

The NI Traineeship in Mechanical Engineering

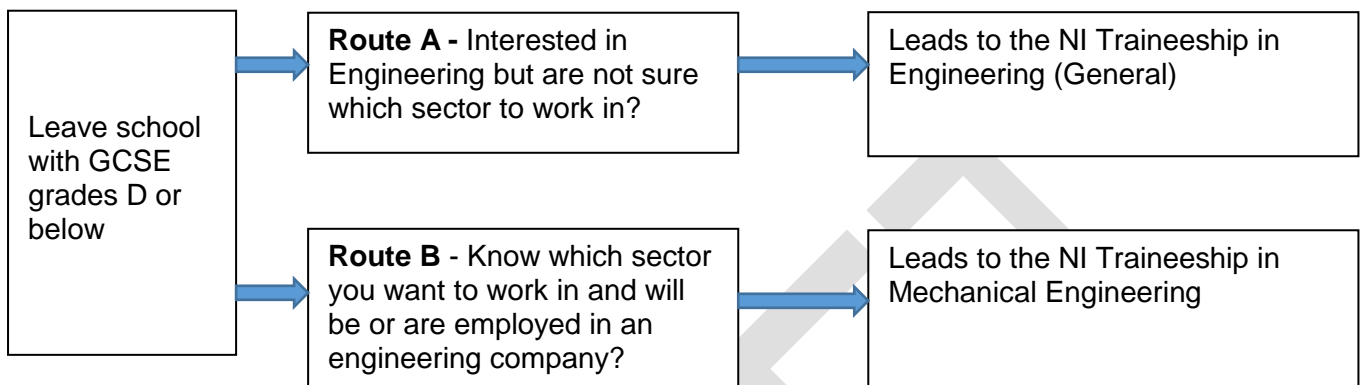
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Framework for Northern Ireland

1. Occupational Framework Title

NI Traineeship in Mechanical Engineering

There are two different routes through this framework. Learners will complete one of the following routes – A or B, depending on their GCSE grades, experience and interests.



• Route A - NI Traineeship in Engineering (General)

This Traineeship is for learners who have left school with GCSE grades D (or equivalent new grade 3) or below in some subjects, with an interest in Engineering but are not sure which sub-sector to work in.

They will:

- be unemployed status
- attempt to improve their GCSE grades to a minimum of a Grade C (or equivalent new grade 4) if required
- undertake work experience - ideally in engineering companies
- develop basic engineering competency skills by completing a L2 qualification
- develop a knowledge of engineering by completing an engineering technical certificate
- develop employability skills such as CV writing, interview techniques, working with others and problem solving, some Transversal/Transferable Skills

• Route B - The NI Traineeship in Mechanical Engineering

This Traineeship is for learners who have left school with GCSE grades D (or equivalent new grade 3) or below in key subjects and are employed in an engineering company.

They will:

- be employed by an engineering company
- develop basic engineering competency skills by completing a Level 2, or a work based NVQ L2 as selected by their employer (employer to select relevant units in either Performing Engineering Operations (PEO) or a Level 2 Mechanical Engineering NVQ)
- develop a knowledge of engineering by completing an engineering technical certificate
- developed a range of Transversal/Transferable Skills

Whichever route you choose will give you the opportunity to do a variety of job roles, such as the ones described in the following Section 2.

2. Occupational Profile - description of the job role and progression opportunities

Mechanical Engineering trainees work across a broad range of job roles in the sector, such as a Machine Setter Operator, CNC Operator/Setter or in semi-skilled roles like Jig and Tool Fitter, Composite Fitter, Mechanical Fitter.

CORE OCCUPATIONAL STANDARD

Across the job roles in Mechanical Engineering, trainees will be able to understand and demonstrate the following core knowledge, skills, behaviours and transversal skills relevant to their chosen specialism.

