

National Apprenticeship- Occupational Profile

Apprenticeship Title: *Robotics and Automation Apprenticeship (RAA)*

NFQ Level: Level 6

Duration: 24 Months

Typical Tasks/ Responsibilities:

The key tasks and responsibilities for a Robotics and Automation Technician include:

- Collaborates with Engineering and Production departments on design, operation and maintenance of automation and robotics systems. Provides input/feedback on operational, design and upgrade issues and associated criteria.
- Identifies and implements new technologies and manufacturing techniques to improve safety/ergonomics, reduce manufacturing costs (e.g., labour, material, inventory, scrap), and improves product/process quality.
- Designs, implements, and works with technology vendors and provides production support for all automation and robotics systems used in manufacturing operations.
- Supports cross-functional teams in the development and implementation of automated and robotics systems in support of manufacturing operations.
- Works with Production and Process engineering Departments to provide process specifications for new technologies and upgrades.
- Supports production in tracking the performance of automation systems by measuring Key Performance Indicators (KPIs).
- Troubleshoots manufacturing issues in automated cells and equipment, recommends and implements improvements and solutions to support availability within manufacturing operations.
- Executes support for major automation programmes and continuous improvement projects.
- Analyses/interprets engineering drawing, manufacturing operation sequences, tooling function, and process specifications to improve or eliminate manufacturing issues in sustaining production operations as related to automation and robotic systems.
- Authors or modifies Robotics/PLC/SCADA controlling software, ensures proper operation of cells and ensures compliance to safety and RIA standards.
- Works with vendors/suppliers regarding sourcing, technology information updates.

On successful completion of this apprenticeship, the RAA Technician will be able to:

Knowledge:

- Outline the practical application of engineering science and technology in manufacturing, referring to the principles, techniques, procedures, and equipment in the design and production of various goods and services.
- Describe the fundamental concepts of advanced manufacturing processes and techniques.
- Enumerate general manufacturing mathematical principles, methods, techniques, graphical expressions, symbols formulae and calculations in a maintenance environment and the type of equipment being maintained.
- Specify mechanical, electrical, electronic, fluid power and process control principles in a maintenance environment.
- Outline fault diagnostic methods, techniques and equipment used when maintaining equipment and systems.
- Explain the importance of complying with statutory, quality, organisational and health and safety regulation.
- Describe digitisation trends in advanced manufacturing, and how they can be successfully utilised within a manufacturing environment.
- Outline how teams work effectively in a manufacturing environment. • Relate the behaviours and requirements to operate effectively in a business, with customers, and the broader industrial ecosystem.
- Define the various cloud terminologies, and data tools relevant in the context of advanced manufacturing.
- Describe integrated environments as they apply to advanced manufacturing practices.
- Explain how emerging IIoT technologies support and create innovative opportunities in advanced manufacturing.
- Discuss the importance of only using current and approved processes, procedures, and documentation.
- Recognise and interpret manufacturing data and documentation to undertake and complete the job tasks and activities.
- Identify the different roles and functions in the organisation and how they interact to fulfil the manufacturing process.
- Outline the relevance of digitalisation tools, cybersecurity and cloud technologies in Industry 4.0 / 5.0 processes and plant equipment.

Skills:

- Demonstrates how to implement, monitor, and maintain advanced manufacturing processes.
- Minimises machinery downtime by implementing planned preventive maintenance programmes.
- Undertake maintenance and repair activities on robotic systems and associated equipment.
- Schedule the work activity using the correct processes, procedures, and equipment.
- Practice condition monitoring of plant and equipment.
- Employ complex fault diagnostic and repair activities on high technology engineered systems using diagnostics systems and equipment.
- Monitor in accordance to prescribed operational specifications and standards, mechanical equipment and fluid & pneumatic power systems using data driven approaches.
- Maintain electronic process control equipment using data driven approaches.
- Apply structured techniques to problem-solving.
- Resolve manufacturing problems promptly and effectively within the limits of role responsibility, using approved diagnostic methods, reporting techniques and escalation protocols as necessary.
- Support the installation, testing and commissioning of manufacturing equipment.
- Demonstrate how to execute support for major automation programs and continuous improvement projects.
- Practice the programming, testing, integration, commissioning, operating, monitoring and maintenance of robotic systems and associated technologies.
- Configure and control Robotics/PLC/SCADA systems to ensure efficient and effective operation of cells and compliance to safety and RIA standards.
- Complete confirmation testing and subsequent smooth hand over of equipment and plant.
- Complete any required documentation using the defined recording systems at the appropriate stages of the work activity.
- Restore the work area on completion of the activity and where applicable return any resources and consumables to the appropriate location.
- Interpret core digitisation information utilising input / output devices and applying data analytics techniques.
- Employ prescribed safety and security protocols as they relate to the advanced manufacturing environment.

