Course Information

CITY OF WOLVERHAMPTON COLLEGE

Engineering Manufacturing Technician Apprenticeship Level 4

Study Mode: Full Time, Work Based Learning

Is this course right for me?

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. Research indicates that the sector needs to recruit approximately 124,000 engineers and technicians every year.

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.

In their daily work, an employee in this occupation interacts with their line manager to confirm departmental programmes of work and to agree individual responsibilities. This in turn will align to an overarching organisational resource and delivery plan. 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. As well as liaising with internal colleagues, they may also be responsible for working directly with customers and/or suppliers or with representatives from appropriate regulatory bodies. Typically this would involve interaction with auditors to demonstrate compliance to specific organisational or regulatory requirements (such as Civil Aviation Authority).Their time will be spent between working in an office environment and working in the manufacturing environment or visiting customers or suppliers as and when required.

An employee in this occupation will be responsible for the quality, safety and delivery of the manufactured product or service, ensuring it is delivered to the customer on time at the agreed cost. They will typically report to an engineering or manufacturing manager as part of a cross functional team, the size of this team and responsibilities will vary depending on the size of the employer. Although working within defined quality processes and procedures, they are responsible for the delivery, quality and accuracy of the work they complete. 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. They also have a responsibility to identify and contribute to making improvements such as business processes, procedures, ways and methods of working.

Typical job titles Include: Manufacturing engineer quality, manufacturing production engineer, manufacturing procurement engineer, quality engineer, costing engineer, test and commissioning engineer, installation engineer, process engineer, production support engineer.

Students will gain a wide range of sector knowledge tied to practical skills gained in research, self-study, directed study and workplace activities.

The apprenticeship offers two specialist routes – electrical/electronic engineering and mechanical engineering – with a set of core modules applicable to both routes and additional modules depending on the specialism chosen.

Core Modules:

- Engineering design
- Engineering maths
- Engineering science
- Managing a professional engineering project
- Electrical/Electronic Modules
- Electrical and electronic principles
- Digital principles (of electronics)
- Electrical machines
- Electronic circuits and devices
- Mechanical Modules
- Mechatronics
- Mechanical principles
- Fundamentals of thermodynamics and heat engines
- Fluid mechanics

In addition, apprentices will have the option to study additional units – relevant to their specialism -to demonstrate their competence in the workplace. These will be selected by the employer and apprentice, with support from the college assessor, based on the apprentice’s job role

Entry Requirements

Individual employers will set the selection criteria for their apprenticeships.

In order to optimise success, candidates will typically havefive GCSE’s at Grade C Grade 4/5 in the new numerical GCSE grading system) or above, including maths*, English and a science, technology or engineering-related subject, or 90+ credits in an Engineering BTEC at level 3.

*As further guidance, the level of maths has an advisory GCSE level of grade B (Grade 5/6 in the new numerical GCSE grading system)

What will I learn?

Duty

- Ensure the safe and efficient performance of every production task in compliance with company procedures, approved engineering data and local Health and Safety requirements. Ensure Safe Systems of Work and risk assessments (assisting as necessary in the completion of risk assessments) are adhered to for engineering or manufacturing activities.
- Prepare product and process documentation by collecting, analysing, and summarising information and trends.
- Manage internal and/or Supplier Quality Notifications, and liaison with the required stakeholders for resolution.
- Liaise with internal and external customers to implement programme initiatives, such as the application of lean analysis methods, processes and tools.
- Carry out new product introduction and/or existing product modifications within engineering and/or manufacturing by contributing to activities such as facilitation of quality activities (including any testing and/or commissioning requirements), supplier approvals, gate reviews.
- Deliver financial planning or costing analysis such as:- estimation of costs for manufacture, supplying drawings or specification for quotations, obtaining manufacture quotes, calculating costs associated with quality problem or machine downtime.
- Develop new technology initiatives by contributing to activities such as, justifying capital investment equipment/system upgrades from purchase through to installation and commissioning.
- Produce and maintain reports measuring Key Performance Indicators for data management activities.
- Ensure processes and current methods of engineering and manufacturing are as efficient and cost effective, such as: Utilising time and motion analysis, line balancing and flow to achieve the required level of production output.
- Liaise with appropriate internal and external stakeholders at all levels to ensure that engineering and manufacturing operations are completed in line with the agreed time scales. Examples of stakeholders could include production managers, production operatives, auditors, suppliers, customers.
- Ensure work process and outcomes comply with any local, national and or international regulatory or compliance requirements. Such as :- maintain compliance to Aerospace Regulatory bodies (CAA, EASA,MAA) as well as the wider regulations (such as Anti Bribery and Corruption, Export Control).
- Resolve identified engineering and/or manufacturing problems such as:- contributing

to the route cause analysis exercise applying appropriate levels of containment and corrective action.
- Produce engineering and/or manufacturing documentation (such as:- Build Manuals, Standard Operating Instructions/processes, Bill of Materials) to aid and ensure consistent, compliant and cost effective manufacturing processes.
- Review engineering or manufacturing methods to determine the most effective and economical method whilst meeting drawing/specification requirements.

