A person wearing a hard hat and gloves using a computer

Description automatically generated

**Workplace**

**Mentor Handbook**

**National Apprenticeship in Robotics & Automation**

**QQI Level 6 Programme**

# HELLO AND WELCOME

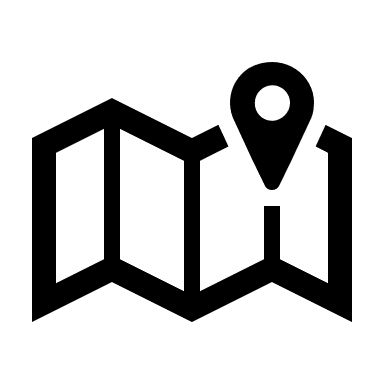
Congratulations on your appointment as a Workplace Mentor for the new Robotics and Automation Apprenticeship Programme within your organization. Your role will be instrumental in the development of the career of your apprentice who will require encouragement and support over the next 2 years. The Robotics and Automation Management team are here to support and guide you too!

Many of today’s industry leaders have publicly acknowledged the support and guidance their mentors have given them and have articulated the value of their mentor’s investment of time and energy in supporting them in the early stages of their careers. Effective recruitment, selection, and ongoing support of apprentices through to the completion of their training, ensures a talent pipeline of skilled workers capable of meeting the business challenges of the Advanced Manufacturing as they adopt Industry 4.0 technologies. The adoption of technologies such as Robotics and Automation systems are changing the manufacturing sector.

Whether your organization decides to extend the skills of existing staff or to recruit new employees, your business will benefit from this apprenticeship programme. Therefore, it is in their best interest to nominate a suitably qualified and reliable employee to act as a mentor to the apprentice. In this context your new role is key to achieving success both for the company and crucially for the apprentice.

This handbook is designed to assist you to develop the Robotics and Automation apprentice within your organization by enhancing your mentoring and coaching skills during their on-the-job training phase of the programme. In addition, LMETB (Louth Meath Education and Training Board) are committed to supporting you in this role on an ongoing basis and contact details of relevant personnel can be found within this handbook.

We look forward to working with you and would like to thank you for the significant contribution you are making to ensure the Robotics and Automation apprentice experiences a supportive learning environment throughout the duration of the programme.



[Find us on Google Maps](https://www.google.com/maps/place/Advanced+Manufacturing+Training+Centre+of+Excellence+(AMTCE)+(LMETB)/@53.9762235,-6.3979326,17z/data=!3m1!4b1!4m6!3m5!1s0x4860cdb7d3a6570d:0x847692419e471cae!8m2!3d53.9762235!4d-6.3979326!16s%2Fg%2F11q1rt14gp?entry=ttu)

Building B, Xerox Technology Park, Dundalk, A91 Y319

# PROGRAMME CONTACTS

|  |  |  |  |
| --- | --- | --- | --- |
| **Role** | **Named Contact** | **Contact email** | **Contact number** |
| **Chairperson of Consortium Steering Group (CSG)** | Barry Kennedy |  |  |
| **Programme Manager** | Adrian Kelly | akelly.amc@lmetb.ie | 086 083 8005 |
| **Co-ordinating Tutor** |  |  |  |
| **College Mentor** |  |  |  |
| **Tutor/s** |  |  |  |
| **Tutor/s** |  |  |  |
| **Workplace Mentor** |  |  |  |
| **Workplace Coordinator** |  |  |  |
| **SOLAS Authorised Officer** | Paul Doody |  |  |
| **Programme Quality Manager** | Kelvin Harvey/Paula Quinn | [Kharvery.amc@lmetb.ie](mailto:Kharvery.amc@lmetb.ie)  Pquinn.amc@lmetb.ie |  |

[HELLO AND WELCOME 2](#_Toc160443340)

[PROGRAMME CONTACTS 3](#_Toc160443341)

[1 SOME DETAILS ABOUT THIS APPRENTICESHIP PROGRAMME 6](#_Toc160443342)

[2 RATIONALE FOR PROVIDING THE PROGRAMME 7](#_Toc160443343)

[3 CONSORTIUM STEERING GROUP 8](#_Toc160443344)

[4 PROGRAMME BOARD – MEMBERSHIP AND TERMS of REFERENCE 10](#_Toc160443345)

[5 ROLES AND RESPONSIBILITIES of COORDINATING PROVIDER 12](#_Toc160443346)

[6 RAA APPRENTICESHIP NATIONAL PROGRAMME MANAGER 13](#_Toc160443347)

[7 SOLAS AUTHORISED OFFICER 14](#_Toc160443348)

[8 INTRODUCING APPRENTICESHIPS 15](#_Toc160443349)

[8.1 Programme Outline 15](#_Toc160443350)

[9 PROGRAMME AIMS AND OBJECTIVES 16](#_Toc160443351)

[9.1 Programme Structure 17](#_Toc160443352)

[9.2 Learning Outcomes 17](#_Toc160443353)

[9.2.1 Programme Aim / Purpose 17](#_Toc160443354)

[9.2.2 Programme Objectives 17](#_Toc160443355)

[9.2.3 Minimum Intended Programme Learning Outcomes (MIPLOs) 18](#_Toc160443356)

[10 EMPLOYER APPROVAL 19](#_Toc160443357)

[10.1 Employer Registration Journey 20](#_Toc160443358)

[10.2 The Apprentices Admissions Journey 21](#_Toc160443359)

[11 THE ROBOTICS AND AUTOMATION APPRENTICE DEFINED 22](#_Toc160443360)

[Profile of Learners 22](#_Toc160443361)

[Minimum Entry Requirements 22](#_Toc160443362)

[12 NATIONAL FRAMEWORK OF QUALIFICATIONS 26](#_Toc160443363)

[13 MENTOR 28](#_Toc160443364)

[Workplace Mentor/Assessor Qualifications 29](#_Toc160443365)

[The Assessment Process check this out 29](#_Toc160443366)

[13.1 Principles of Fair and Consistent Assessment 30](#_Toc160443367)

[13.2 Link between On-the-Job and Off-the-Job 32](#_Toc160443368)

[13.3 Work-based Learning Environment 32](#_Toc160443369)

[14 MENTOR AIDS 33](#_Toc160443370)

[14.1 5 Generations in the Workplace 33](#_Toc160443371)

[14.2 The 5 Rs of Positive Mentoring: 34](#_Toc160443372)

[14.3 Guidance on how to Successfully Complete the Workplace Tasks 34](#_Toc160443373)

[14.4 Tips for Active Listening 34](#_Toc160443374)

[14.5 Tips for Giving Feedback 35](#_Toc160443375)

