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FRAMEWORK

Advanced Manufacturing Engineering (Wales)

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Apprenticeships

Advanced Manufacturing Engineering (Wales)

Contents

Framework summary

Advanced Manufacturing Engineering

Higher Apprenticeship in Advanced Manufacturing Engineering Level 4

Pathways for this framework at level 4 include:

Pathway 1: Aerospace

Competence qualifications available to this pathway:

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture

C2 - *Level 4 NVQ Diploma in Engineering Manufacture

Knowledge qualifications available to this pathway:

K1 - Foundation Degree FdEng in Aeronautical Engineering (Manufacture)

K2 - Pearson BTEC Level 4 HNC Diploma in Aeronautical Engineering

K3 - Foundation Degree FdSc Manufacturing Technology

K4 - Foundation Degree FdEng Aircraft Maintenance

K5 - Foundation Degree Fd Eng in Aeronautical and Manufacturing Engineering

K6 - Pearson BTEC Level 4 Higher National Certificate in Engineering

K7 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering

K8 - Foundation Degree FdEng in Advanced Manufacturing Engineering

K9 - Pearson BTEC Level 5 Higher National Diploma in Engineering

K10 - Pearson BTEC Level 5 Higher National Diploma in Aeronautical Engineering

K11 - Pearson BTEC Level 5 HND Diploma in Manufacturing Engineering

K12 - Pearson BTEC Level 5 HND Diploma in Aeronautical Engineering

K13 - Pearson BTEC Level 4 HNC Diploma in Manufacturing Engineering

Combined qualifications available to this pathway:

N/A

This pathway also contains information on:

- Employee rights and responsibilities
- Essential skills

Pathway 2: Mechanical

Competence qualifications available to this pathway:

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture

C2 - *Level 4 NVQ Diploma in Engineering Manufacture

Knowledge qualifications available to this pathway:

K1 - Foundation Degree FdEng in Mechanical Engineering

K2 - HNC Operations Engineering

K3 - HNC Mechanical Engineering

K4 - HNC Mechanical Technology

K5 - Foundation Degree FdEng in Industrial Engineering

K6 - HNC Mechanical Engineering

K7 - Foundation Degree in Mechanical Engineering
K8 - Foundation Degree in Process Operations and Maintenance
K9 - HNC Mechanical Engineering
K10 - HND Mechanical Engineering
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K12 - Foundation Degree FdSc Mechanical Technology
K13 - Foundation Degree in Casting
K14 - HNC Mechanical Technology
K15 - Foundation Degree FdEng Integrated Engineering
K16 - Foundation Degree FdEng Materials Engineering
K17 - Foundation Degree FdEng Mechanical Engineering
K18 - HNC in Mechanical Engineering
K19 - Pearson BTEC Level 4 Higher National Certificate in Engineering
K20 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering
K21 - FdEng in Advanced Manufacturing Engineering
K22 - Pearson BTEC Level 5 Higher National Diploma in Engineering
K23 - University Certificate in Mechatronics
K24 - Pearson BTEC Level 5 HND Diploma in General Engineering
K25 - Pearson BTEC Level 5 HND Diploma in Mechanical Engineering
K26 - Pearson BTEC Level 5 HND Diploma in Manufacturing Engineering
K27 - Pearson BTEC Level 4 HNC Diploma in Manufacturing Engineering
K28 - Pearson BTEC Level 4 HNC Diploma in General Engineering
K29 - Pearson BTEC Level 4 HNC Diploma in Mechanical Engineering
K30 - HNC in Advanced Manufactuing Operations

Combined qualifications available to this pathway:

N/A

This pathway also contains information on:

- Employee rights and responsibilities
- Essential skills

Pathway 3: Electrical / Electronics

Competence qualifications available to this pathway:

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture
C2 - *Level 4 NVQ Diploma in Engineering Manufacture

Knowledge qualifications available to this pathway:

K1 - Pearson BTEC Level 4 HNC Diploma in Electrical and Electronic Engineering
K2 - Foundation Degree in Electrical/ Electronic Engineering
K3 - Pearson BTEC Level 4 HNC Diploma in Electrical Engineering
K4 - Pearson BTEC Level 4 HNC Diploma in Electronic Engineering
K5 - HNC Electrical/ Electronic Engineering
K6 - HNC Electrical/ Electronic Engineering
K7 - Foundation Degree FdEng in Industrial Engineering
K8 - HNC Electrical/ Electronic Engineering
K9 - Foundation Degree FdSc Electrical and Electronic Technology

K10 - Foundation Degree FdSc Manufacturing Technology
K11 - HNC Mechanical Technology
K12 - HNC Electrical and Electronic Technology
K13 - HNC Electrical and Electronic Engineering
K14 - HNC in Electrical and Electronic Engineering
K15 - Pearson BTEC Level 4 Higher National Certificate in Engineering
K16 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering
K17 - Foundation Degree FdEng in Advanced Manufacturing Engineering
K18 - Pearson BTEC Level 5 Higher National Diploma in Engineering
K19 - University Certificate in Mechatronics
K20 - Pearson BTEC Level 5 HND Diploma in Electrical and Electronic Engineering
K21 - Pearson BTEC Level 5 HND Diploma in Electrical Engineering
K22 - Pearson BTEC Level 5 HND Diploma in Electronic Engineering
K23 - Pearson BTEC Level 4 HNC Diploma in Manufacturing Engineering
K24 - HNC in Advanced Manufacturing Operations
K25 - HND in Electrical and Electronic Engineering

