

Apprenticeship Standard for:

Machinist - Advanced Manufacturing Engineering

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

Role Profile

Machinists in the Advanced Manufacturing Engineering sector are predominantly involved in highly skilled, complex and precision work, machining components from specialist materials using conventional and/or CNC machine tools such as centre lathes, vertical and horizontal milling machines, horizontal and cylindrical grinding machines, electro discharge machines, single and multi-axis CNC machine tools centres. They must be able to use and interpret engineering data and documentation such as engineering drawings, technical data and computer generated programmes. They will be expected to be able set up, operate and adjust/edit equipment settings as applicable to the machine tool being used. When using CNC equipment they will be expected to be able to produce, prove and/or edit programmes. During and on completion of the machining operations they will be expected to measure and check the components being produced and make adjustments to the equipment/programme to ensure components meet the required specification. They will be able to work with minimum supervision, taking 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.

Role Requirements (Knowledge & Skills)

1. Using mathematical techniques, algebraic expressions, formulae and calculation to understand the machining and manufacturing processes such as speeds and feeds, calculating angles/tapers, material removal
2. Understanding the structure, properties and characteristics of common materials used in the manufacture of machined components
3. Understanding the practical and theoretical uses of the machines used, and their applications.
4. Understanding the workholding devices, cutting tools, and setting up procedures, in adequate depth to provide a sound basis for carrying out the activities, correcting faults and ensuring the work output is to the required specification
5. Understanding the typical problems that can occur during the machining process and how they can be resolved
6. Determine the most efficient and effective approach to machine the component using a range of tools, machining process and techniques
7. Complying with statutory, quality, organisational and health and safety regulations while carrying out manufacturing techniques
8. Reading and interpreting engineering data: reading and interpreting engineering drawings, specifications and computer generated information in order to determine what has to be produced and to what specification
9. Obtaining, checking and using the appropriate documentation (such as job instructions, drawings, quality control documentation)
10. Obtaining, checking and using the appropriate materials, tools, equipment and consumables required
11. Selecting and setting up the correct tooling and work holding devices
12. Setting and adjusting the machine operating parameters to produce the work pieces to the required specification. This will involve setting feeds and speeds for roughing and finishing operations
13. Selecting and using a range of measuring and testing equipment to check components are to the required quality and accuracy
14. Business improvement techniques : recommending and contributing to the designing and implementation of new or revised manufacturing processes, procedures or ways of working in order to be more efficient and cost effective
15. Producing complex and specialist components as a one off test and trial work piece and/or producing components in small or large batches
16. Employer tailored skills as required such as undertaking equipment/asset care and/or Preventative Planned Maintenance processes and procedures

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 development phase of the Apprenticeship. The employers on the Trailblazer group have developed 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 this Apprenticeship Standard. It will also provide a clear basis for the development of the assessment of this

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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.

Role Requirements: Employee Behaviours

Modern manufacturing organisations require their apprentices to have a set of behaviours that will ensure success both in their role and in the overall company objectives. The required behaviours are:

1. Safety mind-set: manage self and support others to maintain and contribute to a safe working environment in line with local procedures and National and European requirements
2. Strong work ethic: motivated, proactive, committed
3. Dependability and responsibility: punctual, reliable
4. Positive attitude: constructive thinking, motivated to succeed
5. Team player: able to work and interact effectively within a team and committed to equality & diversity
6. Effective communication: spoken, listening, body language, presentation, written
7. Adaptability: able to adjust to change
8. Honesty and integrity: truthful, sincere and ethical
9. Self-motivation: self-starter, able to make appropriate decisions and lead their own professional development
10. Personal commitment: prepared to make a personal commitment to the industry

Entry Requirements

Individual employers will set the selection criteria for their Apprenticeships. In order to optimise success, candidates will typically have 4 GCSEs at Grade C or equivalent, including Mathematics, English and a Science. Employers who recruit candidates without English or Maths at Grade C or above must ensure that the candidate achieves this standard prior to the completion of the Apprenticeship.

Duration of Apprenticeship

Typically 42 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 qualifications (working titles - currently in development)

- Level 2 Advanced Manufacturing Engineering (Foundation Competence)
- Level 2 Advanced Manufacturing Engineering (Foundation Technical Knowledge)

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

- Level 3 Advanced Manufacturing Engineering (Development Competence)
- Level 3 Advanced Manufacturing Engineering (Development Technical Knowledge)

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.

Recognition

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

Level and Review – This Apprenticeship Standard is at Level 3 (equivalent to A Levels) and will be reviewed every three years after the first cohort to ensure it remains relevant and continues to meet employers' requirements and provides the basis to higher qualifications and/or job roles.