

Apprenticeship Standard for:

Aerospace Engineer

The following standard reflects employers' requirements for the skills, knowledge and behaviours required to be competent in the job roles of Aerospace Engineering and Advanced Manufacturing.

Role Profile

Aerospace Engineers will work primarily within a specific Engineering discipline, such as Airframe, Design and Stress, Systems Integration, Support Engineering, Quality or Advanced Manufacturing/Manufacturing Engineering. They will focus on all aspects related to the full lifecycle of systems and products. Aerospace 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 drawings, reports and computer generated models. They will be expected to work both individually and as part of an Engineering team, often comprising several disparate Engineering disciplines. They will be expected to design, develop, specify, analyse, test, validate and modify designs and solutions to satisfy Customer requirements and In-Service Operations. The requirements are designed to offer stretch and progression. They will be able to work with minimum supervision, taking responsibility for the quality, accuracy and timely delivery of the work they undertake. They will be proactive in finding solutions to problems and identifying areas for improving the business.

Role Requirements: Knowledge and Skills

The apprentice will be able to:

1. Understand engineering process & practices covering: mechanical/electrical/electronic systems design, design and stress analysis eg computer aided engineering techniques, systems design, integration & test, in-service and through product life support, advanced manufacturing, aerospace quality and governance
2. Understand the applicable regulatory and quality requirements as the systems and products mature through their development, qualification and In-Service phases
3. Understand and apply analytical methods (engineering mathematics – algebra, differentiation, function, geometry, trigonometry, statistics)
4. Understand Aeronautical Sciences – stress, strain, static and dynamic systems, motion, force, electrical power and resistance, mass and weight
5. Understand Material Sciences – selection and application, structures, properties and analytical testing
6. Demonstrate the ability to comply with statutory, organisational, environmental, health and safety regulations
7. Apply business improvement techniques ensuring optimisation of processes, resources and budgets
8. Apply a wide range of technical skill sets that can be applied in a range of aerospace disciplines and contexts that could include research, development, design, procurement, logistics, planning, production, quality assurance, inspection, testing, installation, commissioning, maintenance, life cycle management, decommissioning and environmental compliance such as:
 - Planning what has to be done, when and by whom
 - Ensuring that **resources** are available and capable of achieving the required outcomes.
 - Allocating and deploying **resources** in a timely manner
 - Completing/project managing work outputs/programmes to the required **specification**
 - **Monitoring** programmes of work and report progress to appropriate personnel.
 - Agreeing any amendments to work **specification**/work requirements
 - Ensuring that quality assurance requirements are adhered to
 - Retaining and storing documentation and records for traceability

Monitoring: The regular checking of specific aerospace engineering activities or outcomes to ensure that they are being achieved according to requirements. Monitoring includes observation; data collection; sampling, and can be continuous; periodic; on demand; random; scheduled; formal; informal.

Resources: The available means to undertake processes and achieve aerospace work outcomes. Resources include equipment; facilities; finance; material; people; information/data, and are obtained from customers; suppliers; or from within their own organisation.

Specifications are precise technical descriptions of the characteristics of an Aerospace engineered product or Aerospace engineered process such as performance, function, quality, materials, aesthetics, life cycle, technologies, performance/capability, delivery schedule, interfacing, environmental/sustainability, branding, safety, budget, volume, timing.

Note: Options are available through the Apprenticeship by selection of units most appropriate to the engineering discipline of the role. All routes have core competencies, but specific knowledge qualification and competency options are likely to differ.

Full details of the requirements including core and options, minimum requirements and rules of combination are contained in the **Employer Occupational Brief (EOB) within the Assessment Strategy**. 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, ensuring that the credibility and consistency of Apprenticeship outcome is maintained.

Role Requirements: Employee 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 foundation skills and technical knowledge development all apprentices will be required to achieve the following qualification (working title -currently in development)

- Level 2 Aerospace and Aviation (Foundation Competence)

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

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

All of the qualification requirements in the foundation and development phases 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.