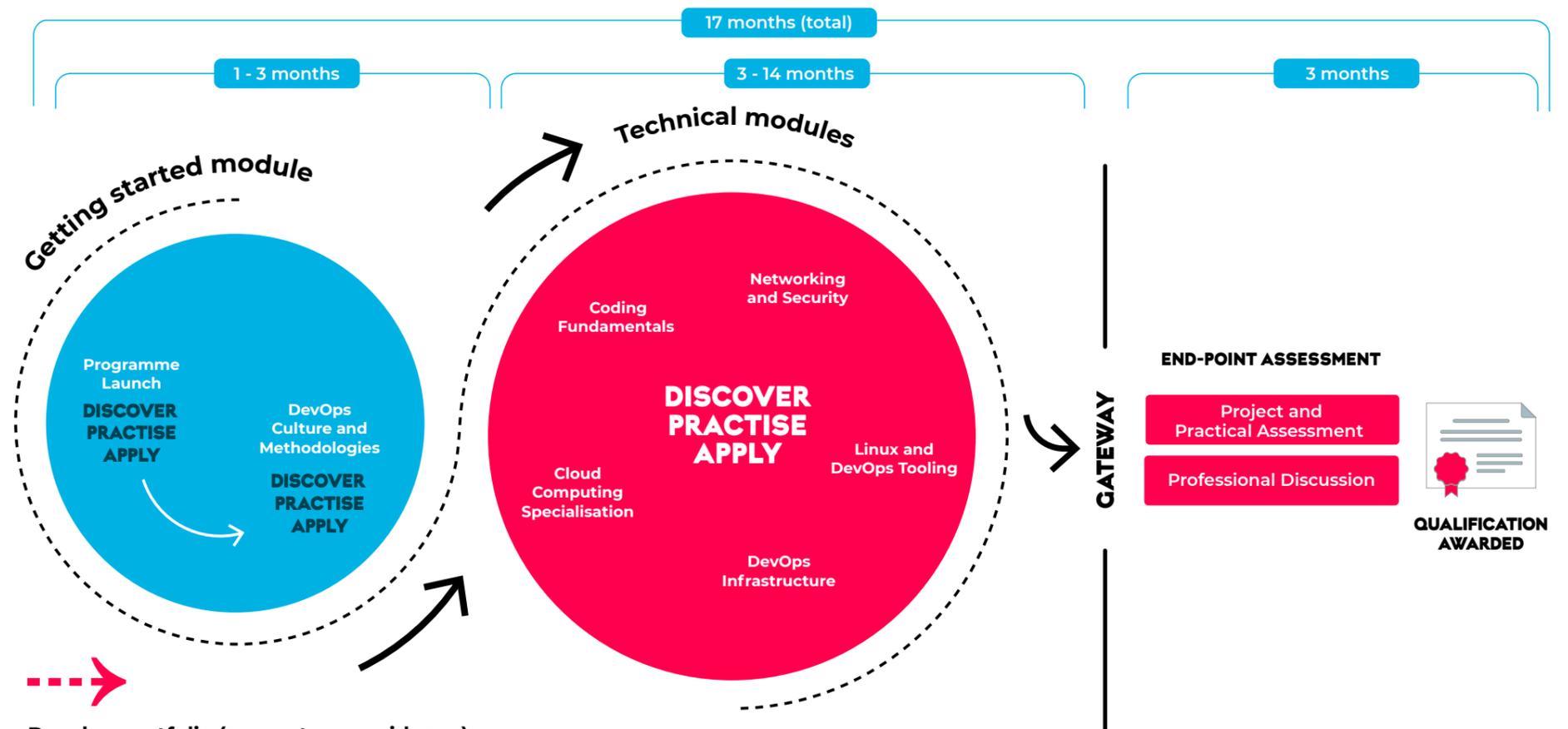
PRACTISE

Learners will practise their new-found knowledge by completing activities - online, in the live events and (most importantly) directly at work in their day-to-day role.



APPLY

Learners will apply what they've discovered and practised at work. They will actively contribute to your organisation whilst building their portfolio of evidence (showing how they've applied their new skills) to gain their qualification.