[15 WE ARE HERE TO SUPPORT YOU AND THE APPRENTICE ON THIS EXCITING JOURNEY 36](#_Toc160443376)

# SOME DETAILS ABOUT THIS APPRENTICESHIP PROGRAMME

* This apprenticeship is a two-year level 6 programme designed and developed in collaboration with the programme Consortium Steering Group, consisting of representatives from the Robotics & Automation industry, Advanced Manufacturing sector, Industrial Research, Unions, and education Providers.
* The programme is targeted at companies who provide Robotics and Automation solutions and companies in the Advanced Manufacturing Sector who use these solutions.
* It is suitable for those currently employed in these companies, school leavers, career switchers and mature applicants wishing to pursue a career as a qualified Robotics and Automation Technician.
* The modules in the apprenticeship will give the apprentice, the knowledge and a range of robotics and automation skills.
* The programme has been conceived and developed through an Industry led Consortium and engagement with work-based learning experts.
* The apprenticeship programme includes 9 modules, concludes with a capstone project in line with the company processes and procedures. Cross reference on PDT
* Upon completion of the programme, successful apprentices will graduate with an Advanced Certificate in Robotics and Automation at Level 6 on the (QQI) National Framework of Qualifications.

# RATIONALE FOR PROVIDING THE PROGRAMME

The emerging and apparent skills storage across the advanced manufacturing sectors are considered as having a significantly negative impact on the capacity for growth despite there being a buoyant and expanding global marketplace. The named consortium proposes to develop a national Robotics and Automation Apprenticeship Programme (RAA) as a timely means to address some of the emerging skill needs - through devising a new and appropriate dual education FET award at NFQ Level 6.

The proposed national Robotics and Automation Apprenticeship Programme is fully aligned to key and relevant National and Regional Government Strategies, Policies and Actions regarding workforce development and industrial policy as articulated in the following publications:

1. Future Jobs Ireland 2019: Preparing Now for Tomorrow’s Economy.
2. Technology Skills 2022: Ireland’s Third ICT Skills Action Plan
3. The Expert Group on Skills Needs Report-Digital Transformation: Assessing the impact of Digitalisation on Ireland’s Workforce.
4. FIT ICT Skills Audit 2018
5. Supporting Working Lives and Enterprise Growth in Ireland 2018
6. SOLAS Skills to Advance 2019 – 2021
7. SOLAS Further Education and Training Strategy 2020 – 2024
8. Ireland’s Industry 4.0 Strategy 2020 – 2025
9. Manufacturing in Ireland 2023 (IBEC)

The industrial revolution of today, known as Industry 4.0/5.0, is driven by the interconnectedness of advanced technology, automation, robotics and real time data via the Industrial Internet of Things (IIoT). While industrial cyber-physical systems can autonomously exchange information to trigger actions and make decentralised decisions, it’s impossible to dismiss the importance of the human factor in manufacturing process as emphasised by Industry 5.0.

Industry 4.0/5.0 are characterised by the integration of digital connectivity and advanced technologies, giving rise to automated industrial systems and smart production processes that boost efficiency across supply chains. The advanced technologies and process that direct, manage and maintain machine operations, gather data, and make decentralised decisions work in concert with employees to create what is often called a “smart shop floor”.

At consumer level, they have manifested as smart home devices and voice-enabled technologies. At societal level, they are fuelling the growth of small cities, revamping public services. While big companies are leveraging digital technologies throughout their extensive operations, these tools are also democratising manufacturing by allowing the entry of smaller players into the sector while supporting sustainability through facilitating bespoke production.

The key challenge emerging in the context of ‘advanced’ or ‘smart’ manufacturing is the optimal cooperative interactivity of humans, robotics, machines, and ICT systems. Thus, production technologies, production processes and organisation, as well as human resources development, are regarded as equally important. The RAA will develop a complementary FET Level 6 programme to enhance the talent pipeline for the manufacturing, robotics, automation, and systems integration sectors as part resolution to the growing and concerning skills shortages across these sectors.

# CONSORTIUM STEERING GROUP

The Consortium Steering Group (CSG) comprises of the key stakeholders in the RAA apprenticeship programme namely, employers, occupational associations and regulatory interests, training providers and the Coordinating Provider. The essential role of the CSG is to guarantee that the RAA apprenticeship programme is enterprise-led, responsive to pertinent and emerging occupational requirements and satisfies current and future labour market requirements.

The Coordinating Provider for the Apprenticeship plays a lead role in liaising with the employers and other providers through the Consortium Steering Group. With respect to the delivery of the RAA apprenticeship, LMETB, represented by the Board of the Advanced Manufacturing Training Centre of Excellence is the Coordinating Provider and consortium lead, and the consortium is largely comprised of the Board Members.

The CSG has a key role in the development and review of the occupational profile and in promoting public awareness of that profile. The CSG ensures that the apprenticeship programme complies with the requirements of the occupation and thereby plays a critical role in the development and review of the occupational profile and in promoting public awareness of that profile and is a mandatory governance requirement for validating apprenticeship programmes with QQI.

In collaboration with the statutory regulator, the CSG should guarantee that the essential component of 'on-the-job' training is upheld and administered at the suitable level with the determined learning objectives and that it is applied competently by employers and by the Coordinating Provider. It functions as a connection between employers and the Coordinating Provider at a wide level.

The CSG is chaired by an industry representative with extensive experience in the sector.

The Consortium Steering Group is part of the overall national development structure of all new apprenticeship programmes. The role, membership, and purpose of the CSG are set out in QQI Topic Specific QA Guidelines for New Apprenticeships.

The CSG contributes to the decision-making process in collaboration with the ETB and national stakeholders on the expansion of apprenticeships, and the addition of new employers and providers. Approval for establishment of the Consortium Steering Group is vested in the National Apprenticeship Alliance.

On validation of the programme, the role of the Consortium Steering Group will transition from a developmental role in the establishment of the occupational profile and the appointment of a Coordinating Provider, to a continuing role in supporting and improving the validated apprenticeship programme. To carry out this role the CSG will interact with employers, the regulatory authorities, the occupational bodies, the National Programme Board and the Coordinating and Collaborating Providers.

# PROGRAMME BOARD – MEMBERSHIP AND TERMS of REFERENCE

The Programme Board is responsible for the oversight of the RAA apprenticeship programme and reports to LMETB’s QAGMC (QA Governance Management Council). It has access to information and data on the execution of the programmes, the assessment results, and the mobility of apprentices through the components of the programme. It receives all procedural reports from collaborating providers and from independent examiners and is cognisant of the circumstances of the collaborating providers and in the occupation.

The Programme Board is representative of relevant employers nationally utilising robotics and automation in the manufacturing process and education and training providers, apprentices, and stakeholders to advise on the programme proposal and operation. The Programme Director is a member of the Programme Board and will act as secretariat liaising with the consortium and awarding body as required.

