

ENGINEERING MANUFACTURING TECHNICIAN APPRENTICESHIP STANDARD

Standard Code ST0841
Course Level 4
Day Release
Location: Lincoln
Funding Level £21000
Duration 45mths including EPA

Course Description

This occupation is found in large and small engineering and manufacturing organisations providing products and services throughout a wide range of sectors, such as Automotive, Aerospace/Airworthiness, Chemical Processing, Land Systems, Marine, Maritime Defence, Materials Manufacturers and their respective supply chains.

The broad purpose of the occupation is to provide specialist technical support for engineers, so that organisations can develop, produce or test new/existing products, processes, or procedures to meet a customer specification in terms of quality, cost and delivery, as efficiently and effectively as possible. Engineering Manufacturing Technicians gather information and data from a range of sources and analyse the information/data. They will make decisions, solve problems and produce and/or update technical documentation, reports or specifications covering areas such as quality, reliability, production schedules/targets, costing or other technical documentation that informs others, either internally or externally what needs to be done such as how a product must be designed, manufactured, tested, modified, maintained, stored, transported, commissioned or decommissioned.

Engineering Manufacturing Technicians can be office based, manufacturing/plant based or more commonly combination of both, working with engineering and/or manufacturing teams at an operational level such as with production team leaders and/or management level working with specialist quality or design engineers. They have the autonomy to use judgement when undertaking the occupational duties and applying their technical knowledge, skills and behaviours in a wide range of contexts and environments. They use a range of tools and techniques to support decision making and solve problems that are often complex and non-routine.

There are two pathways available Mechanical or Electrical/Electronic.

Off the Job Training

A key requirement of an Apprenticeship is Off-the-job training. This must make up an average of 6 hours per week of the apprentice's working hours, over the total duration of the apprentice's planned training period. Off-the-job training must be directly relevant to the apprenticeship standard and must take place within the apprentice's normal working hours. The new learning must be documented and reflected on through the Learner Journal on their e-portfolio.

Entry Requirements

A minimum of 48 UCAS Tariff points from the following: GCE A and AS Levels in relevant subjects, with at least one subject at A Level. BTEC National (Diploma or Extended Diploma) in a relevant subject Access to HE Scottish Higher/Advanced Higher with at least one subject at Advanced Higher. For mature applicants some experience may be taken in lieu of A Levels / BTECs. Plus GCSE English – grade C/4 or above GCSE Maths – grade C/4 or above (**Level 2 Functional skills is not taken as an equivalent**)

EU and International applicants NARIC confirmed equivalent of 48 UCAS points
Apprentices may be required to attend an interview and undertake relevant skills assessments.

Once they have been accepted on to the programme all apprentices will be required to attend a Lincoln College Induction. Apprentices will require access to a tablet/computer to access their e-portfolio.

Knowledge, Skills and Behaviours

KNOWLEDGE

K1: Problem solving tools/techniques. Such as practical problem solving (PPS), root cause analysis (RCA) and process failure mode effects analysis (PFMEA).

K2: Effective communication techniques including listening, questioning and support of others.

K3: Use, benefits and applications of lean methods and tools used in manufacturing and engineering (such as Kaizen, Six Sigma and 8 wastes).

K4: How Industry 4.0 will impact organisations, including the integration of automation, digital systems and manufacturing engineering systems.

K5: Quality management systems used such as ISO9001, AS9100, ISO 14001 and TS16949, its purpose and internal governance arrangements to ensure compliance.

K6: Different manufacturing methods used, their applications, such as machining, joining, forming, assembling, shaping, processing, printing, moulding, extruding and casting.

K7: Principles of quality control and quality assurance in a manufacturing and engineering environment.

- K8:** Team integration techniques, including conflict resolution and managing difficult conversations (team working).
- K9:** Core engineering principles such as mathematics, science, mechanical and electrical/electronic applications relevant to manufacturing and engineering activity undertaken.
- K10:** Importance for individuals to use and follow the organisations approved Standard Operating Procedures (SOP's) and documentation recording systems and the potential implications on safety, quality and delivery if they are not adhered to.
- K11:** Statutory and organisation health and safety policies, procedures and regulations that must be adhered to in a manufacturing and engineering environment including the risk assessment process, procedures and documentation used within the work area.
- K12:** Project management techniques, such as Strengths, Weaknesses, Opportunities, Threats (SWOT), stakeholder matrices, risk mapping, radar chart and summary risk profiles.
- K13:** How human factors (organisational, environment and job factors) can influence and impact individual characteristics, performance and behaviours in the workplace.
- K14:** Engineering and manufacturing related documentation used such as job cards / build records, 2D & 3D drawing/models, Bill of Materials (BOM), Cost Analysis Reports, Compliance Report, Standard Operating Instructions (SOI's), Standard Process Instructions (POI's), Engineering Query Notifications (EQN's) and Drawing Query Notifications (DQN's).
- K15:** Prioritisation of workload/time management techniques to ensure that personal and team objectives are achieved effectively.
- K16:** Engineering and manufacturing data collection systems used, their format and content.
- K17:** How organisations manage and monitor internal and or supplier performance to ensure that cost, quality, delivery and sustainability objectives are being delivered.
- K18:** Use and applications of common metallic and non – metallic materials used in manufacturing and engineering.
- K19:** Different production methods used and their applications such as single, batch, flow and mass.
- K20:** Different methods, tools and frequency used to check quality in manufacturing and engineering including measurements such as (dimensions, weight, signal, temperature, time,) and testing (such as non-destructive and destructive).
- K21:** Departmental process used to create, record and review financial data and information.
- K22:** The different applications and limitations of computer based software system/packages used such as Computer Aided Design (CAD), Data Analytics and Databases.
- K23:** The impact of sustainability and environmental efficiency and how such matters influence manufacturing decisions.