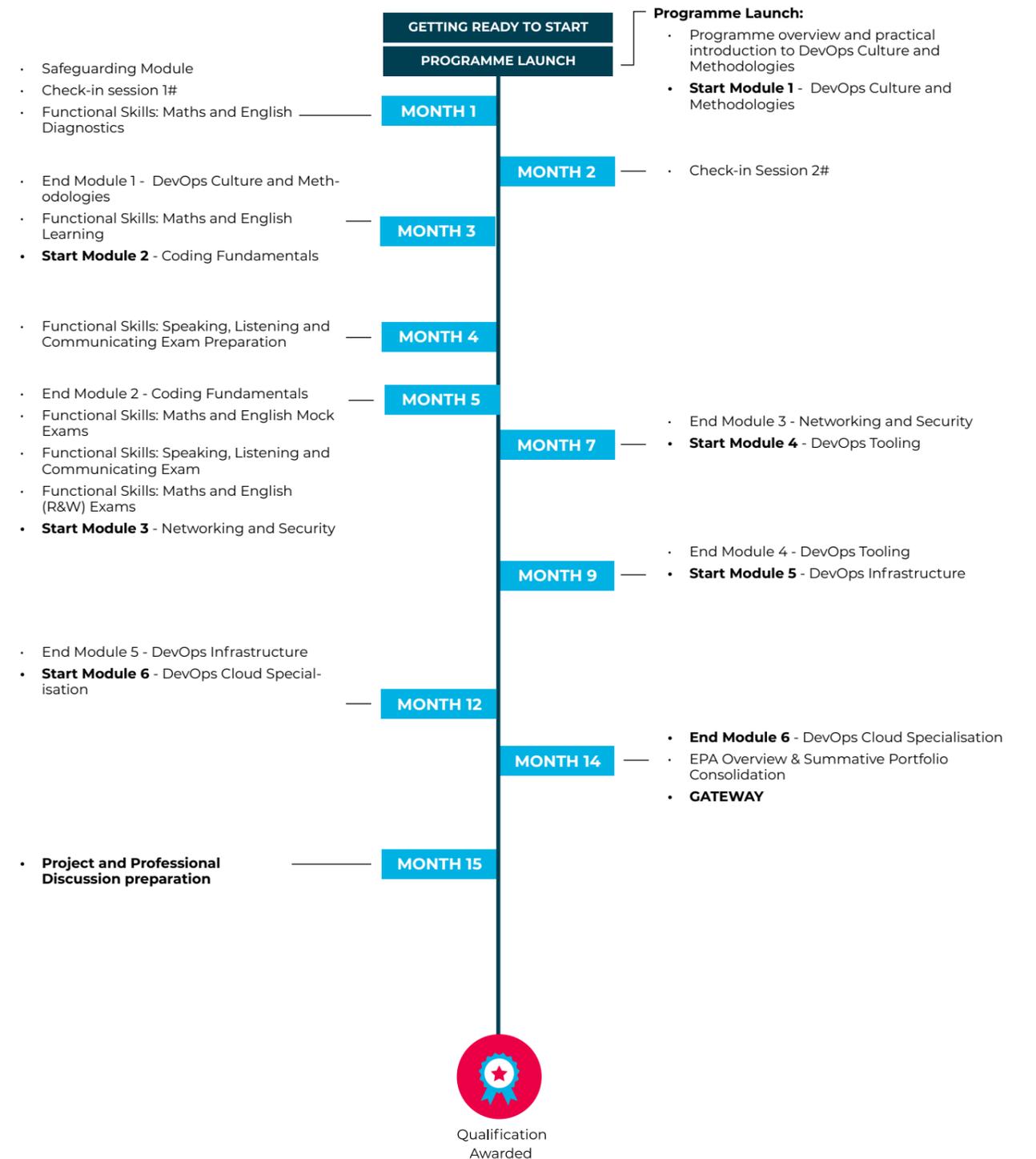


Develop portfolio (competency evidence)

Level 2 functional skills, English and Maths must be passed as part of the programme (if not already) and certificates presented, prior to taking the end-point assessment. This will be discussed at programme launch.

THE LEARNER'S JOURNEY

Programme timeline | Duration: 18 Months | Gateway: 14 Months



GETTING STARTED MODULE

The modules in our DevOps Engineer apprenticeship equip learners with the advanced technical skills they need for their role. Each module develops the core set of skills they must be able to do well to be competent.