Combined qualifications available to this pathway:

N/A

This pathway also contains information on:

- Employee rights and responsibilities
- Essential skills

Pathway 4: Automotive

Competence qualifications available to this pathway:

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture
C2 - *Level 4 NVQ Diploma in Engineering Manufacture

Knowledge qualifications available to this pathway:

K1 - Foundation Degree FdSc Automotive Management & Technologies
K2 - Pearson BTEC Level 4 HNC Diploma in Electrical and Electronic Engineering
K3 - Foundation Degree FdEng in Industrial Engineering
K4 - Foundation Degree in Automotive Engineering
K5 - Foundation Degree FdSc Manufacturing Technology
K6 - HNC Electrical and Electronic Technology
K7 - Foundation Degree FdEng in Advanced Manufacturing Engineering
K8 - Pearson BTEC Level 5 Higher National Diploma in Engineering
K9 - Pearson BTEC Level 4 Higher National Certificate in Engineering
K10 - Pearson BTEC Level 5 HND Diploma in Manufacturing Engineering
K11 - Pearson BTEC Level 4 HNC Diploma in General Engineering
K12 - Pearson BTEC Level 4 HNC Diploma in Manufacturing Engineering

Combined qualifications available to this pathway:

N/A

This pathway also contains information on:

- Employee rights and responsibilities
- Essential skills

Pathway 5: Maintenance

Competence qualifications available to this pathway:

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture

C2 - *Level 4 NVQ Diploma in Engineering Manufacture

Knowledge qualifications available to this pathway:

K1 - Pearson BTEC Level 4 HNC Diploma in Electrical and Electronic Engineering

K2 - HNC Engineering

K3 - HND Engineering

K4 - HNC Mechanical Engineering

K5 - HNC Electrical/ Electronic Engineering

K6 - Foundation Degree FdEng in Industrial Engineering

K7 - HNC Instrumentation Engineering

K8 - HND Power Systems Engineering

K9 - Foundation Degree Instrumentation and Electrical Engineering

K10 - Foundation Degree FdSc Manufacturing Technology

K11 - HNC in Mechanical Engineering

K12 - HNC in Electrical and Electronic Engineering

K13 - Pearson BTEC Level 4 Higher National Certificate in Engineering

K14 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering

K15 - Foundation Degree FdEng in Advanced Manufacturing Engineering

K16 - Pearson BTEC Level 5 Higher National Diploma in Engineering

K17 - Pearson BTEC Level 5 HND Diploma in Operations Engineering

K18 - Pearson BTEC Level 4 HNC Diploma in General Engineering

K19 - Pearson BTEC Level 4 HNC Diploma in Manufacturing Engineering

K20 - Pearson BTEC Level 4 HNC Diploma in Mechanical Engineering

K21 - Pearson BTEC Level 4 HNC Diploma in Operations Engineering

K22 - HNC in Advanced Manufacturing Operations

Combined qualifications available to this pathway:

N/A

This pathway also contains information on:

- Employee rights and responsibilities
- Essential skills

Pathway 6: Wind Generation

Competence qualifications available to this pathway:

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture

C2 - *Level 4 NVQ Diploma in Engineering Manufacture

Knowledge qualifications available to this pathway:

K1 - Pearson BTEC Level 4 HNC Diploma in Electrical and Electronic Engineering

K2 - Foundation Degree FdEng in Industrial Engineering

K3 - Pearson BTEC Level 4 Higher National Certificate in Engineering

K4 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering

K5 - Pearson BTEC Level 5 Higher National Diploma in Engineering

K6 - Pearson BTEC Level 5 HND Diploma in General Engineering

K7 - Pearson BTEC Level 5 HND Diploma in Operations Engineering

K8 - Pearson BTEC Level 4 HNC Diploma in General Engineering

K9 - Pearson BTEC Level 4 HNC Diploma in Mechanical Engineering

K10 - Pearson BTEC Level 4 HNC Diploma in Operations Engineering

Combined qualifications available to this pathway:

N/A

This pathway also contains information on:

- Employee rights and responsibilities
- Essential skills

Pathway 7: Marine

Competence qualifications available to this pathway:

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture

C2 - *Level 4 NVQ Diploma in Engineering Manufacture

Knowledge qualifications available to this pathway:

K1 - Pearson BTEC Level 4 HNC Diploma in Electrical and Electronic Engineering

K2 - Pearson BTEC Level 4 HNC Diploma in Electrical Engineering

K3 - Pearson BTEC Level 4 HNC Diploma in Electronic Engineering

K4 - Pearson BTEC Level 4 Higher National Certificate in Engineering

K5 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering

K6 - Pearson BTEC Level 5 Higher National Diploma in Engineering

K7 - Pearson BTEC Level 5 HND Diploma in Electrical and Electronic Engineering

K8 - Pearson BTEC Level 5 HND Diploma in Electrical Engineering

K9 - Pearson BTEC Level 5 HND Diploma in Electronic Engineering

K10 - Pearson BTEC Level 5 HND Diploma in General Engineering

K11 - Pearson BTEC Level 4 HNC Diploma in General Engineering

Combined qualifications available to this pathway:

N/A

This pathway also contains information on:

- Employee rights and responsibilities
- Essential skills

Pathway 8: Space Engineering

Competence qualifications available to this pathway:

C1 - Level 4 Extended Diploma in Engineering Manufacture

C2 - *Level 4 NVQ Diploma in Engineering Manufacture

Knowledge qualifications available to this pathway:

K1 - Foundation Degree in Space Engineering

K2 - Pearson BTEC Level 4 Higher National Certificate in Engineering

K3 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering

Combined qualifications available to this pathway:

N/A

This pathway also contains information on:

- Employee rights and responsibilities
- Essential skills

Pathway 9: Rail Engineering

Competence qualifications available to this pathway:

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture

C2 - *Level 4 NVQ Diploma in Engineering Manufacture

Knowledge qualifications available to this pathway:

K1 - Foundation Degree FdEng Railway Engineering

K2 - HNC Railway Engineering

K3 - Pearson BTEC Level 4 HNC Diploma in Electrical and Electronic Engineering

K4 - Pearson BTEC Level 4 HNC Diploma in Electrical Engineering

K5 - Pearson BTEC Level 4 Higher National Certificate in Engineering

K6 - Pearson BTEC Level 4 HNC Diploma in Mechanical Engineering

K7 - Pearson BTEC Level 4 HNC Diploma in Operations Engineering

Combined qualifications available to this pathway:

N/A

This pathway also contains information on:

- Employee rights and responsibilities
- Essential skills

Framework information

Information on the Publishing Authority for this framework:

SEMTA

The Apprenticeship sector for occupations in science, engineering and manufacturing technologies.

Issue number: 13	**This framework includes:**
Framework ID: FR04331	Level 4
Date this framework is to be reviewed by: 31/03/2019	This framework is for use in: **Wales**

Short description

The Higher Apprenticeship framework for Advanced Manufacturing Engineering at Level 4 has been designed to provide the manufacturing and engineering sectors with high grade technicians and engineers who have practical skills, combined with a higher education qualification. This will facilitate progression to Level 5/6 qualifications, including the new Degree Apprenticeship, and enable them to work towards 'Incorporated Engineer' status. Higher Apprentices will undertake higher-level technical occupations in such sectors as aerospace, mechanical, electrical / electronics, automotive, maintenance, wind generation, marine, space and rail engineering.

Contact information

Proposer of this framework

Semta has worked closely with its employers to define National Occupational Standards (NOS). From the NOS, qualifications such as NVQs and Technical Certificates have been developed that are suitable for use within this apprenticeship framework.

This framework has been developed by a Consortium of Manufacturing Sector Skills/Sector Skills Bodies comprising of Semta, Cogent Skills, National Skills Academy Food & Drink (previously Improve and Proskills), and the following companies and their supply chains throughout the UK: BAE Systems, Rolls Royce, Airbus, Aircelle, North West Aerospace Alliance, GKN, John Huddleston Engineering, Auto Marine Cables, E Harding & Sons, Siemens, Jaguar Landrover, Ford, Bentley Motors, National Space Centre, Magna Parva, MBDA, ITP Engines UK, Avanti Communications, COM DEV EUROPE, University of Leicester Space Research Centre, Remploy, Pilkington, The Manufacturing Institute and the National Skills Academy for Rail (NSAR).

This Advanced Manufacturing Engineering framework will ensure that apprentices are given the appropriate skills, knowledge and understanding required in the workplace.

Developer of this framework

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Revising a framework

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Why this framework is being revised

This framework is being revised to:

- Removed ERR qualifications that are no longer available
- Add knowledge qualifications as requested by Awarding Organisations

Summary of changes made to this framework

All pathways

- Two ERR qualifications have been removed

Pathway 2

One knowledge qualification added

Pathway 3

Two knowledge qualifications added

Pathway 5

One knowledge qualification added

Qualifications removed

All pathways:

Pearson BTEC Level 2 Award in WorkSkills for Effective Learning and Employment 501/1793/2
Pearson BTEC Level 3 Award in WorkSkills for Effective Learning and Employment 501/1791/9

Qualifications added

Pathway 2: Mechanical

K30 - HNC in Advanced Manufacturing Operations (University of Wales (Trinity St Davids))

Pathway 3: Electrical / Electronic

K24 - HNC in Advanced Manufacturing Operations (University of Wales (Trinity St Davids))

K25 - HND in Electrical and Electronic Engineering (University of Wales (Trinity St Davids))

Pathway 5: Maintenance

K22 - HNC in Advanced Manufacturing Operations (University of Wales (Trinity St Davids))

Qualifications that have been extended

None

Purpose of this framework

Summary of the purpose of the framework

The Higher Apprenticeship framework for Advanced Manufacturing Engineering at Level 4 has been designed to provide the manufacturing and engineering sector in Wales with high grade technicians and engineers who have practical skills, combined with a higher education qualification. The programme will facilitate progression to Level 5/6 qualifications and enable apprentices to work towards Incorporated Engineer status.