SKILLS

- S1:** Read and extract relevant engineering and manufacturing related data and information (such as workplans/project plans ,schedules, drawings, specifications, production data, quality reports, costing data, statistical information) drawing accurate conclusions and making informed decisions.
- S2:** Use project management tools, such as Strengths, Weaknesses, Opportunities, Threats

(SWOT), stakeholder matrices, risk mapping, radar chart and summary risk profiles.

S3: Use problem solving tools such as Root Cause Analysis (RCA) Process Failure Modes Effects Analysis (PFMEA), Fishbone, Practical Problem Solving (PPS) and Advanced Product Quality Planning (APQP).

S4: Analyse and interpret data and information in order to generate manufacturing engineering documentation such as Parts Per Million (PPM) quality adherence, cost analysis and test data.

S5: Communicate using the appropriate method for the audience such as, formal and informal presentations, written reports, verbal, electronic, social media and incorporating relevant and appropriate data and/or metrics.

S6: Use the approved process and quality compliance procedure to create or amend engineering and/or manufacturing documentation.

S7: Use lean tools and techniques, such as Six Sigma, 8 Wastes, Workplace organisation such as 5S's (sort, set in order, shine, standardise and sustain), Kaizen and Poka-Yoke (Error proofing).

S8: Apply documentation control processes and procedures such as format, location, access, authorisation.

S9: Use financial planning, recording and review processes and documentation such as departmental budgets, estimating, cost control, cost forecasting, and investment appraisal.

S10: Use computer-based software system/packages such as Computer Aided Design (CAD), Data Analytics and Databases.

BEHAVIOURS

B1: Champions the importance of adherence to the organisation's Environmental, Health and Safety management systems: - actively displays and promotes a safety-first culture within the organisation.

B2: Operates in a systematic, proactive and transparent way.

B3: Actively promotes the case for the adoption of emerging and advanced engineering and manufacturing technologies to optimise performance.

B4: Takes full responsibility for own professional development, seeking opportunities to enhance knowledge, skills and experience. Keeping abreast of developments in engineering processes manufacturing and emerging technologies.

B5: Complies with statutory and organisational health & safety regulations and policies at all times. Accepts responsibility for their workload with a responsible approach to risk. Demonstrates a high level of motivation and resilience when facing challenge.

B6: Creates and maintains positive, professional, trusting and ethical working relationships with their team and the wider range of internal, external and connected stakeholders.

B7: Acts professionally with a positive and respectful attitude.

Assessment

On program learning will be supported by an engineering work-based assessor and our experienced college lecturing team. They will be assessed in the workplace across a broad range of duties closely mapped to the KSB's above. In addition to this they must also

complete their HNC and gain or hold before they are submitted for end point assessment level 2 in Maths and English.

End Point Assessment

EPA can take one of two forms and is selected dependent on the apprentice employer and EPAO

Observation with questioning

Apprentices must be observed by an independent assessor completing work tasks in their normal workplace, in which they will demonstrate the KSBs assigned to this assessment method. The rationale for this assessment method is:

- This is a practical role, best demonstrated through observation.
- Observation allows for the assessment of work tasks in a normal place of work, using processes and equipment with which the apprentice is familiar, which is likely to enable the apprentice to perform at their best.
- Observation is a cost-effective assessment method, as it makes use of the employer's premises and resources.
- The tasks chosen reflect something that would be completed by an Engineering Manufacturing Technician on a regular basis.
- The questioning component enables the checking of underpinning knowledge, skills and behaviours.

Portfolio supported by professional discussion

This assessment will take the form of a professional discussion which must be appropriately structured to draw out the best of the apprentice's competence and excellence and cover the KSBs assigned to this assessment method. The rationale for this assessment method is:

- It allows a wider breadth of knowledge and understanding than can be covered in a single observation.
- It allows the KSBs, which may not naturally occur in every workplace or may take too long to observe, to be assessed the supporting portfolio of evidence allow the apprentice to refer to real work examples and doesn't rely on memory. **The portfolio of evidence is not assessed.**

Qualifications

Depending on Pathway one of the 2 qualifications will be achieved

HNC in Mechanical Engineering

This apprenticeship is designed to prepare successful apprentices to meet the requirements for registration as Engineering Technician (EngTech) with:

- Institute of Engineering and Technology (IET)
- Institute of Mechanical Engineers (IMechE)

HNC in Engineering (Electrical and Electronic pathway)

Progression

Apprentices following this program may progress into promotions within their organisations or onto HND or degree programs.

Fees

As an Apprentice, you will pay no course fees. However, your employer may have to pay towards your training as well as providing you with a wage. All Apprentices are entitled to the national minimum apprentice wage within their first year of training from their employer, although they can, and often do, pay more. In the second and subsequent years of an Apprenticeship programme, if you are aged 19 or over, the national minimum wage for your age would apply [<https://www.gov.uk/national-minimum-wage-rates>]

If you are an employer and want to find out more information regarding employer contributions and any further costs related to the Apprenticeship programme, please contact our dedicated Apprenticeship team at employers@lincolncollege.ac.uk

Business Benefits

Employers have designed the Apprenticeship Standards to meet the needs of the sector and industry. Ensuring they include:

- Relevant Knowledge, skills and behaviours ensure that the Standard is relevant to the occupation.
- Widening participation Apprenticeship standards provide opportunities to employees that may not previously have been available.
- Development tools A cost effective way to train your employees to undertake specific roles in your business.
- Return on Investment On average, an apprentice who has completed their course will increase business productivity by £214 per week (CEBR, 2015).