The Programme Board will assist the Consortium Steering Group in ensuring the RAA programme is informed and led by the current and future requirements of enterprises.

The Programme Board is the single national entity with responsibility for the eﬀective management, operation, monitoring and review of the Apprenticeship Programme.

Day to day oversight of the operation of the validated apprenticeship programme

* Establish a Recognition of Prior Learning (RPL) Committee, where required, to manage the operation of RPL as it applies to the programme, as validated.
* Devise / approve the assessment strategy and types of assessment to be used in a programme cycle to ensure that the module outcomes are being assessed, that cumulatively the MIPLOs are assessed.
* Generate a bank of assessment resources.
* Agree the assessment schedules for the programme on the advice of the Programme Manager.
* Consider inputs from the External Authenticator on issues of delivery and assessment. This will be done on receipt of the External Examiner’s report and in advance of new cycle starting.
* Consider reports from Collaborating Providers, Workplace Mentors, and teachers on the progress of apprentices and on delivery and assessment of the approved programme.
* Encourage the sharing between workplace mentors and providers of best practice in the delivery and assessment of apprentices.
* Consider the eﬀectiveness of the teaching, learning and assessment strategies being implemented as per the validated programme.
* Ensure as far as possible that the apprentices in each centre get an equivalent experience.
* Programme monitoring, review and improvement:
  + Agree and implement minor modifications and additions to the programme where these do not aﬀect module outcomes. This will include suggestions from the External Authenticator, or improvements suggested by mentors or by teachers.
  + Monitor the on-going operations of the programme nationally.
  + Monitor examination and continuous assessment results nationally to ensure an appropriate mix of learning modes and associated assessment methods.
  + Seek feedback from significant stakeholders on the delivery of the programme and on possible minor modifications.
  + Regularly consider results of surveys of apprentices and other stakeholders of programmes.
  + Contribute to the occupational review process.
  + Suggest necessary equipment and facilities requirements and upgrades as well as skills enhancement initiatives.
  + Examine the eﬀectiveness of support services such as administrative services and Moodle.
  + Make recommendations on the use of existing resources and the need for new resources.
  + Introduce improvements in the programme arising out of the monitoring and review process.
  + Perform a detailed self-evaluation of the operation of the Programme Board periodically (usually every five years)
  + Suggest appropriate external experts to play a role in designing, monitoring, and reviewing programmes.
  + Recommend appropriately qualified persons as External Authenticators.

# ROLES AND RESPONSIBILITIES of COORDINATING PROVIDER

The purpose of the Coordinating Provider (AMTCE) is to develop and maintain the curriculum and assessment procedures for the RAA apprenticeship programme and to lead and support LMETB’s approved collaborating providers. The Coordinating Provider is a mandatory governance requirement for validating apprenticeship programmes with QQI. Under the day-to-day leadership of the Operations Manager of the Advanced Manufacturing Training Centre of Excellence and supporting staff, the RAA operational activity will be discharged in accordance with the governance requirements as set out by QQI. On behalf of LMETB, the AMTCE Board assumes responsibility as Coordinating Provider and consortium lead, and the consortium membership is as set out.

# RAA APPRENTICESHIP NATIONAL PROGRAMME MANAGER

* LMETB (AMTCE) will appoint a Programme Manager whose function will incorporate:
* Overall Management of RAA Apprenticeship Programme
* Effective oversight of the administration of the programme
* Clear and Timely Communication with partners and stakeholders and point of contact for all providers of the programme
* Responsibility for the organisation of programme and examination boards
* Effective liaison with the Awarding Body and the Programme Board
* Point of contact throughout the programme for apprentices with individual or group concerns, responsible for the resolution of such issues and their timely resolution
* Assist to employers with regard to the registration of apprentices and the subsequent registration of apprentices with the awarding body

# SOLAS AUTHORISED OFFICER

A network of SOLAS Authorised Oﬀicers based in ETBs manage, support, and administer a portfolio of apprentice approved companies and apprentices within their region on behalf of SOLAS. They operate under a certificate of appointment as SOLAS Authorised Oﬀicers by the Chief Executive Oﬀicer of SOLAS under section 43 of the Industrial Training Act 1967, as amended.

The SOLAS Authorised Oﬀicers provide an independent brokerage through which the integrity of the overall Apprenticeship programme is maintained and are a critical link between the Co-ordinating and Collaborating Providers, the apprentice, and the employer. They currently carry out a range of functions on behalf of SOLAS including, but not limited to:

* Conducting an assessment site visit to assess the employer’s suitability to train apprentices.
* Briefing employers on their roles and responsibilities in relation to the on-the-job elements of the apprenticeship on behalf of the statutory regulator. Assessing and approving employers to register apprentices, through SOLAS Employer Approval and Code of Practice
* Approving and registering new apprentices and apprentices changing employers
* Providing an objective information and guidance service to all apprentices registered
* Monitoring of employers during the apprentice’s on-the-job phases
* Maintaining apprentice and employer records.
* Collaborate and communicate with the National Programme Manager in the delivery of the Programme.

Louth & Meath Education and Training Provider as Co-ordinating Provider, will work in collaboration with the network of SOLAS Authorised Oﬀicers and will fully brief them on the programme-specific criteria for employer suitability to train apprentices, as outlined in the validated programme documentation. On validation of the programme, a schedule of briefings will be conducted for SOLAS Authorised Oﬀicers by the National Programme Manager and National Programme Board representatives.

# INTRODUCING APPRENTICESHIPS

An apprenticeship is defined as a programme of structured education and training which formally combines and alternates learning in the workplace with learning in an education or training centre. It is a dual system, a blended combination of on-the-job employer-based training and off-the-job college based. On successful completion of several stages of training, apprentices become recognized professionals.

Well trained employees are crucial for business success. Employing apprentices who over their training develop the key knowledge, skills, and competencies to become effective employees allows the organization to meet the challenges of competition, growth, and innovation. Apprenticeships provide the opportunity for learning acquired off-the-job to be applied and further developed under guidance in the workplace. It is a proven approach to attract, develop, and retain a pipeline of talent for the participating organization.

Apprenticeships are an attractive route for many learners. Apprenticeships use an “earn and learn” model whereby they are employed by SOLAS approved employers for a duration of 2 – 4 years and are paid a salary whilst building up valuable work ready skills in a chosen occupation. Significantly apprenticeship programmes must provide at least 50% workplace-based learning, so applied learning is foremost in curriculum delivery.