The manufacturing sector is broader than the remit of any single Sector Skills Council (SSC), therefore we have worked together as a consortium of SSCs/SSBs to address this important skills need:

Cogent: chemical manufacturing, nuclear science, oil and gas extraction (also includes process technology, bioscience, polymer and sign making)

The National Skills Academy for Food & Drink:
Former Improve sector**:** food and drink manufacturing and processing
Former Proskills sector: printing, mineral extraction and processing, health and safety and process and manufacturing of furniture, glass, ceramics, coatings and paper (also includes glazing, building products, wood and mining)

Semta: Science, engineering and manufacturing

Profile of the Advanced Manufacturing Engineering sector in Wales

Sector employment and establishments
The Advanced Manufacturing sector in Wales is made up of 5,855 establishments, with the vast majority (>99%) being classed as micro, small or medium-sized. The sector employs almost 100,000 people in total, with around 32,000 in process, plant and machine operative occupations, 21,000 in skilled trades occupations and almost 7,400 in associate professional and technical roles. In total, of almost 80,000 workers whose qualification levels are known there are around 12,000 qualified to first degree Level 6 and over 4,500 qualified to higher levels.

The main sub-occupations within the higher-level technical occupations are:

- Technicians - engineering technicians, draughtspersons, laboratory technicians, electrical and electronics technicians and quality assurance technicians
- Professionals – mechanical engineers, electrical engineers, design and development

engineers, production and process engineers and planning and quality control engineers
- Managers – production, works and maintenance managers, research and development managers and quality assurance managers

At all skill levels the workforce is largely male and white, and it is ageing. In the calendar year of 2017 there were over 100 AME sector technical roles advertised which required applicants to be qualified at Level 4 or above; of these, over half were degree Level 6 or higher.

Welsh speaking apprentices may have opportunities to learn through the medium of the Welsh language. A Good Practice Guide for sector and standard setting bodies has been published by the Welsh Government to assist in determining the demand for Welsh language skills, Welsh translations of national occupational standards and vocational qualifications through the medium of Welsh. The guide can be found on the Welsh Government website at:

http://wales.gov.uk/topics/educationandskills/qualificationsin_wales/welshmedium/welshmediumguidance/

Challenges facing the Advanced Manufacturing sector in Wales

In common with the AME sector in other parts of the United Kingdom, high skill levels are likely to become more in demand in the coming years as new technologies and ways of working become more widely embedded.

This means that between 2018-24 there will be an expected increase of around 700 in the numbers working in AME in Wales who are qualified to Level 4, an increase of around 300 in those qualified to Level 5, an increase in 2,000 in the numbers qualified to Level 6 and an increase of around 100 in the numbers qualified to Level 7; there will also be a small (<20) increase in the numbers qualified to Level 8.

Across AME sub-sectors in Wales, there will be a general increase in the proportion of workers employed in professional occupations by 2024. For example, in the marine sub-sector the proportion of workers in professional roles will increase from 10.8% in 2014 to 11.9% by 2024; in aerospace, from 11.2% to 12.4%; and in automotive from 5.4% to 6.4%. There will also be increases in the numbers employed in associate professional and technical roles, and in managerial roles, across the sector.

The most recent government data on skills shortage vacancies shows that in 2015 Welsh manufacturing employers had a skills shortage vacancy incidence of 31%, with 600 vacancies in total. The sector also had the highest density of skills gaps of any sector. The 2017 data has yet to be published but an analysis of job vacancies over the years 2016-7 indicates that a relatively high skills shortage vacancy incidence in Welsh manufacturing continues.

Employers and Professional Institutions are supporting this Level 4 Higher Apprenticeship in Advanced Manufacturing because it:

- has been designed with the help of employers, using the set of competencies for Incorporated Engineers produced by the Engineering Council in its UK Specification document that most closely meet their needs for higher level Engineering Technicians, Incorporated Technicians and Chartered Engineers
- acts as an alternative entry route into the sector, attracting a more diverse range of applicants with a range of skillsets and will help to address the issues of an aging workforce
- provides a cost effective, comprehensive package of qualifications, rather than using stand alone qualifications
- provides a progression route from the Level 4 Higher Apprenticeship in Advanced Manufacturing to aid retention
- is endorsed by IMechE, IET and the Royal Aeronautical Society (RAeS) to meet their sectors' needs for professional registration as Incorporated Engineer.

The lack of employees with higher level qualifications in the Welsh AME sector will have a significant impact on Wales' ability to meet the skills needs of high-profile, high-value projects such as the Swansea Bay Tidal Lagoon. 13% of the job roles for that project are forecast to be at NVQ Level 4, and a recent report suggested that without concerted action Wales might only meet a little over half of the total skills needs of the project itself. Other significant projects include the Western Rail Access Scheme and the Automotive Technology Park; the arrival in Wales of high profile engineering companies like Aston Martin and the continual development of anchor companies such as Sony, Ford and Airbus, along with enabling employers to develop a workforce with the digital skills to embrace the technology required for Industry 4.0.