Core Knowledge

- Understand the typical hazards that can occur
- What health, safety and environmental procedures and precautions to follow
- How to use engineering data, drawings and reports
- How to set up, operate and close down equipment correctly
- What tools/equipment/accessories are required, how to check the condition and use them
- The procedure for obtaining replacement parts, materials and other consumables required
- The appropriate inspection checks/test methods to use and equipment required
- How to handle and dispose of unwanted components, waste materials and substances safely
- How to deal with faults and problems
- How to complete relevant records

Core Skills

- Follow the relevant instructions, assembly drawings, specifications
- Use the appropriate tools and equipment and check they are in a safe and usable condition
- Check that all safety procedures and mechanisms are in place
- Operate the machine/equipment safely and correctly and produce components to the required quality
- Carry out quality sampling checks at suitable intervals
- Complete the relevant documentation

Core Behaviours and Transversal Skills

The following transversal skills and behaviours should be developed through naturally occurring activities in the job role within the apprenticeship. They should be included and recorded in the competence and knowledge qualifications.

Behaviours

- A strong work ethic
- Dependability
- Integrity
- Positive attitude
- Responsibility
- Motivation
- Team player
- Honesty and commitment

Skills

- Literacy
- Numeracy
- Communication
- Digital Skills
- Self-management
- Working with others
- Work professionalism
- Problem solving and decision making

Specialist Pathways

Specialist Pathway	Knowledge	Skills
<i>Machine Setter Operator</i>	<p>Operation of the machine controls in hand and power modes</p> <p>The basic principles of operation of the machine and its accessories, and typical operations that they can perform</p> <p>How to handle and store machine tools safely and correctly</p> <p>The range of workholding methods and devices</p> <p>Roughing and finishing cuts, and the effect on tool life, surface finish and dimensional accuracy</p> <p>The use of cutting fluids on a range of different materials</p> <p>How to recognise machining faults and how to identify when tools need re-sharpening</p>	<p>Mount, set and secure the required workholding devices, workpiece and cutting tools to make the component to specification</p>
<i>Jig and Tool Fitter (semi-skilled)</i>	<p>Operation of the machine controls in hand and power modes</p> <p>The basic principles of operation of the machine and its accessories, and typical operations that they can perform</p> <p>How to handle and store machine tools safely and correctly</p> <p>The range of workholding methods and devices</p> <p>Roughing and finishing cuts, and the effect on tool life, surface finish and dimensional accuracy</p> <p>The use of cutting fluids on a range of different materials</p> <p>How to recognise machining faults and how to identify when tools need re-sharpening</p>	<p>Mount, set and secure the required workholding devices, workpiece and cutting tools to make the component to specification</p>
<i>Mechanical Fitter (semi-skilled)</i>	<p>The various methods used to modify assemblies</p> <p>How the components are to be aligned, adjusted and positioned before securing, and the appropriate tools and equipment to use</p> <p>The sealants and adhesives to be used and the precautions that must be taken when working with them</p>	<p>Assemble components in the correct positions using the appropriate methods and techniques</p> <p>Secure components using the specified connectors and securing devices</p> <p>Check the completed assembly to ensure that all operations have been completed and the finished assembly</p>

	<p>How to conduct checks to ensure the accuracy, position, security, function and completeness of the assembly</p> <p>How to detect assembly defects</p> <p>The methods and equipment used to transport, lift and handle components and assemblies</p>	<p>meets the required specification</p>
<p><i>CNC Operator/Setter</i></p>	<p>Operation of the CNC machine controls in both hand and power modes</p> <p>How to use the visual display and understand the various messages displayed</p> <p>How to find the correct restart point in the program when the machine has been stopped before completion of the program</p> <p>Roughing and finishing cuts, and the effect on tool life, surface finish and dimensional accuracy</p> <p>The use of cutting fluids on a range of different materials</p> <p>How to recognise machining faults and how to identify when tools need re-sharpening</p>	<p>Deal promptly with error messages or equipment faults and report those that cannot be solved</p>
<p><i>Composite Fitter (semi-skilled)</i></p>	<p>The assembly, fitting/trimming and bonding methods, techniques and procedures to be used</p> <p>How the components are to be aligned, adjusted and positioned before bonding, and the appropriate tools and equipment to use</p> <p>The sealants and adhesives to be used and the precautions that must be taken when working with them</p> <p>How to conduct checks to ensure the accuracy, position, security, function and completeness of the assembly</p> <p>The different methods used to identify defects in composite mouldings</p>	<p>Check the specified components are available and that they are in a usable condition</p> <p>Assemble components in the correct positions</p> <p>Secure components using the specified connectors and securing devices</p> <p>Check the materials to be bonded and bonding agents comply with the specification</p> <p>Carry out the bonding and curing operations</p> <p>Make bonds of the required quality and within the specified dimensional accuracy</p> <p>Check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification</p>