As part of the national apprenticeship system, there are formal requirements for approval of an employer’s suitability to train apprentices and for registration of apprentices. SOLAS is responsible for delivering on these requirements and draws on a network of ‘Authorized Officers’ (AOs) located in the Education and Training Boards (ETBs) around the country to do this role. The availability of suitably qualified mentors is key to successfully completing the process.

## Programme Outline

Robotics and Automation Manufacturers are a group of Irish companies, mostly in the Manufacturing Sector, that provide innovative and practical solutions to a broad range of customer’s needs. Many are market leaders in their field.

The Robotics and Automation (RAA) Apprenticeship is targeted at the Robotics and Automation Manufacturing sectors which sell to national and international markets. Their products are for use in the agricultural, transportation, materials handling, quarrying, construction equipment, food processing, recycling handling and allied industries.

The Robotics and Automation Technician (the role for which these apprentices are prepared) will be required to deliver across a range of disciplines including mechatronics, robotics etc. as well as using testing and measurement tools to assist with analytics and problem solving. Furthermore, the Robotics and Automation Apprentice will be a key member of cross functional teams and as such will develop skills in teamwork, communications, and project management. This integrated programme will address the sector specific skills and the personal development requirements of the individual apprentices.

# PROGRAMME AIMS AND OBJECTIVES

The Robotics and Automation Apprenticeship (RAA) programme aims to provide Apprentices with the skills, knowledge, competencies, and practical application to secure and retain quality employment in advanced technician roles across the various advanced manufacturing sectors including engineering, food & drinks, pharma etc.

A Robotics and Automation Technician designs, installs supports, and maintains the on-demand availability of both robotic and factory automation systems.

RAA’s will be trained and qualified to manage, monitor, and maintain automated manufacturing equipment and assembly processes, monitor and check product quality and document results in adherence to prescribed protocols and safety procedures in a discrete manufacturing environment. Training and tasks undertaken by RAA’s will relate to:

* Setting up, operating, and maintaining robotic cells and industrial control systems; running and real-time monitoring of equipment outputs, overseeing highly automated manufacturing cells or processes e.g., IIoT plant and machinery, tablet manufacturing or automated production and packaging process, CNC machine centres, automated welding cells etc.
* Overseeing, monitoring and maintenance of automated assembly lines or assembly stations.
* Relevant knowledge and familiarity with automated manufacturing processes to oversee and troubleshoot at an appropriate level in consultation senior members of staff as prescribed by operational procedures.
* Maintain robotics systems and associated equipment e.g., robotic welding stations in good working order by performing regular inspection, cleaning, servicing along with preventative and predictive maintenance interventions.
* Perform systems upgrades including application and firmware updates and patching.
* Maintain accurate and clear documentation that proves that systems are being maintained in accordance with both internal and external quality systems or regulations.
* Keep maintenance logs for the equipment or processes they oversee, which requires proficiency in technical writing, word processing and spreadsheet software.
* Provide regular productivity reports, and incident reports if an accident occurs.
* Follow strict internal protocols and Standard Operating Procedures (SOPs) as well as following current Good Manufacturing Practices (GMP) when working with the pharmaceutical and medical device manufacturing industry.

The proposed RAA on completion will equip robotics and automation technicians with key skills and traits including:

* Key technological competencies and relevant computer skills.
* Robotics and automation operations, process, and maintenance skills.
* Production Process Capabilities
* Ability to apply a safety mindset to all aspects of the role
* Engineering and PLC competencies
* CAD/CAM Competencies
* Proficiency in Technical Documentation
* Mathematical, Numerical & Measurement Competencies
* Knowledge of IIoT Technologies Implementation, Monitoring and Maintenance
* Good Communication, Interpersonal and Team skills.

## Programme Structure

The programme structure facilitates delivery in four phases preceded by a workplace-based induction and programme orientation period. The overall programme is designed so that the apprentice spends 70% of their time on-the-job and 30% off-the-job.

## Learning Outcomes

It is the policy of LMETB to manage the development of a teaching and learning strategy to deliver relevant, high-quality programmes to apprentices and to enhance apprentice learning and progress, both on and off-the-job.

All new national apprentice programmes are required as part of QQI validation process to have an associated set of Minimum Intended Programme Learning Outcomes (MIPLOs) and Minimum Intended Module Learning Outcomes (MIMLOs).

### Programme Aim / Purpose

The Robotics and Automation Apprenticeship programme aims to provide a dedicated and practical programme for learners wishing to secure and retain employment in a robotics and automation technician role.

### Programme Objectives

1. To provide apprentices with a broad knowledge of robotics and automation in the advanced manufacturing sector.
2. To provide apprentices with related specialised knowledge, a safety mindset, practical skills, and competence for autonomous professional practice as a robotics and automation technician.
3. To enable apprentices to fully participate in the related professional community of practice.
4. To provide apprentices with the skills to evaluate information and evidence and to generate creative solutions to problems arising in their professional activity.
5. To develop the ability for apprentices to exercise autonomy, judgement and responsibility in applying their knowledge and skills in compliance with safety requirements.
6. To enable apprentices to communicate effectively and to achieve a professional standard of communications across various forms of technical and non-technical communications.
7. To provide apprentices with the ability to act effectively in team roles, exercise supervision, lead activities and contribute to development of the workplace and the performance of others.

### Minimum Intended Programme Learning Outcomes (MIPLOs)

On completion of this programme, the learner (apprentice) will be able to:

1. Identify and appraise the key elements and principles of advanced manufacturing and industry 4.0/5.0. and the fundamentals and benefits of robotic systems.
2. Evaluate problems and develop solutions autonomously in the design, programming, system integration and use of robotic systems while adhering to health and safety regulations and guidelines.
3. Adhere to a safety mindset in their own professional activity and be able apply the relevant safety concepts, regulations and standards that apply to automation and robotic systems within the context of the community of practice.
4. Demonstrate an ability to apply tools and techniques to the digitisation of the design, maintenance and optimisation of manufacturing processes with due regard to ethical considerations.
5. Apply knowledge, initiative, good decision making autonomously, and the practical hands-on skills required to operate, maintain, calibrate, troubleshoot, and upgrade industrial systems and engineering workshop processes.
6. Describe various types of control systems used in manufacturing and robotics; and how to configure, programme, maintain and troubleshoot them.
7. Use a range of mathematical techniques to solve problems and describe how this approach can be applied to improve manufacturing processes.
8. Work effectively as an individual, in teams and lead others in the field of advanced manufacturing, robotics and automation, taking responsibility for their own work while continually engaging in ongoing learning and professional development.
9. Communicate complex information effectively in both technical and non-technical contexts.
10. Manage and evaluate their own learning and help others to identify their needs in the context of the potential impact of the technologies and how they are used.