In order to meet the challenges to fill higher-level occupational skills gaps, manufacturing employers have increased training activity/spend or they are increasing and expanding trainee programmes, such as apprenticeships. The Welsh Government also has in place a policy to create 100,000 new apprenticeship places by 2020, while advanced manufacturing and engineering is set to play a key role in the developing Industrial Strategy.

The Space Engineering Industry is worth a massive £9.1 billion to the UK economy every year and is currently growing at a rate of 7.5%. The Higher Apprenticeship in Space Engineering will help to sustain this growth – direct consultation with the industry has shown that there is a need for new entrants to take advantage of the growing opportunities in the sector and our programme will deliver these personnel.

Rail in the UK economy is a key economic enabler and is determined to further improve its support for the economy. The Eddington Study1 identified three key transport markets that are crucial to the productivity and competitiveness of the economy:

- Urban areas and their catchments
- Inter-urban corridors showing signs of congestion and unreliability
- International links via ports and airports showing signs of congestion and unreliability

Rail has a role in each of these markets. It can provide reliable, high levels of accessibility along the main transport corridors in the country and to the locations that drive economic growth. Rail supports the economies of London and the wider South East region, other towns and cities of Britain, our industries and their markets, our tourist and leisure destinations, and our ports and airports. Rail freight makes a significant contribution to the economy by supporting key industrial sectors and is also penetrating other markets where it can serve the trunk-haul function for distribution of other products. Rail engineering skills form a vital component of maintaining and improving the rail infrastructure in Wales.

The competence and knowledge qualifications in this framework contribute to general competence as measured in the Engineering Council's UK specification and is endorsed by IMechE, IET and the Royal Aeronautical Society (RAeS).

There are currently nine pathways in this framework covering a wide range of job roles in advanced manufacturing and engineering and which broadly fit into the higher-level skills requirements for the following sectors:

- Aerospace
- Mechanical
- Electrical/Electronics
- Maintenance
- Automotive
- Wind Generation
- Marine
- Space Engineering
- Rail Engineering

Aims and objectives of this framework (Wales)

To provide the engineering manufacturing and engineering sectors in Wales with high grade technicians and engineers who possess practical skills, combined with a higher education qualification to meet the environmental skills needs of employers and to help them to improve productivity and remain competitive.

Further objectives are to:

- provide apprentices with the technical knowledge, skills and competence at Level 4 in one framework to operate at higher technician level in manufacturing and engineering
- attract learners who wish to gain a higher education qualification while receiving a salary through a work based learning route
- attract learners from diverse backgrounds to help address the equality and diversity challenges faced by the sector, including those of an aging workforce
- develop apprentices employability skills making them more attractive to all employers

whichever career they choose
- help improve recruitment and retention rates within the industry by offering appropriate career progression into high level jobs and training, working towards Engineering Technician (Eng Tech) status and Incorporated Engineer (IEng) status
- act as essential preparation for those who will eventually operate at Level 4, 5 and 6

Entry conditions for this framework

Employers wish to attract applicants who have an interest in working in a manufacturing/ engineering environment at technician level and who come from a diverse range of backgrounds with a wide range of experience, achievements or qualifications.

Please note: Applicants for this framework need to be 18+ years

Entry to this framework is flexible so that applicants:

- may have variety of qualifications such as A Levels, Certificate/Diploma in Engineering, Apprenticeship in Engineering or
- without formal qualifications can show, possibly through a portfolio, that they have the potential to complete this apprenticeship, through having previously worked in the sector at Level 3 or
- they are currently employed in the sector and are looking for personal development and career progression.

Learners who have completed the Welsh Baccalaureate may have completed units or short courses which will provide underpinning knowledge towards the Apprenticeship. This will be assessed during an initial assessment allowing Recognition of Prior Learning (RPL), where appropriate.

Initial assessment
It is highly likely that applicants will be asked to undertake a variety of tests which will include English, Maths, spatial awareness and problem solving, supported by an interview. These are not a meant as a barrier to entry but more to gauge the ability of the applicant to achieve the programme and to tailor the individual learning plan to meet their needs and those of the employer. In some cases, employers may wish to recruit apprentices who have the ability to eventually undertake a Level 6 apprenticeship, who would start initially at Level 4. Under these circumstances, candidates would need to have appropriate A levels or other relevant qualifications that would allow them entry to Higher Education at Level 6.

Rules to avoid the need to repeat qualifications
Processes exist to make sure that applicants with prior knowledge, qualifications and/or experience are not disadvantaged by having to repeat learning. Training providers, Colleges and Awarding Organisations will be able to advise applicants on the current rules for accrediting prior learning and recognising prior experience. Proxies for any qualifications are listed at the front of this framework, and providers are encouraged to identify additional on-the-job training programmes that customise the learning to the new workplace.

It is understood that where applicants have accredited prior learning that apprentices must be offered training which helps them to develop new skills and learning at a higher level.