- Manage vendors/suppliers regarding sourcing, equipment parts and technology information updates.

Competences & Behaviours:

- Demonstrates awareness of good practice within manufacturing environments.
- Adopts personal responsibility and exhibit resilience in analysis and problem solving in the manufacturing environment.
- Display creative and logical thinking and an organised approach to working practice.
- Demonstrates use of own initiative.
- Displays capability to work autonomously.
- Exhibits capacity to work effectively in teams.
- Conforms with relevant legislative and health and safety requirements.
- Demonstrates a commitment to continuous professional development.
- Adheres to organisational policies and codes of conduct.
- Employs effective communications and interpersonal skills.
- Follows quality assurance procedures and practices.
- Adheres to lean principles and sustainability practices.

Industry/industries served by the apprenticeship:

As more and more manufacturing companies invest and deploy robotics and automation solutions to meet their customers' demands, the need for highly skilled technicians to operate and maintain these systems is critical to the long-term success of both existing companies and start-ups. Robotics and Automated systems continue to grow in importance within manufacturing and industrial production systems as companies leverage their ability to employ advance manufacturing and increase production in almost every industry such as pharmaceutical, chemical, automotive, healthcare, food, agricultural etc.

Overall, there are 275,000 people employed in the Irish manufacturing sector, accounting for over 12% of total employment in the economy. The sector is responsible for €13.4 billion in wages and employment taxes annually, €1.7 billion of tangible investment and over €3 billion of corporation tax. In addition, it spends, over €19 billion each year on purchases of goods and services from other suppliers in the Irish economy. The story of manufacturing in Ireland is not just one of inward investment. Irish owned manufacturing exporters grew their sales globally by over 76% between 2012 and 2022 while value-added per person employed grew by 25%. Inward FDI manufacturers grew their exports by 66% over the period. (Ibec manufacturing report November 2023) Advanced manufacturing capacity is a key component



for many manufacturing verticals such as Food Processing, Biopharma, Life Sciences, ICT, Engineering, Green Technologies etc., whereby products are being used which have been manufactured by automated processes or a certain service is provided by those industries. Advanced manufacturing is based on the use of integrative robotics and automation systems during the manufacturing process. The digitisation and automation of the manufacturing process enable a broad range of industry sectors to improve productivity, reduce costs, increase product quality, increase product customisation and to develop smarter products. The extensive range of services provided by the sector is critical for economic gain. Enhanced by Industry 4.0/5.0 technologies, robotics and automation systems increasingly impact every facet of production capacity services. This enables organisations to produce goods efficiently and sustainably in response to real-time demand using analytics to maximise potential to create internal and external solutions to business problems. Developing skills and capacity will be crucial to the future success of the manufacturing sector in Ireland and its significant contribution to the regional and national economy

Programme access arrangements are as follows:

- Interview: Apprenticeship applicants will be selected by an interview with the prospective employer.
- Registration: SOLAS registers successful apprenticeship applicants as the Regulatory Authority for the Apprenticeships.

Minimum entry requirements for apprentices on the programme:

- Applicants will be required to complete an initial aptitude test.
- Must be 17 years or older.
- Must have achieved a passing grade (O6/H7) in 5 or more subjects (to include Maths and English) at Ordinary Level in the Leaving Certificate.

OR

- Have a full QQI Level 5 or higher qualification
- For those who may not hold this certification, equivalence may be decided through a Recognition of Prior Learning procedure.
- Applicants must hold a minimum of a grade B2 CEFR B2 in writing, reading, listening, and speaking or recognised equivalent (Common European Framework of Reference for Languages).



Skills and attributes are as follows:

- Must be numerate and literate
- Have good learning skills
- Be interested in manufacturing technology and customer service
- Have the ability to absorb product knowledge
- Be motivated and analytical
- Possess effective communication skills, and excellent interpersonal skills
- Be able to work as a team member, be adaptable and flexible