Knowledge

Apprentices will develop knowledge of:

- Problem solving tools/techniques. Such as practical problem solving (PPS), root cause analysis (RCA) and process failure mode effects analysis (PFMEA).
- Effective communication techniques including listening, questioning and support of others.
- Use, benefits and applications of lean methods and tools used in manufacturing and engineering (such as Kaizen, Six Sigma and 8 wastes).
- How Industry 4.0 will impact organisations, including the integration of automation, digital systems and manufacturing engineering systems.
- Quality management systems used such as ISO9001, AS9100, ISO 14001 and TS16949, its purpose and internal governance arrangements to ensure compliance.
- Different manufacturing methods used, their applications, such as machining, joining, forming, assembling, shaping, processing, printing, moulding, extruding and casting)
- Principles of quality control and quality assurance in a manufacturing and engineering environment.
- Team integration techniques, including conflict resolution and managing difficult conversations (team working)
- Core engineering principles such as mathematics, science, mechanical and electrical/electronic applications relevant to manufacturing and engineering activity undertaken
- 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.
- 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.
- Project management techniques, such as Strengths, Weaknesses, Opportunities, Threats (SWOT), stakeholder matrices, risk mapping, radar chart and summary risk profiles.
- How human factors (organisational, environment and job factors) can influence and

impact individual characteristics, performance and behaviours in the workplace.

- 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).
- Prioritisation of workload/time management techniques to ensure that personal and team objectives are achieved effectively.
- Engineering and manufacturing data collection systems used, their format and content.
- How organisations manage and monitor internal and or supplier performance to ensure that cost, quality, delivery and sustainability objectives are being delivered.
- Use and applications of common metallic and non – metallic materials used in manufacturing and engineering.
- Different production methods used and their applications such as single, batch, flow and mass.
- 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).
- Departmental process used to create, record and review financial data and information.
- The different applications and limitations of computer based software system/packages used such as Computer Aided Design (CAD), Data Analytics and Databases
- The impact of sustainability and environmental efficiency and how such matters influence manufacturing decisions.

Skills

- 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.
- Use project management tools, such as Strengths, Weaknesses, Opportunities, Threats (SWOT), stakeholder matrices, risk mapping, radar chart and summary risk profiles
- 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).
- 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.
- 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.
- Use the approved process and quality compliance procedure to create or amend engineering and/or manufacturing documentation.
- 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),
- Apply documentation control processes and procedures such as format, location, access, authorisation.
- Use financial planning, recording and review processes and documentation such as departmental budgets, estimating, cost control, cost forecasting, and investment appraisal
- Use computer based software system/packages such as Computer Aided Design (CAD), Data Analytics and Databases.

Behaviour

Apprentices will demonstrate the following behaviours:

- 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.
- Operates in a systematic, proactive and transparent way.
- Actively promotes the case for the adoption of emerging and advanced engineering and manufacturing technologies to optimise performance.
- 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.
- 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.
- Creates and maintains positive, professional, trusting and ethical working relationships with their team and the wider range of internal, external and connected stakeholders.
- Acts professionally with a positive and respectful attitude.

What skills will I gain?

Apprentices will gain the following skills:

- 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.
- Use project management tools, such as Strengths, Weaknesses, Opportunities, Threats (SWOT), stakeholder matrices, risk mapping, radar chart and summary risk profiles
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How will I be assessed?

Throughout the programme the apprentice will receive expert training from highly qualified staff. A qualified assessor will provide an induction and regular workplace assessments.

What can I do next?

Apprentices who successfully complete this qualification can progress to:

- Employment in the industry in an engineering maintenance-related role
- Higher National Diploma (HND) in Engineering
- Relevant undergraduate degree

Delivery

Location:

Start Date:

Day:

Time:

Course Fee:

Course Code: AP0100

Study Mode: Full Time, Work Based Learning

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