Essential Skills Wales

Apprentices registered on a SASW Apprenticeship on or after 1st January 2016 must complete the required mandatory new Essential Skills Qualifications (ESQ) at Level 2: Essential Communication Skills and Essential Application of Number Skills and Essential Digital Literacy Skills.

Apprentices who have enrolled prior to 31st December 2015 can continue to work towards either Key Skills / Essential Skills Wales (AON, Comms, and ICT / Digital Literacy) as required by the framework, which will be accepted within SASW.

For apprentices registered on or after 14th October 2016, recognised proxies for the new ESQ qualifications are accepted - these are listed in the front of this framework document. This includes a wider range of exemption qualifications and the new equivalent numerically graded GCSEs, together with the Welsh Baccalaureate Qualification (WBQ) with ESQ and GCSE components. Candidates undertaking the new WBQ will not be required to provide individual certificates as evidence.

Apprenticeship starts before the 14th October 2016 must continue to meet the 2013 SASW requirements for Essential Skills. Essential Skills Wales qualifications achieved in the context of the Welsh Baccalaureate Qualification (WBQ) can be accepted as long as the specific certification of the title(s) and level(s) of those ESW/ESQ qualifications is provided. The WBQ certificate itself does not provide this specific evidence.

Knowledge qualifications

If applicants already have the knowledge qualification at Level 4 (see qualifications pages) before starting their apprenticeship, they may count this and will not have to repeat the qualification, providing they have achieved this within five years of starting the apprenticeship. The training hours that were spent gaining the qualification may be counted towards the total training hours for the apprenticeship.

Competence qualifications

If applicants have already achieved the NVQ Level 4 Extended Diploma in Engineering Manufacture or one of the competence qualifications at Level 4 (see competence qualifications page) before starting their apprenticeship, they may count this and will not have to repeat the qualification providing they have achieved this qualification within five years of starting their

apprenticeship. The hours that were spent gaining the competence qualification may be counted towards the total hours for the apprenticeship.

It is important that there is agreement between the employer and the apprentice that the applicant is currently competent.

If however they have no record of competence, they will have to undertake the relevant competence qualification as a prerequisite before undertaking the competencies described within the UK Spec.

Wider Key Skills
Wider Key Skills qualifications are no longer required for this framework.

Note: Apprentices already registered on an earlier framework can have Wider Key Skills qualifications previously attained in the context of the Welsh Baccalaureate Qualification (WBQ) accepted, provided the specific proof of certification of the title(s) and level(s) of those qualifications is provided. The WBQ certificate does not provide this specific evidence.

Prior experience in the sector
Applicants that are already working in the sector or who have recently worked in the sector, can apply to have their experience formally recognised by an awarding organisation and this will count towards the qualification(s) in this framework.

Level 4

Title for this framework at level 4

Higher Apprenticeship in Advanced Manufacturing Engineering Level 4

Pathways for this framework at level 4

Pathway 1:	Aerospace
Pathway 2:	Mechanical
Pathway 3:	Electrical / Electronics
Pathway 4:	Automotive
Pathway 5:	Maintenance
Pathway 6:	Wind Generation
Pathway 7:	Marine
Pathway 8:	Space Engineering
Pathway 9:	Rail Engineering

Level 4, Pathway 1: Aerospace

Description of this pathway

1. Level 4 NVQ Extended Diploma in Engineering Manufacture - **for use with 18 to 24 year olds only or as an option for 25+**

Aerospace: Minimum credit value: 245 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,163
- Competence = 461 hours/ 107 credits
- Knowledge = minimum 368 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3)/18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 332 Hours Year 2 = 332 Hours Year 3= 332 Hours Year 4 = 167 Hours

Minimum off-the-job training hours = 702 training hours
Knowledge - minimum of 368 training hours plus 334 additional training hours for Essential Skills and Mentoring.

2. Level 4 NVQ Diploma in Engineering Manufacture - **for use with 25 years and over only**

Note: This NVQ Diploma qualification is for adult apprentices 25 years and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with relevant health and safety training.

Aerospace: Minimum credit value: 218 credits
Pathway duration approximately 42 months depending on the qualification and unit options

selected

Pathway with minimum total training hours = 1,040

- Competence = 338 hours/ 80 credits
- Knowledge = minimum 368 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3)/18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 297 Hours Year 2 = 297 Hours Year 3= 297 Hours Year 4 = 149 Hours

Minimum off-the-job training hours = 702 training hours

Knowledge - minimum of 368 training hours plus 334 additional training hours for Essential Skills and Mentoring.