# EMPLOYER APPROVAL

Employers interested in training apprentices in the RAA programme complete an Expression of Interest application (EOI ) and submit to the Robotics and Automation Programme Manager. Insert photo to RAA when advertised and implemented on Generation Apprenticeship website.

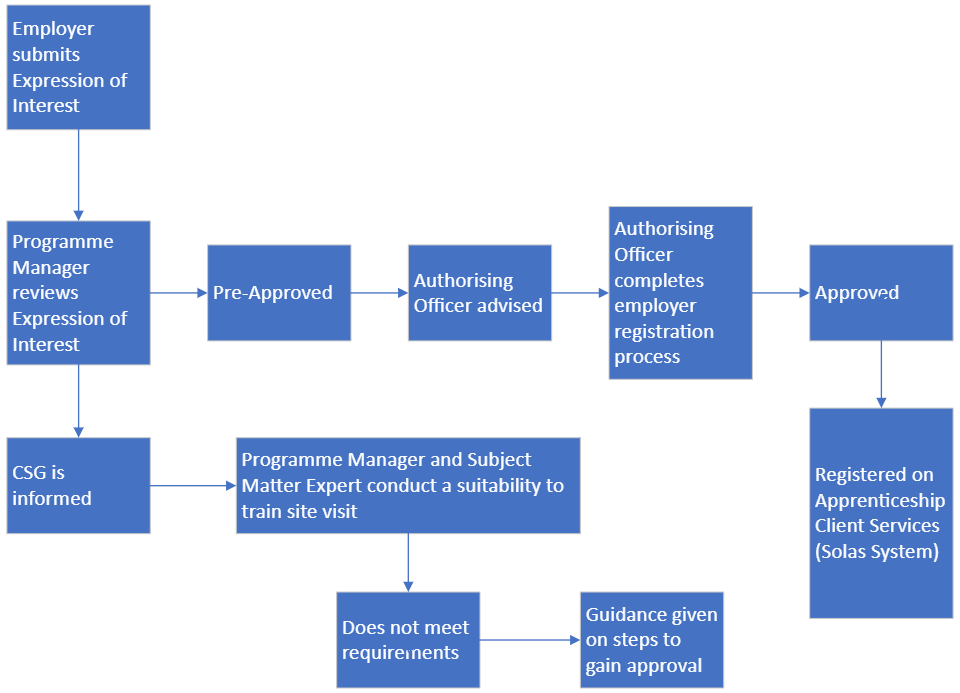
The employer must demonstrate that they have the capacity and the ability to provide quality, relevant on-the-job training to apprentices as per the requirements of the national apprenticeship programme and the statutory apprenticeship system overall.

Specific to Robotics and Automation Apprenticeship is a Site Visit by the National Programme Manager, Subject Matter Expert and AO to assess whether the company can provide the experience in the range of Work Based Tasks required by the Robotics and Automation Apprenticeship. This provides the employer and the programme team with an opportunity to review the needs of the apprentice in the specific on-the-job context.

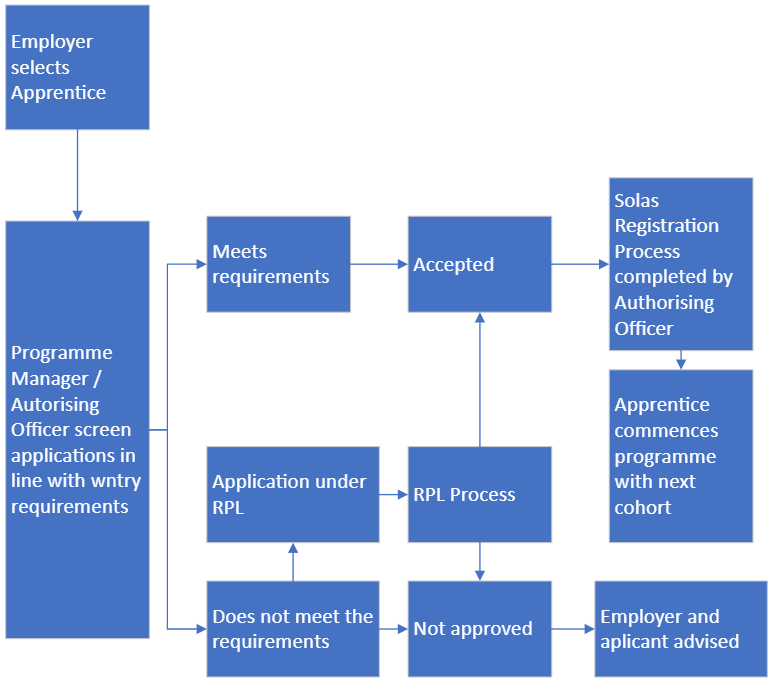
Following Preapproval by the CSG, the Authorized Officer (AO) carries out a site visit to the employer’s premises and the employer is formally assessed. The AO makes a recommendation to SOLAS on the employer’s suitability to deliver the programme. If the employer is not initially approved, the AO will work with the employer to identify what requirements remain to be met and the employer can be re-assessed.

For more information on the Irish apprenticeship system please visit [www.apprenticeship.ie](http://www.apprenticeship.ie)

## Employer Registration Journey



## The Apprentices Admissions Journey



# THE ROBOTICS AND AUTOMATION APPRENTICE DEFINED

The graduating RAA technician will be a general practitioner of a range of skills. Specialist skills would be called upon if outside the certified competence of the Robotics and Automation technician. This type of apprenticeship has not existed heretofore, unlike many of those that have previously been approved.

## Profile of Learners

The Robotics and Automation Apprenticeship is designed to suit learners with an aptitude for, and an interest, in engineering and manufacturing. The apprenticeship model, “Earn While You Learn”, offers an excellent alternative to those interested in engineering, in particular the practical element, and who do not want to continue their education in Higher Education institutions. The apprenticeship is promoted to both male and female students. LMETB actively engage with schools, teachers, Guidance Counsellors, the Engineering and Technology Association (ETTA), as well as parents and guardians to increase the awareness of the programme, career possibilities following completion of the apprenticeship and all benefits associated with choosing this course.

The programme is available to all learners who are employed and registered with SOLAS as Robotics and Automation apprentices whilst meeting the minimum educational entry requirements.

## Minimum Entry Requirements

Entry Criteria: make as clear as possible, how you will identify those apprentices who have a reasonable chance of succeeding on this programme. make as clear as possible, how you will identify those apprentices who have a reasonable chance of succeeding on this programme. If there are numeracy and/or language requirements, they should be made clear.