3. Entry requirements

As a guide, the NI Traineeship in Engineering is suitable for applicants who have left school with GCSE grades D (or equivalent new grade 3) or below in key subjects including Maths, English, and a Science. Candidates may be considered on an exceptional basis for entry if they do not meet the stated requirements. If applicants have shown an interest in engineering, or have previous work experience or employment in the sector, then this would be relevant to include in their application.

Typically applicants must be:

- willing to undertake a course of training both on-the-job and off-the-job and apply this learning in the workplace
- able to follow instructions and diagrams, with literacy and numeracy to work with data
- a good team worker, who can also work under own initiative
- keen and motivated to work in an engineering or manufacturing environment
- able to develop transversal/transferable skills

4. Duration

Both routes in this Mechanical Engineering traineeship typically take 24 months for trainees starting this traineeship with no or little engineering experience.

Adult trainees or those with relevant experience or who have already achieved some of the required qualifications may require less time to complete the programme.

5. National Occupational Standards (NOS)

This Traineeship in Mechanical Engineering is underpinned by National Occupational Standards (NOS) which indicate the standards of competency performance that trainees must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding.

The relevant NOS for this framework are in the Performing Engineering Operations Suite 2 and Mechanical Manufacturing Engineering Suite 2, where:

- the competency qualifications standards are linked directly to the NOS
- the underpinning knowledge qualification specifications are linked where possible to the NOS

Specific details of these can be found in [Appendix 1](#)

6. Qualifications

Qualifications are based on competency and knowledge. Competence and technical knowledge are separately identified and separately assessed to ensure trainees not only demonstrate the competence to do the job, but also develop the underpinning technical skills, knowledge and understanding of the wider industry and market.

If trainees have already achieved any of the qualifications, or have relevant experience of working in the sector, this prior achievement can be recognised.

The relevant competency qualifications derived from these NOS are:

- Level 2 NVQ/SVQ Diploma in Performing Engineering Operations
- Level 2 NVQ Diploma in Mechanical Manufacturing Engineering (only suitable for employed trainees)

They contain pathways relevant to the job titles listed above.

This table summarises what qualifications must be taken – qualification details are given in [Appendix 2](#)

Competency	Knowledge (Technical Certificate)
<p>Route A Trainees must complete a PEO L2 qualification offered by one of these Awarding Organisations:</p> <ul style="list-style-type: none"> ▪ EAL ▪ City & Guilds ▪ Pearson ▪ SQA Awards <p>Route B Trainees must complete either:</p> <ul style="list-style-type: none"> • a PEO L2 qualification (as in Route A) with units relevant to their job role <p>or</p> <ul style="list-style-type: none"> • a work based NVQ L2 in Mechanical Manufacturing Engineering as selected by their employer and offered by one of these Awarding Organisations: <ul style="list-style-type: none"> ▪ EAL ▪ City & Guilds ▪ Pearson 	<p>Route A or Route B Trainees must complete one of the Technical Certificate listed in Appendix 2</p> <p>Each Technical Certificate is relevant to both Route A and Route B, so there is no restriction by route choice.</p>

7. Assessment

Qualifications must be assessed and this can be through a variety of different methods. Some may be assessed internally (such as by tests or project work) or externally (such as by exams) or require a portfolio of evidence.

The competency qualifications must be assessed in a work environment. The knowledge qualification may have some type of external assessment.

Assessors must hold the Level 3 Award in Assessing Competence in the Work Environment and have current, verifiable, relevant and sufficient technical competence to evaluate and judge performance and knowledge evidence requirements.