In each module, learners will 'discover', 'practise' and 'apply' what they've learned. This helps them put their newly-found knowledge into action back at work. There are 6 modules to complete with the following learning outcomes.

Module 1: DevOps Culture and Methodologies

Discover. Practise. Apply.

This module will introduce learners to the common practices whilst working in a DevOps environment, including Agile, Scrum, Continuous Integration and Continuous Delivery. The module also introduces the fundamentals of Cloud Computing alongside Version Control with Git.

This will include:

- Agile values, characteristics
- Scrum roles, artefacts, values
- Estimation and Planning
- DevOps as a Culture
- Intro to Continuous Integration and Continuous Delivery
- Environments and Containers
- Infrastructure Consistency
- Cloud Introduction
- Cloud Deployment Models
- Introduction to Source Control
- Git Fundamentals
- Git cloning and forking
- Merging and reverting
- Pull requests
- Jenkins build server – intro, install, configuration
- Managing and running builds
- Version control and Jenkins

Module duration: 8 weeks | **Classroom attendance:** 3 days

TECHNICAL MODULES

The remaining modules focus on the knowledge and skills required of a DevOps Engineer in detail. After each module learners will 'apply' what they've learned at work on current projects.

Module 2: Coding Fundamentals

This module will focus on the developer skills needed for learners to create applications through Python with connected databases, practicing TDD and OOP when applicable.

This will include:

- Python Programming Basics
- Working in TDD
- Data Types
- Control Flow, Iteration
- Lists and Arrays
- Functions
- Working with Files
- Python and Databases
- Python OOP
- Collections and Generics
- Testing in Python
- SOLID principles

Module duration: 8 weeks

Classroom attendance: 7 days

Module 3: Networking and Security

This module will introduce learners to networking and security principles both generally and within a DevOps context.

This will include:

- Networking Basics
- Networking Models
- Routing and IP Addresses
- Network Address Translation
- Security
- Security Basics
- Authentication and Authorization
- Security Attacks
- Passwords
- Hashing vs Encrypting vs Encoding
- Introduction to DevSecOps
- Pen Testing, DAST & SAST

Module duration: 8 weeks

Classroom attendance: 3 days

Module 4: Linux and DevOps Tooling

This module will take a deep-dive into the build and environment tools within DevOps, discussing the design and construction of pipelines within DevOps CI/CD to support application development, building, testing and release within a local and cloud-based context.

This will include:

- Basic cloud configuration (AWS)
- Linux files and directories, management of files
- Linux file structure
- Linux bash interpreter and terminal
- Linux user and file administration, ownership, sudo
- Data streams, pipes, filters
- Scripting in Linux
- Linux Networking and Security
- Creating artefacts
- Pipeline as Code
- Pipeline security
- NGINX Introduction and Configuration
- HTTP Reverse Proxy Configuration
- Web Server Configuration
- Containerisation basics
- Building and deploying containers
- Creating Dockerfiles, managing Docker volumes
- Resource sharing
- Docker compose, Docker swarm
- Containerisation Security principles
- Kubernetes Introduction
- kubectl Pods
- Namespaces
- ConfigMaps
- Labels & Selectors
- Sidecar Model
- Logging
- Prometheus Configuring with Kubernetes
- Managing Container Resources
- Network Policies
- Secrets
- Security Contexts

Module duration: 12 weeks

Classroom attendance: 7 days

Module 5: Coding Fundamentals

This module will focus on infrastructure as code and configuration management, building upon a learner's DevOps skills to automate the creation and provisioning of cloud-based infrastructure.

This will include:

- Introduction to APIs
- Building APIs
- Ansible Introduction
- Inventory
- Playbooks
- Variables
- Ansible Tower
- Terraform Introduction
- HashiCorp Configuration language
- Data types, variables
- Providers and Resources
- Terraform Syntax
- Configuration file discovery

Module duration: 12 weeks

Classroom attendance: 5 days

Module 6: Cloud Computing Specialisation

This module will focus on the specifics of a cloud vendor – AWS, Azure or GCP – including developing and architecting DevOps solutions and pipelines on the platform.