Minimum entry requirements are as follows:

* Learners wishing to enrol on the RAA Apprenticeship programme must be 17 years or older and have achieved a passing grade (O6/H7) in 5 or more subjects (to include Maths and English) at Ordinary Level in the Irish Leaving Certificate, or a suitable equivalent qualification. For those who may not hold this certification, equivalence may be decided through a Recognition of Prior Learning procedure.
* CERFL proficiency at B2 for those whose first language is not English.
* Additional requirements may apply to non-EU/EA learners. Please refer to Labour Market Access Permission - Immigration Service Delivery (irishimmigration.ie)
* Candidates may be required to complete an RAA specific application form, undergo an appropriate aptitude assessment and take part in an interview held by a Collaborating Accepted Employer

**Skills and attributes are as follows:**

Prior to commencement candidates must complete the statutory apprenticeship registration process. Prospective Learners on the RAA Apprenticeship programme must be numerate, literate and interested in robotics and automation and in pursuing a career in advanced manufacturing. They should possess good communication skills, excellent interpersonal skills, and an ability to work in a team. They should display an interest in and a capacity to absorb product knowledge and related technical competencies. They should demonstrate motivation to commence and complete the RAA apprenticeship programme within the timeframe specified.

Learners wishing to enrol on the RAA Apprenticeship programme should notify their prospective employer during the application process if they require any reasonable adjustments (i.e, provisions for physical or unseen impairments or a requirement for additional aid to utilise technology during the application process or during the programme of training). This should be immediately communicated to LMETB (AMTCE) prior to commencement on the programme.

**Recognition of Prior Learning (RPL) for Entry:**

Applicants who do not have the standard entry requirements are deemed non-standard applications and these will be assessed by RPL designated employees within the coordinating Provider or their Collaborating Provider. All learners wishing to avail of RPL for the New Post-16 RAA Apprenticeship programme must follow the specific procedures outlined in LMETBs RPL policy and in the summary of requirements which can be found in a supporting statement on Access Transfer and Progression. Candidates wishing to avail of RPL for Experiential Learning must have a minimum of two years' experience in the Robotics and Automation industry. Check this diagram below

|  |  |
| --- | --- |
| **Submitted by:** | Consortium Steering Group for RAA Technician |
| **Date of Development:** | Insert date when submitting |
| **Craft Occupation / Apprenticeship Title:** | Robotics and Automation Technician |
| **NFQ Level:** | Level 6 |
| **Duration:** | 2 years\* |
| **Industry Served:** | The Irish RAA (Robotics and Automation) Sector manufacture a range of modern equipment, which is sold globally for use in the agricultural, transportation, materials handling, quarrying and construction equipment industries. RAA Technicians will work in the Manufacturing, Engineering and Mechatronic industries. |
| **Profile of Craft:** | The RAA Sector manufacture a range of modern equipment as outlined above. These contain a range of complex electrical, battery, electro-mechanical, hydraulic, pneumatic, and electronic technology. The RAA Technician is tasked with manufacturing, assembly, testing, servicing, and maintaining a range of original, engineered plant and equipment, to include unique & bespoke solutions to customer’s needs.  While common engineering skills will be developed over the duration of the programme, the RAA Engineering Technician, uniquely, will cultivate the skills necessary to assemble, install, test, commission and electronically control engine driven (diesel and gas) and battery powered systems. The RAA Technician will have the necessary skills to analyse these systems together with electrical wiring systems, hydraulics systems, pneumatic systems and robotics systems to identify specific faults encountered in RAA products. RAA Technicians will possess the expertise to provide support to customers around the use and maintenance of the products they manufacture.  The RAA Technician will be required to interpret technical data and use calibration, torqing, and testing instuments for effective product assembly, fault diagnosis and rectification. They will also be responsible for the installation and calibration of sensors and transmitting and controlling devices. The RAA Technician will be a key member of cross-functional teams such as research and development, assembly, manufacturing, testing, customer support, service & installation, product management and marketing/sales. |
| **Core Skills:** | At the end of the Apprenticeship, the RAA Technician will be able to demonstrate competence in the following:   * Equipment assesmbly using testing procedures, interpretation of technical drawings, schematics, data and relevant RAA standards in a manufacturing environment. * Installation, use, testing and troubleshooting of hydraulic, electromechanical, pneumatic, electrical wiring and automated control systems in a manufacturing environment. |
| **Specialist Skills:** | * Fault diagnosis and rectification within RAA products across engine driven systems, electrical wiring systems, battery powered systems, hydraulics systems, pneumatic systems, and control systems. * Installation, use, testing and troubleshooting of robotics systems, battery powered systems, diesel, and gas engines. * Manufacture, installation, and commissioning of RAA products * Customer service and support around the correct use and maintenance of RAA products |
| **Common Skills:** | * Health and safety procedures, including the selection, safe use of and storage of craft-related tools, plant, equipment, components and materials * Engineering workshop techniques and practice * Fitting and torqing of various fasteners, e.g nuts, bolts, hydraulic fittings, electrical connections etc. * Manufacturing efficiency (LEAN) principles to the RAA workplace * Mathematical calculations/principles during installation, use, testing and fault diagnosis associated with RAA products * Use of common computer applications |
| **Personal Skills:** | * Communications * Customer service and support * Ability to work as part of a team * Ability to work independently * Critical thinking * Problem solving * Time management/planning * Information gathering * Report writing   Check PDT and QA Manual to cross reference |

# NATIONAL FRAMEWORK OF QUALIFICATIONS

The national framework of qualifications (NFQ) is an approved framework through which learning achievements can be measured and related to come together in a coherent way.

Qualification frameworks describe the qualifications of an education and training system and how they interlink. As described by Quality and Qualifications Ireland (QQI) “the Irish NFQ, established in 2003, is a framework through which all learning achievements may be measured and related to each other in a coherent way. The many different types and sizes of qualifications included in the NFQ, are organized based on their level of knowledge, skill, and competence. Because all NFQ qualifications are quality assured, learners can be confident that they will be recognized at home and abroad”. (Reference <https://www.qqi.ie/what-we-do/the-qualifications-system/national-framework-of-qualifications>)

Rationale for the choice of QQI named award stem sought and for the named award title QQI level 6 was considered by the consortium as the most appropriate level for new entrants, who wish to develop a pathway within the Robotics and Automation Sector.

The level of education was certified by QQI at level 6 on completion of a robust programme validation process.

A circular diagram with different colored circles

Description automatically generated

# MENTOR

The importance of you as a Mentor

The Employer Mentor plays a critical role in the integration, organization, and oversight of work-based learning. In addition, this experienced practitioner performs a key function in monitoring progress and in guiding, informing, and caring for learners.