Entry requirements for this pathway in addition to the framework entry requirements

There are no additional requirements other than the general entry conditions

Job title(s)	Job role(s)
Electrical /Electronics Engineering Senior Technician (Aerospace Computer Systems)	Development, manufacture and testing of electrical / electronic components for use in aerospace platforms, including instrumentation & power systems, ensuring compliance with relevant standards and quality requirements
Software Engineering Senior Technician (Aerospace Computer Systems)	Development, coding, testing and implementation of software systems & protocols for use in aerospace platforms
Systems Engineering Senior Technician (Aerospace Computer Systems)	Development, implementation and testing of aircraft systems for use in cockpit, power, and distributed computing, ensuring compliance with relevant standards and quality requirements
Electrical/ Electronics Senior Technician	Design, building and testing of aerospace integrated electronic systems ensuring compliance with relevant standards and quality requirements
Software Senior Technician	Software design, verification and testing of aerospace avionic and instrumentation software packages
Systems Senior Technician	Design, assembly and test of avionic integrated systems, programmes and components
Systems Operations Senior Technician	Customer-facing aerospace operational electrical and avionic testing and fault finding
Aircraft Systems Development Senior Technician	Development of design specifications, prototyping and testing of new aircraft systems: mechanical, electrical, avionic, electronic, pneumatic or hydraulic
Manufacturing Senior Technician	Development and optimisation of manufacturing processes and systems to meet aerospace manufacturing requirements
Senior Quality Technician	Implementation and compliance with AS9100 and AS9102 aerospace quality assurance systems. Responsible for resolving quality issues that may result in non-compliance or late delivery
Senior Design Technician	Design, test, and supervise the manufacture of aircraft, spacecraft, and missiles. Disciplines include aerodynamics, propulsion, avionics, material science, structural analysis and advanced manufacturing

Qualifications

Competence qualifications available to this pathway

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C1a	600/9529/5	City & Guilds	107	461	
C1b	600/9576/3	EAL	107	461	

C2 - *Level 4 NVQ Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C2a	600/9486/2	EAL	80	338	

Knowledge qualifications available to this pathway

K1 - Foundation Degree FdEng in Aeronautical Engineering (Manufacture)					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K1a	N/A	Glyndwr University	240	N/A	

Knowledge qualifications available to this pathway (cont.)

K2 - Pearson BTEC Level 4 HNC Diploma in Aeronautical Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K2a	500/8992/4	Pearson	120	480	

K3 - Foundation Degree FdSc Manufacturing Technology					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K3a	N/A	Staffordshire University	N/A	N/A	

K4 - Foundation Degree FdEng Aircraft Maintenance					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K4a	N/A	Glyndwr University	N/A	N/A	

K5 - Foundation Degree Fd Eng in Aeronautical and Manufacturing Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K5a	N/A	Swansea University via Coleg Cambria	N/A	N/A	

Knowledge qualifications available to this pathway (cont.)

K6 - Pearson BTEC Level 4 Higher National Certificate in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K6a	603/0450/9	Pearson	120	480	

K7 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K7a	603/0485/6	Pearson	120	480	

K8 - Foundation Degree FdEng in Advanced Manufacturing Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K8a	N/A	Swansea University via Coleg Cambria	240	N/A	

K9 - Pearson BTEC Level 5 Higher National Diploma in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K9a	603/0451/0	Pearson	240	960	

Knowledge qualifications available to this pathway (cont.)

K10 - Pearson BTEC Level 5 Higher National Diploma in Aeronautical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K10a	603/0484/4	Pearson	240	960	

K11 - Pearson BTEC Level 5 HND Diploma in Manufacturing Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K11a	500/8828/2	Pearson	240	980	

K12 - Pearson BTEC Level 5 HND Diploma in Aeronautical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K12a	500/8991/2	Pearson	240	980	

K13 - Pearson BTEC Level 4 HNC Diploma in Manufacturing Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K13a	500/8829/4	Pearson	120	480	

Combined qualifications available to this pathway

N/A

Relationship between competence and knowledge qualifications

***Level 4 NVQ Diploma in Engineering Manufacture - is for use by 25 years+ only (see below)**

K1 - K13 provide underpinning knowledge for C1 and C2

The designated Foundation Degrees and Technical Certificates underpin the knowledge elements of the competence qualification in this pathway. The knowledge qualifications deliver essential underpinning knowledge which supports the fundamental scientific and mathematical principles that equip apprentices with the understanding required to operate effectively and efficiently at a high level within this sub-sector.

Employers will select the knowledge qualification relevant to the job role of the Higher Apprentice. Note that Maths options must be included as part of the knowledge qualifications as this is a requirement of the job.

Higher Apprentices (age 18 to 24 years) must complete Level 4 NVQ Extended Diploma in Engineering Manufacture. However, if the relevant PEO units have already been achieved and certificated in a previous programme, for example applicants who have completed a Level 3 NVQ Extended Diploma as part of the Engineering Manufacture Level 3 framework, then they will be able to accredit these against the requirements of the Level 4 Extended Diploma.

*** Note:** The Level 4 NVQ Diploma in Engineering Manufacture may be used by adult apprentices 25 years old and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with the relevant health and safety training.

Assessment of the units in the competency qualification should be carried out in line with: 'The units must be assessed in a work environment and must be assessed in accordance with the Common Requirements for National Vocational Qualifications (NVQ)' which can be downloaded from Semta's website.

Additional assessment requirements have been published by Semta. These additional assessment requirements are set down in Semta's Engineering NVQ unit assessment strategy which can also be downloaded from Semta's website.

Delivery methods for knowledge based qualifications may vary, from a conventional college-based environment, to delivery through a combination of this and

written/web-based/distance learning materials.

Transferable skills (Wales)

Essential skills (Wales)

Subject	Minimum Level
Communication	2
Application of numbers	2
ICT/Digital literacy	2

For a full list of available proxies for starts on or after 14th October 2016 please see section 35 of the current SASW.