This will include:

- AWS, Azure or GCP
- Core services – computing, storage, networking
- Security Services, Monitoring and Auditing
- Developing with the platform
- CI/CD
- Web application building
- Decoupled apps
- Code committing and deployment
- API management
- Architecting with the platform
- Migrating to the cloud, business usage
- Serverless Computing, Serverless Functions
- Lambda, APIs, storage and databases
- Containerisation and container releases

Module duration: 8 weeks

Classroom attendance: N/A

Gateway and end-point assessment Consolidation, preparation and assessment (Online)

The gateway is the final step that learners have to complete, before they take on their EPA. This QA process will ensure that learners are ready for the final assessment, increasing their chances of success.

At the gateway, they'll submit:

- A project a summary describing what they intend to complete for their **Project and Practical Assessment**
- All functional skills certificates that prove that they have attained Level 2 English and Maths
- A signed Gateway Form

Once learners have submitted their materials, they will start preparing for the **Professional Discussion** with an independent assessor.

Finally, learners will go through their EPA which will comprise two assessment methods:

- Assessment method 1: Project and Practical Assessment
- Assessment method 2: Professional Discussion

This is a very important stage in our learners' apprenticeship journey, and we have built in a number of check-points to ensure learners are prepared, confident, and ready to achieve their qualification.

Duration: 5 learner-led weeks + EPA

Qualifications earned



- Level 4 DevOps Engineer Apprenticeship

LEARNING OUTCOMES

As well as being assessed on their technical knowledge, learners are also assessed on their ability to demonstrate the following competencies through their portfolio and interview.

This ensures balanced development – as the competency standards provide a greater emphasis on the importance of both technical and soft skills relevant to their role in the workplace.

QA DLCs will help apprentices build their portfolio and record these skills throughout the programme.

Logic and Problem Solving

- Write good quality code with sound syntax in at least one language
- Apply good practice approaches according to the relevant paradigm (OOP, TDD)
- Apply structured techniques to problem solving
- Debug code and understand the structure of programmes

Environment Management

- Design and deploy environments on an individual and group/project-wide scale
- Manage environments both locally and within the cloud

CI/CD

- Understand all stages of the software development lifecycle, with increasing breadth and depth over time with initial focus on deployment of projects
- Utilise skills to build, manage and deploy code into enterprise environments
- Apply automation and scripting techniques to streamline any and all activities within development, testing and deployment

Business Skills

- Respond to the business environment and business issues related to software development.
- Operate effectively in their own business's, their customers' and the industry's environments.
- Understand how teams work effectively to produce software and contribute appropriately.

Skills and Behaviours

Apprentices will also need to show they have demonstrated the following skills and behaviours in their role:

- Logical and creative thinking skills.
- Analytical and problem-solving skills.
- Able to work independently and to take responsibility.
- Use own initiative.
- Take a thorough and organised approach.
- Able to work with a range of internal and external people.
- Able to communicate effectively in a variety of situations.
- Maintain a productive, professional and secure working environment.

HOW TO GET READY FOR THE END-POINT ASSESSMENT

We want to deliver memorable learning experiences, whilst developing learners with well-rounded skillsets, ready to meet their professional requirements.

To ensure we are achieving this goal consistently, it is important for learners, digital learning consultants and employers to work together to ensure learners are supported to succeed in their apprenticeship's end-point assessment (EPA).

In this section we outline a number of guidelines which intend to provide a framework so that this can be achieved in a consistent way.

Preparation for the end-point assessment starts from day one.