When the apprentice obtains employment with the company, the company assigns that apprentice to a mentor. The mentor will normally mentor two apprentices but no more than four. The mentor will receive training on the duties and responsibilities of the role and is approved by the National Programme Manager. The National Programme Manager ensures that the work-based mentors and assessors are suitably qualified and trained to conduct training and assessment for the programme. The mentor should have the qualifications or experience as previously stipulated. The work-based training is organized by a mentor. The mentor in association with the relevant LMETB Instructors/Tutors/Lecturers/Teachers/Contracted Trainers will ensure that the training tasks and assessments cover the learning outcomes of the modules for each stage.

**Workplace Mentors**

Assigned Mentors should be qualified individuals with experience in the discipline who can guide, advice and support their designated apprentice personal, technical, and professional development in the workplace. Mentors are also charged within ensuring apprentices are allocated the time and resources to complete all workplace projects and assignments in accordance with the programme schedule.

A continuous record of experience and assessment should be maintained for each apprentice. This record should also contain the apprentice’s reflections on their experience and should be confirmed by the workplace mentor and should be accessible to other examiners.

Workplace mentors will occupy a role in the workplace that corresponds to a senior practitioner level. They will be appointed by the employer and approved by the SOLAS Authorised Oﬀicer supported by the Programme Manager, or the Programme Leader as required.

Employers and Workplace Mentors will be briefed on the Workplace competency requirements by the programme team in collaboration with the Consortium Steering Group. They will be trained to ensure that they understand their responsibility in relation to training and assessing an apprentice on-the-job, to industry and awarding body standard. They will be responsible for mentoring and assessing apprentices in the workplace.

**The Workplace Mentor will:**

Ensure that the apprentice is introduced to his/her colleagues and peers and is familiar with the workplace environment.

* Provide opportunities to enable the apprentice to achieve the minimum intended programme learning outcomes as documented in the programme specification.
* Facilitate the apprentice’s learning experience in the workplace by shadowing, coaching, observing, and guiding.
* Support the apprentice in communicating with the employer on training related issues.
* Support the apprentice in the workplace by ensuring that the apprentice is conversant with the normal work practices and rules pertaining to the occupation, including its history, staﬀing structure, customer base and competitive position, and as far as is possible, include the apprentice in the community of practice within the workplace.
* Develop a sense of professionalism in the apprentice.
* Guide the apprentice in completing his/her programme and when the standard for each competency task has been reached, sign the Work-Based Competency Task Book.
* Provide pastoral care for the apprentice in the workplace on an on-going basis and bring any issues of concern to the attention of the Teacher.
* Assess the apprentice in “on-the-job” competencies.
* Ensure the apprentice uploads all assessment documents and evidence of workplace assessment on the VLE.
* Communicate with the Teacher and other staﬀ on issues to do with the apprentice and the programme.
* Attend National Programme Board meetings as appropriate and co-operate with reviews of the programme.

## Workplace Mentor/Assessor Qualifications

The following qualifications are required to be a workplace Mentor/Assessor:

* Level 6 qualification in a robotics/automation or related discipline and a minimum of 2 years industry experience in the sector or
* Have completed a craft apprenticeship in mechanical, electronic, or electrical or related discipline or
* Have a minimum of 5 years’ experience working in the Robotics and Automation sector.

## The Assessment Process check this out

Work based assessments will be carried out in the workplace and will be organized and assessed by a company assessor. The mentor may or may not be the assessor dependent on their qualification and experience. The ETB assessor/tutor will provide support and advice to the work-based assessor on an ongoing basis. The oversight of the work-based learning starts with the Authorized Officer’s approval of the company to participate in the programme.

The programme tutors will work closely with the work-based mentors and assessors to assist them in providing the learners with a professional programme, by ensuring that the Minimum Intended Learning Outcomes (MIMLOs) are met.

The Instructors/Tutors/Lecturers/Teachers/Contracted Trainers will assist the mentors and assessors in developing training tasks and assessments for the modules in each stage of the programme. In the initial years of the programme, the Instructors/Tutors/Lecturers/Teachers/Contracted Trainers will visit the mentor on a regular basis. As the mentor gains experience of the programme, the visits will be reduced.

The mentor will provide an on-the-job observation report. The report will contain a record of the individual learner’s achievements during the work-based learning stage. The report will be provided to the National Programme Manager who will consolidate the report and forward it to the National Programme Board.

Apprentice feedback forms are completed by the apprentice at the end of each stage of the work-based learning. The form is distributed by the mentor and is a standard survey form on content, delivery, and the management of the programme. The National Programme Manager will consolidate the forms and forward them to the National Programme Board. The mentors, assessors and tutors will be deeply involved in the development and roll out of this process to ensure that any issues can be addressed at an early stage. This will ensure a successful implementation of this very important instrument.

Two persons who have acted as workplace mentors and have been nominated by employers will be members of the National Programme Board and as such will have direct input into the ongoing delivery and development of the Robotics and Automation programme. Names to be confirmed for RAA for National Programme Board from CSG, as below.

## Principles of Fair and Consistent Assessment

The principles of fair and consistent assessment of apprentices, (QQI 2016) are listed and defined as follows:

**Standards**

A basic principle of standards-based assessment systems is that to be effective, assessment must measure and record the attainment of industry set standards of occupational performance or behavior of apprentices. In a standard based system such standards are criterion referenced rather than norm based. This means that apprentices are required to attain pre-defined standards or complete pre-defined tasks successfully. Such standards are usually defined in terms of measurable criteria such as quality and speed of finished product/s or process/es.

Examples: In an engineering practical test, parts are made to specified limits of accuracy and smoothness for the finished component part. In a construction test, the completion of a project in brick or timber will be assessed by comparing the completed product with the requirements for dimensional accuracy, quality of finished joints, levels and angles or squareness of surfaces relevant to each other as specified in the drawing.

**Validity and Reliability**

Standards for occupational competence are therefore informed by real customer needs and industrial and commercial standards. In a criterion referenced standard-based system the apprentices’ performance is always compared with an agreed and usually written performance standard and never to other apprentices.

To quality-assure an accurate measurement of any performance of skills or application of knowledge, it is essential that the assessment method or item is capable of producing valid and reliable information. To be valid the assessment content must test the training objective and the assessment methods being used must measure the application of relevant skills, knowledge, and attitude. For example, a written test is a valid way to assess an apprentice’s knowledge of the rules of the road but a written test is not a valid measure of their ability to drive a car. Therefore, in order to test the breadth of skill, knowledge and attitude of a competent driver, both a practical and theoretical assessment is called for to ensure validity. Reliability refers to the consistency of any chosen assessment method or item, to measure performance results accurately. If an assessment method is reliable, different assessors will measure and score the same result for the same performance.

The reliability of an assessment method and marking scheme is assured when:

It is understood by both the apprentice and assessor what is required.

* Assessment conditions are clear and adhered to
* Results are based on clear marking schemes and rules.
* Sufficient assessment is undertaken to reduce the chance of errors.

