Higher Apprenticeship Standard for:

Aerospace Software Development Engineer

The following standard reflects employers' requirements for the skills, knowledge and behaviours expected from someone to be competent in the job role.

Role Profile

Software Engineers are predominantly involved in the discipline of Software Engineering, however aspects of Modelling and Simulation, Human Factors and Systems Engineering disciplines are also covered as essential background for a fully rounded software engineer.

During the Concept, Assessment, Demonstration and Manufacture life cycle phases, Software Engineering is focused on influencing product architecture to accommodate modification and upgrade throughout product lifecycle. Software is an intrinsic component of the systems used to deliver in-service support. Following the in-service date, Software Engineering delivers support, optimises and upgrades the Support System infra-structure. These are considered to be Sustainment activities.

All engineers must comply with statutory regulations and organisational safety requirements. They must be able to use and interpret engineering data and documentation such as engineering requirements, specifications, designs, code, test specifications, test scripts, code analysis (static and dynamic) tool output.

Software engineers will be expected to work both as individuals and as part of wider Engineering teams. They will be expected to demonstrate coding ability and specify, analyse, test and modify Software Engineering artifacts across Design and Development and In-Service Operations. They will be expected to validate, test and modify software to comply with its design and associate requirements.

The requirements are designed to offer stretch and progression. Higher Apprentices will be able to work with appropriate supervision, whilst taking progressively more responsibility for the quality and accuracy of the work they undertake. They will be proactive in finding solutions to problems and identifying areas for improving the business.

Requirements: Knowledge & Skills

The apprentice will be able to:

1. Demonstrate understanding of fundamentals of Software Engineering Practice, apprentices wil be able to describe all of the phases of the software Lifecycle and the interfaces between each phase
2. Understand and apply configuration management and software build processes, apprentices will gain experience of the methods & tools used to control the change and modification of software related products
3. Develop and apply Algorithms, including specification, design and implementation, apprentices will construct algorithms required to implement required functionality in software
4. Apply appropriate Engineering Operations and Toolsets, apprentices will use the standard methods adopted for software production and the toolsets deployed to support efficient development
5. Understand and apply analytical methods (engineering mathematics), apprentices will use mathematics and associated toolsets to reason about properties of software such as safety or performance
6. Apply Systems Engineering principles, apprentices will learn the criteria for making architectural decisions in order to achieve an optimal solution over potentially conflicting system objectives
7. Demonstrate understanding and use of "Modelling & Simulation" software, apprentices will learn how to develop software more quickly and reliably utilising "Modelling" toolsets
8. Read and interpret Software engineering data, apprentices will demonstrate an understanding of code, design and requirements documentation
9. Apply business improvement techniques ensuring optimisation of processes, resources and budget, apprentices will use systematic methods to identify and eliminate waste and inefficiencies in their software production activities
10. Demonstrate the ability to comply with statutory, quality, organisational, environmental and health and safety regulations, apprentices will seek opportunities to show compliance with appropriate standards

Note: In order to articulate the specific level of skills, knowledge and behaviours required to be achieved and assessed to demonstrate full occupational competence in the foundation and undergraduate phases of the Apprenticeship, employers will develop and maintain a more detailed **Employer Occupational Brief (EOB).** The brief will inform the awarding organisations of the required elements of both knowledge and vocational skills within the qualifications used within this Apprenticeship Standard. It will also provide a clear basis for the development of the assessment of this Apprenticeship and will enable the sector to maintain world class levels of quality and ensure that the credibility and consistency of Apprenticeship outcome is maintained.

Requirements: Behaviours

Modern Engineering organisations require their apprentices to have a set of behaviours that will ensure success, both in their role and in the overall company objectives. These required behaviours are aligned to those specified for professional Registration, and defined in UK-SPEC

A. **Knowledge and understanding**.
   Commitment to continue personal development, refreshing and expanding Engineering knowledge through a variety of methods.

B. **Design and development of processes, systems, services and products**.
   Contributing to the continuing development of Engineering within their domain

C. **Responsibility, management or leadership**.
   Taking personal responsibility for their actions, Managing projects, including resource management within their remit.

D. **Communication and inter-personal skills**
   Be able to demonstrate a range of communication styles and methods. Understanding the importance of networks within and across functions.

E. **Professional commitment**.
   Demonstrating a personal and professional commitment to society, their profession and the environment, adopting a set of values and behaviours that will maintain and enhance the reputation of the profession.

Entry Requirements

Academic qualifications of 240 UCAS points or above at A-Level standard or equivalent, to include Maths plus at least one further STEM based subject such as Physics, ICT, Computing, Electronics. Plus Five GCSEs at Grade A-C including Mathematics, English Language and Double Science or equivalent qualification.

Typical Duration of Apprenticeship

Typically 48 months. Timescales may reduce if an apprentice has prior relevant qualifications/experience

Qualifications and Development

After a period of skills and technical knowledge development all apprentices will be required to achieve the following qualifications (working titles - currently in development)

- Level 4 Aerospace Software Engineering (Development Competence)
  Plus
- Level 5 Aerospace Software Engineering (Development Technical Knowledge)
  and
- Employer Stipulated Level 6 Bachelor Honours Degree (BSc)

All of the qualification requirements in this development phase are mandatory outcomes for the completion and final certification of the Apprenticeship Standard. Each qualification has a core and options approach and employers will select the most applicable pathway and unit options to meet their business requirements. Further detail can be found in the Employer Occupational Brief which is an annex to the Assessment Plan.

There will be an assessment at the end of the development phase where the apprentice will need to demonstrate full competence against the qualification outcomes for knowledge, skills and behaviours, set out in the Standard and Employer Occupational Brief. On successful completion of the employer endorsement phase (sign off) apprentices will be then be put forward to be awarded their Apprenticeship completion certificate by the recognised industry endorsed third party.

Recognition

Completion of the Apprenticeship is designed to be recognised by relevant Professional Engineering Institutions at the appropriate level of professional registration (IEng.).

Level and Review

This Apprenticeship Standard is at Level 6, and will be reviewed in March 2018 to ensure it remains relevant and continues to meet employers' requirements and provides the basis for progression to higher qualifications and or job roles.