8. Enhancements

No additional enhancements have been identified by employers to date

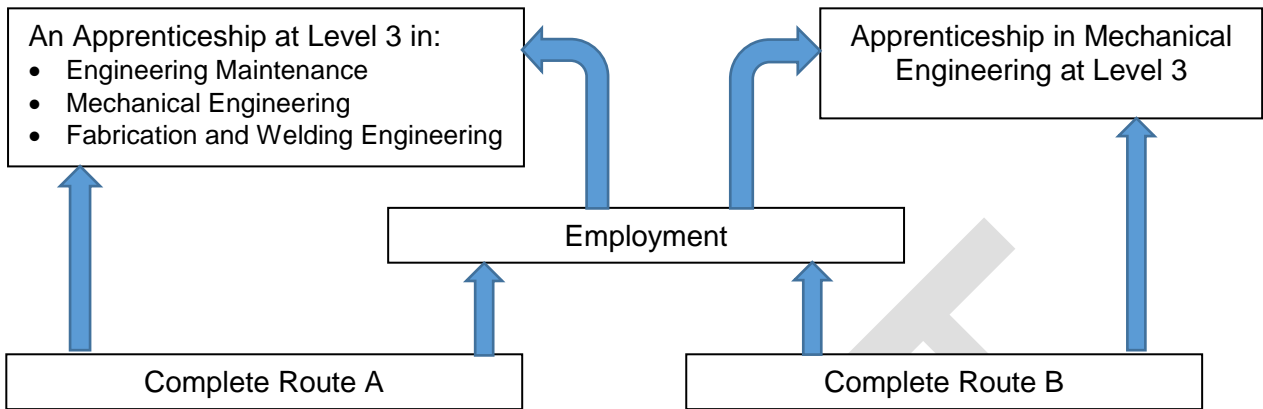
9. Progression

When trainees have completed this framework, either through Route A or Route B, they have two options open to them.

They can gain employment within an engineering company, perhaps in one of the semi-skilled job roles described earlier, leading to internal promotion to team leader or supervisory roles. In time, they may also choose to complete an Apprenticeship at Level 3.

Alternatively it gives an opportunity to progress directly to a Level 3 Apprenticeship. The general nature of the PEO Level 2, combined with relevant work experience, allows trainees to move between and across sectors.

Employed trainees completing Route B of the Level 2 Traineeship can progress to the Level 3 Apprenticeship in Mechanical Engineering.



The following websites are useful to help trainees plan career progression:

www.apprenticeships.org.uk/types-of-apprenticeships/engineering-and-manufacturing-technologies.aspx

nationalcareersservice.direct.gov.uk/advice/planning/jobfamily/Pages/manufactureandengineering.aspx

Appendix 1

The Level 2 NVQ Diploma in Performing Engineering Operations qualification is derived from the following standards:

	URN	Title of the Occupational Standard
Core NOS for all pathways	SEMMAN12301	Complying with statutory regulations and organisational safety requirements
	SEMPEO202	Working efficiently and effectively in engineering
	SEMPEO203	Using and communicating technical information
Available NOS	SEMPEO204	Producing mechanical engineering drawings using a CAD system
	SEMPEO205	Producing components using hand fitting techniques
	SEMPEO206	Producing mechanical assemblies
	SEMPEO207	Forming and assembling pipework systems
	SEMPEO208	Carrying out aircraft detail fitting activities
	SEMPEO209	Installing aircraft mechanical fasteners
	SEMPEO210	Producing aircraft detail assemblies
	SEMPEO211	Preparing and using lathes for turning operations
	SEMPEO212	Preparing and using milling machines
	SEMPEO213	Preparing and using grinding machines
	SEMPEO214	Preparing and proving CNC machine tool programs
	SEMPEO215	Preparing and using CNC turning machines
	SEMPEO216	Preparing and using CNC milling machines
	SEMPEO217	Preparing and using CNC machining centres
	SEMPEO218	Preparing and using industrial robots
	SEMPEO219	Maintaining mechanical devices and equipment
	SEMPEO220	Assembling and testing fluid power systems
	SEMPEO221	Maintaining fluid power equipment
	SEMPEO222	Producing sheet metal components and assemblies
	SEMPEO223	Producing platework components and assemblies
	SEMPEO224	Cutting and shaping materials using thermal cutting equipment
	SEMPEO225	Preparing and proving CNC fabrication machine tool programs
	SEMPEO226	Preparing and using CNC fabrication machinery
	SEMPEO227	Preparing and using manual metal arc welding equipment
	SEMPEO228	Preparing and using manual TIG or plasma-arc welding equipment
	SEMPEO229	Preparing and using semi-automatic MIG, MAG and flux cored arc welding equipment
	SEMPEO230	Preparing and using manual oxy/fuel gas welding equipment
	SEMPEO231	Preparing and using manual flame brazing and braze welding equipment
	SEMPEO232	Producing electrical or electronic engineering drawings using a CAD System
	SEMPEO233	Wiring and testing electrical equipment and circuits
	SEMPEO234	Forming and assembling electrical cable enclosure and support systems
	SEMPEO235	Assembling, wiring and testing electrical panels/components mounted in enclosures
	SEMPEO236	Assembling and testing electronic circuits
	SEMPEO237	Maintaining electrical equipment/systems
	SEMPEO238	Maintaining electronic equipment/systems
	SEMPEO239	Maintaining and testing process instrumentation and control devices
SEMPEO240	Wiring and testing programmable controller based systems	
SEMPEO241	Using wood for pattern, modelmaking and other engineering applications	
SEMPEO242	Assembling pattern, model and engineering woodwork components	

	SEMPEO243	Producing composite mouldings using wet lay-up techniques
	SEMPEO244	Producing composite mouldings using pre-preg techniques
	SEMPEO245	Producing composite mouldings using resin flow infusion techniques
	SEMPEO246	Producing composite assemblies
	SEMPEO247	Producing components by rapid prototyping techniques
	SEMPEO248	Producing and preparing sand moulds and cores for casting
	SEMPEO249	Producing and preparing molten materials for casting
	SEMPEO250	Producing cast components by manual means
	SEMPEO251	Fettling, finishing and checking cast components
	SEMPEO252	Finishing surfaces by applying coatings or coverings
	SEMPEO253	Finishing surfaces by applying treatments
	SEMPEO254	Carrying out heat treatment of engineering materials
	SEMPEO255	Carrying out hand forging of engineering materials
	SEMPEO256	Stripping and rebuilding motorsport vehicles (pre-competition)
	SEMPEO257	Inspecting a motorsport vehicle during a competition
	SEMPEO258	Diagnosing and rectifying faults on motorsport vehicle systems (during competition)
	SEMPEO259	Carrying out maintenance activities on motorsport vehicle electrical equipment
	SEMPEO260	Stripping and rebuilding motorsport engines (pre-competition)
	SEMPEO261	Producing CAD models (drawings) using a CAD system
	SEMPEO262	Producing engineering project plans
	SEMPEO263	Using computer software packages to assist with engineering activities
	SEMPEO264	Conducting business improvement activities
	SEMPEO265	General machining, fitting and assembly applications
	SEMPEO266	General fabrication and welding applications
	SEMPEO267	General electrical and electronic engineering applications
	SEMPEO268	General maintenance engineering applications
	SEMPEO269	Joining public service vehicle components by mechanical processes
	SEMPEO270	Assembling structural sub-assemblies to produce a public service vehicle
	SEMPEO271	Fitting sub-assemblies and components to public service vehicles
	SEMPEO272	Preparing and manoeuvring armoured fighting vehicles (AFVs) for maintenance and transportation
	SEMPEO273	Producing composite mouldings using resin film infusion techniques

The Level 2 NVQ Diploma in Mechanical Manufacturing Engineering qualification is derived from the following standards:

	URN	Title of the Standard
Core NOS for all pathways	SEMMAN12301	Complying with statutory regulations and organisational safety requirements
	SEMMAN2302	Using and interpreting engineering data and documentation
	SEMMAN203	Working efficiently and effectively in engineering
Machine Operating Pathway Available NOS	SEMMME204	Operating capstan or turret lathes
	SEMMME205	Operating centre lathes
	SEMMME206	Operating single spindle automatic turning machines
	SEMMME207	Operating multi-spindle automatic turning machines
	SEMMME208	Operating milling machines
	SEMMME209	Operating single and multi-spindle drilling machines
	SEMMME210	Operating grinding machines
	SEMMME211	Operating special-purpose machines
	SEMMME212	Operating gear cutting machines

	SEMMME213	Operating electro-discharge machines
	SEMMME214	Operating honing and lapping machines
	SEMMME215	Operating broaching machines
	SEMMME216	Operating shaping, planing or slotting machines
	SEMMME217	Operating gear grinding machines
	SEMMME218	Operating power presses
CNC Operating Pathway	SEMMME219	Operating CNC turning machines
	SEMMME220	Operating CNC milling machines
	SEMMME221	Operating CNC grinding machines
Available NOS	SEMMME222	Operating CNC punching machines
	SEMMME223	Operating CNC laser profiling machines
	SEMMME224	Operating CNC electro-discharge machines
	SEMMME225	Operating CNC gear cutting machines
	SEMMME226	Operating CNC machining centres
Production Assembly Pathway	SEMMME227	Producing mechanical sub-assemblies/assemblies
	SEMMME228	Assembling fluid power components to mechanical equipment
Available NOS	SEMMME229	Assembling electrical or electronic components to mechanical equipment
	SEMMME230	Assembling pipework components to mechanical equipment
Composite Manufacture Pathway	SEMMME231	Producing composite mouldings using wet lay-up techniques
	SEMMME232	Producing composite mouldings using pre-preg laminating techniques
Available NOS	SEMMME233	Producing components by acrylic moulding
	SEMMME234	Vacuum forming composite materials
	SEMMME235	Trimming composite mouldings using hand tools
	SEMMME236	Identifying defects in composite mouldings
	SEMMME237	Carrying out repairs to composite mouldings
	SEMMME238	Applying surface finishes to composite mouldings
	SEMMME239	Bonding composite mouldings
	SEMMME240	Producing composite assemblies

Appendix 2

Qualifications – Trainees need to complete:

One Competency qualification
(relevant to their choice of Route A or Route B)

and

One Knowledge Certificate
(applicable to both routes)

Competency		Knowledge (Technical Certificate)	
Title	QAN	Title	QAN
Route A – Level 2 NVQ/SVQ Diploma in Performing Engineering Operations			
EAL Level 2 NVQ Diploma in Performing Engineering Operations	600/8264/1	EAL Level 2 Certificate in Engineering Technologies	601/5670/3
		or	
City & Guilds Level 2 NVQ Diploma in Performing Engineering Operations	600/9471/0	EAL Level 2 Diploma in Engineering Technologies	601/5669/7
		or	
Pearson Level 2 NVQ Diploma in Performing Engineering Operations	601/2547/0	EAL Level 2 Diploma in Mechanical Engineering Technology	501/0979/0
		or	
EAL SVQ Level 2 NVQ Diploma in Performing Engineering Operations	GL2P 22	Pearson BTEC Level 2 Extended Certificate in Engineering (Specialist: Manufacturing Engineering)	500/8270/X
		or	
SQA SVQ Level 2 NVQ Diploma in Performing Engineering Operations	GL63 22	City & Guilds Level 2 Diploma in Engineering	600/0881/7
		or	
Route B (employed Trainees only) – one from:		City & Guilds Level 2 Technical Certificate in Engineering	603/0294/X
• Level 2 NVQ/SVQ Diploma in Performing Engineering Operations (as above)			
• Level 2 NVQ Diploma in Mechanical Manufacturing Engineering		or	
EAL Level 2 NVQ Diploma in Mechanical Manufacturing Engineering	500/9851/2	City & Guilds Level 2 Diploma in Machining - Foundation Knowledge	603/1705/X

Pearson Level 2 NVQ 501/0739/2
Diploma in Mechanical
Manufacturing
Engineering

City & Guilds Level 2 NVQ 501/1802/X
Diploma in Mechanical
Manufacturing
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