**Fairness and Consistency**

Assessment events must be appropriate to the learning objectives, plan, and activities. This implies that the system is open to apprentices whereby the apprentices are aware of the training objectives, performance criteria expected and the conditions of assessment. Therefore, it should be clear to an apprentice if they are ready and able to meet the required standard.

**Practicality**

Assessments must be practical in terms of the time required to assess and the effective use of resources. Consideration must be given to the ratio between assessment time and training time, ease of use, administration efficiency and cost factors.

## Link between On-the-Job and Off-the-Job

Education centre-based modules will be delivered within an applied classroom-based environment where class interaction will be central. Instructors/Tutors/Lecturers/Teachers/Contracted Trainers on the programme will have module expertise in their discipline area. Site visits will be organized for specific specialist areas as appropriate. Classes will be taught in a supportive environment which promotes a problem-based learning approach wherein learners will be exposed to real industry learning. Apprentices will be encouraged to think independently and expected to apply knowledge, skills, and techniques to solve real world problems.

Learning in the off-the-job parts of stages will take place in blocks. Stage 1 is a 16-week block of learning; stage 2 is also 16 weeks in duration and stage 3 comprises 14 weeks of off-the-job tuition. Compare PDT to complete.

|  |  |
| --- | --- |
| **Year 1** | **Year 2** |
| On-the-Job Training 16 weeks | On-the-Job Training 16 weeks |
| 36 weeks On-the-Job Includes Holiday Period | 36 weeks On-the-Job Includes Holiday Period |

## Work-based Learning Environment

Along with the support services from LMETB, companies are expected to support the apprentice ensuring they complete their work-based assessment within the working day. This involves promoting a continuous feedback process within a supporting positive learning environment.

All learners will be assigned an ETB supervisor who will be responsible for the academic progress of the apprenticeship. This staff member will liaise with the work-based mentor with respect to work-based assessments and visit the learner when out in the workplace.

# MENTOR AIDS

Key role is to mentor and assess the apprentice in the workplace. A mentor is defined as an ‘experienced and trusted adviser’.

## 5 Generations in the Workplace

Today’s business environment may be the first to include five different generations working side by side toward shared economic and commercial goals.

1. Generation Z (1997–2012)
2. Millennials (1981–1996)
3. Generation Xers (1965–1980)
4. Baby boomers (1946–1964)
5. Silent generation (born between 1928 and 1945)

**Generation Z**: Have been influenced heavily by their Gen X parents and the speed at which the world works today, so they feel respected when you get directly to the point, give them work to do, and then let them go do it.

**Millennials**: Want to be part of the decision-making process; they feel respected when they feel as though they have had input and their ideas have been heard.

**Generation X**: Between the baby boomers and Millennials, Gen Xers were moulded by the evolution of personal computers. Generation Xers are generally more educated than previous generations. Viewed as self-reliant and hardworking, they are often viewed as financially responsible.

**Baby** **boomers**: Have long been known for their strong work ethos and goal-centred leanings. They tend to be hardworking and value face-to-face interaction. They did not grow up using computers, although they will use technology for job-related functions.

**Silent** **generation**: The oldest generation currently in the workforce is the silent generation. They grew up without today’s technology and many other modern conveniences younger generations take for granted. Many members of this generation have overcome adverse economic conditions in their lifetimes and thus have established diligent financial habits. They are hard workers with strong core values.

<https://www.paychex.com/articles/human-resources/how-to-manage-multiple-generations-in-the-workplace>

**Embrace Generational Differences**

It is important to embrace generational differences for example, younger generations value more flexible work schedules and are often more apt to work odd hours, while you are likely working more traditional hours.

It might be worth considering creating a reverse mentorship programme. In traditional mentoring, an older, more experienced employee or manager mentors a younger, less experienced one. Reverse mentorship encourages the apprentice to mentor up. This means you are learning technical skills from your younger counterpart.

## The 5 Rs of Positive Mentoring:

1. **Rationale**: When mentors provide the rationale behind policies and regulations in a learning environment, these young learners are more likely to respond positively.
2. **Relevance**: Most apprentices are aces at “googling” and discovering information. They do not value a piece of information for its own sake, rather for its relevance to their lives. Mentors will find that engagement in hands-on or application-based case studies is better, where new knowledge is discovered and synthesized actively between group members.
3. **Relaxed**: Think “laid back” when you conduct your training sessions. Apprentices prefer a relaxed learning environment, with minimum pressure, more freedom to complete assignments and more freedom for personal expression and creativity.
4. **Rapport**: Apprentices thrive on personal relationships. When being raised, they had complete attention from their parents. They are used to older adults showing more interest in their lives. They prefer and appreciate mentors showing a personal interest in their training and development plans and achievement goals. These learners also perform better at work and in the classroom when mentors connect with them on a personal level.
5. **Respect**: We all need to feel respected in the workplace to stay engaged and motivated. Respect looks a little different for each generation, as they value different treatment that affects perceptions of respect.

## Guidance on how to Successfully Complete the Workplace Tasks

1. Familiarize yourself with the workplace tasks associated with each module.
2. Working closely with the apprentice, agree the workplace tasks to be completed for the relevant module.
3. Explain to the apprentice all the steps in completing the task and be clear about organizational standards for the task being undertaken.
4. If specialized knowledge is required by the apprentice to complete the task, put the apprentice in contact with the relevant person within the organization.
5. Provide the apprentice with sufficient opportunity to practice.
6. Provide constructive feedback to the apprentice.
7. When the apprentice has competently completed a task, record the task as completed.
8. Complete the checklist and feedback sheet, then return to Robotics and Automation Coordinating tutor.

Mentors should utilize the following core skills in their Mentoring of Apprentices.

## Tips for Active Listening

* Ask open ended questions which cannot be answered by yes or no responses.
* Prepare to sit out awkward silences.
* Give apprentices time to find the right words.
* Never assume what the apprentice is going to say.
* Keep clarifying and summarizing to ensure common understanding
* Listen conscientiously to the apprentice.
* Never display boredom or irritation

## Tips for Giving Feedback

* Let the apprentice speak first – ask them about how they felt about their performance.
* Always highlight the positives first by focusing on their strengths
* Be specific about the criteria; identify those which were met and those which were not met.
* Select priority areas for improvement rather than overwhelm them with too much negative feedback.
* Suggest what they could do differently, include advice on who could help and how further practice could be organized.
* Check understanding.
* Finish by agreeing what happens next.

# WE ARE HERE TO SUPPORT YOU AND THE APPRENTICE ON THIS EXCITING JOURNEY

Contact details (Details need to be confirmed for RAA)

Programme Manager