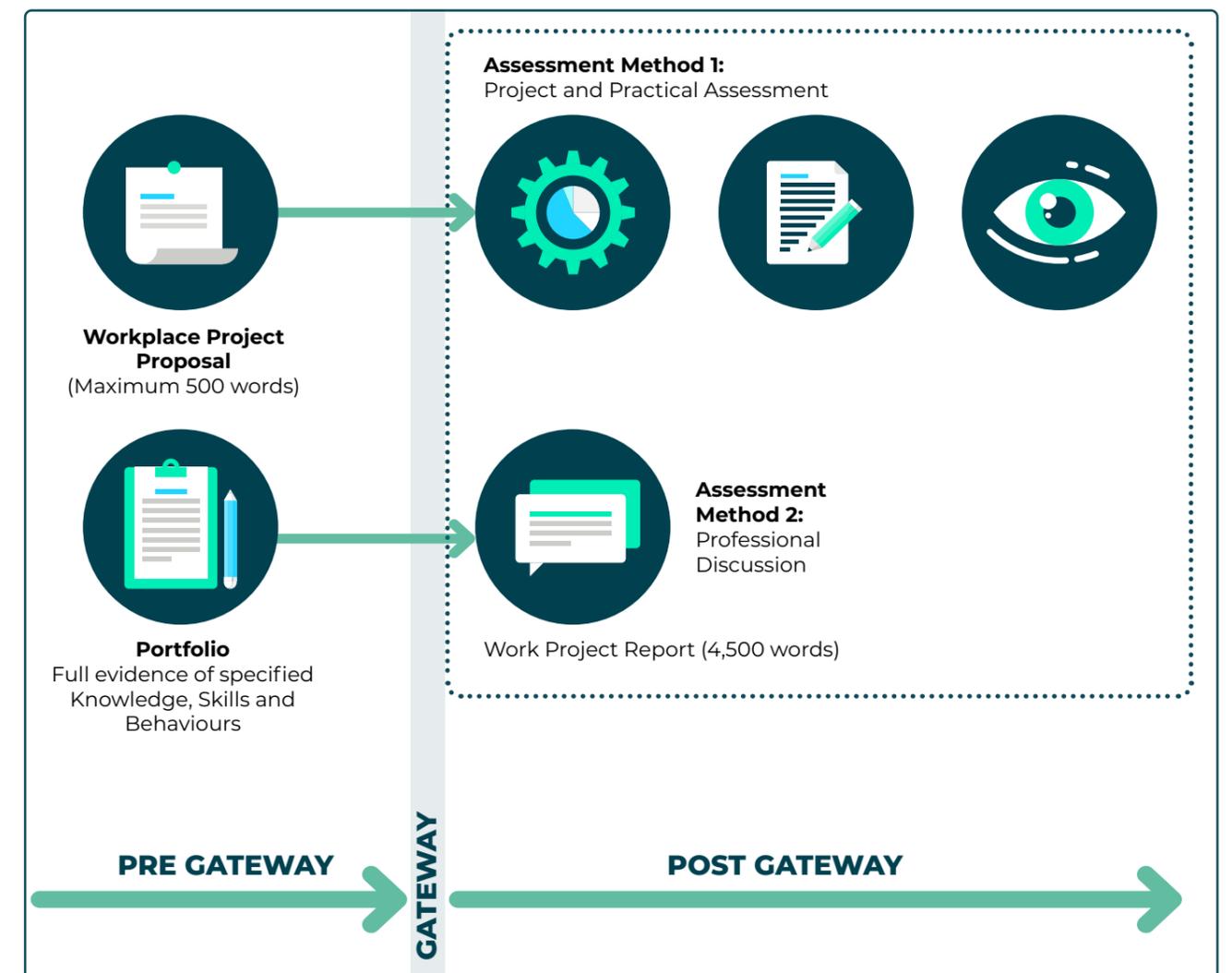
STAYING ON-TRACK THROUGHOUT THE PROGRAMME

Learners and employers should start preparing for EPA from the start of the programme. Employers will need to ensure that learners are given the right opportunities at work to develop and prove the knowledge, skills and behaviours in the standard.

For this reason, it is very important to keep learners, digital learning consultants and employers informed about the programme progress. It is critical to the success of the apprenticeship programme that all of the above work together to ensure that each learning journey is kept on-track avoiding further interventions (and time commitment) whenever possible.

To help learners with this, we have created two guiding documents – a programme timeline, and a progress review map – so progress can be checked against it, at any time. Any progress deviations above 15% will be reviewed on a case-by-case basis. This is to ensure the apprenticeship is progressing in a timely manner.

HOW THE EPA IS GRADED



EXPANDING YOUR TECHNICAL SKILLS WITH cloud academy A QA COMPANY

Our apprentices are given full access to our proprietary Cloud Academy platform for the duration of their programme.

Cloud Academy brings the very latest and up-to-date content to our apprentices through single units, courses and comprehensive learning paths to really build on the core learning outcomes defined within the programme. Furthermore, apprentices are able to prepare for the full suite of vendor qualifications across AWS, GCP and Azure and much more.

Cloud Academy users also benefit from Hands-On Labs, Lab Challenges and Lab Playgrounds providing a safe, sandbox environment in which our learners are able to practise in real time through guided walkthroughs or through their own exploration.

Check out the [Training Library - Cloud Academy](#).



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