Progression routes into and from this pathway

Progression routes into the pathway include those who have:

- A or AS levels in Science, Technology, Engineering or Mathematics subjects and GCSEs in English, Maths and Science - grade C (new equivalent grade 4) or above or
- a Welsh Baccalaureate or
- completed a Level 3 Engineering Apprenticeship or have completed a 14 to 19 Advanced Diploma in Engineering or Manufacturing or
- previous work experience or employment in engineering at Level 3 or
- other relevant qualifications, experience or skills as given in the entry conditions.

It is a requirement that entrants should have completed the Essential Skills in Communication and Application of Number at Level 2 on entry to the framework. The industry has stated that Digital Literacy is relevant to effective performance and included in the required Essential Skills at Level 2. They could be also be obtained through achieving the recognised proxies for the new ESQ qualifications.

Essential Skills Wales qualifications achieved in the context of the Welsh Baccalaureate Qualification (WBQ) can be accepted, provided the specific certification of the title(s) and level(s) of those ESW/ESQ qualifications is provided.

Progression from this pathway for those who have completed a Higher Apprenticeship in Advanced Manufacturing Engineering (Aerospace):

- progression to the new Degree Apprenticeship in Manufacturing Engineering at Level 6
- progression to the Higher Apprenticeship framework for Advanced Manufacturing Engineering at Level 6 Please note that there is no Level 5 Higher Apprenticeship

programme
- employment as a technician in aerospace engineering in a variety of job roles and functions (see job roles).

This Apprenticeship provides excellent preparation towards professional registration as an Engineering Technician and progression to Incorporated Engineer registration via the Degree Apprenticeship or Level 6 frameworks. It may also, where appropriate, provide progression to a range of honours degrees.

To further assist apprentices plan their careers we recommend they visit the following websites:

www.ucas.ac.uk/

www.engc.org.uk/

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

Professional recognition
The Institution of Mechanical Engineers (IMechE), the Institution of Engineering and Technology (IET) and the Royal Aeronautical Society (RAeS) recognise that this apprenticeship pathway provides the necessary skills, knowledge and experience to allow apprentices to apply for Engineering Technician status within their institutions. The apprenticeship does not confer automatic membership of any of these institutions as an Engineering Technician. Apprentices are free to apply to the institution of their choice and engage the process of registration. Please note each institution will charge a registration fee, details of these are available through the weblinks below.

aerosociety.com/

www.theiet.org/

www.imeche.org/

UCAS points for this pathway:

(No requirement specified)

Employee rights and responsibilities

Employee Rights and Responsibilities (ERR) is no longer compulsory, but Semta recommends that all apprentices receive it as part of their induction.

There are two methods of achieving ERR as set out below:

Method 1 - Qualifications

City & Guilds have produced a stand-alone qualification that can cover all 9 outcomes of ERR requirements.

Qualification details:
City & Guilds Level 2 Subsidiary Award in Employment and Personal Learning at Work
600/2819/1
Credit value: 2 credits
Training hours: 15

These qualifications will enable apprentices to both know and understand the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being. Apprentices achieving the qualifications will have demonstrated that they have the underpinning knowledge relevant for the engineering/manufacturing environment which satisfies the Specification for Apprenticeship Standards for Wales.

Method 2 - Workbook

Semta has produced an Apprentice ERR workbook that is available from:
customercare@eal.org.uk

The requirements for completing it must be explained to the apprentice right at the start of their training in order that they may take full advantage of their *company induction where significant amounts of information towards the national outcomes will be covered. The workbook is intended to enable apprentices to know, understand and record the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being.

***Please note:** All apprentices must receive a company induction programme.

Additional employer requirements

(No requirement specified)

Level 4, Pathway 2: Mechanical

Description of this pathway

1. Level 4 NVQ Extended Diploma in Engineering Manufacture - **for use with 18 to 24 year olds only or as an option for 25+**

Mechanical: Minimum credit value = 245 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,190

- Competence = 461 hours/ 107 credits
- Knowledge = minimum 395 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3) /18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 340 Hours Year 2 = 340 Hours Year 3= 340 Hours Year 4 = 170 Hours

Minimum off-the-job training hours = 729 training hours
Knowledge - minimum of 395 training hours plus 334 additional training hours for Essential Skills and Mentoring.

2. Level 4 NVQ Diploma in Engineering Manufacture - **for use with 25 years and over only**

Note: This NVQ Diploma qualification is for adult apprentices 25 years and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with relevant health and safety training.

Mechanical: Minimum credit value: 218 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,067

- Competence = 338 hours/ 80 credits
- Knowledge = minimum 395 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3)/18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 305 Hours Year 2 = 305 Hours Year 3= 305 Hours Year 4 = 152 Hours

Minimum off-the-job training hours = 729 training hours
Knowledge - minimum of 395 training hours plus 334 additional training hours for Essential Skills and Mentoring.

Entry requirements for this pathway in addition to the framework entry requirements

There are no additional requirements other than the general entry conditions

Job title(s)	Job role(s)
Manufacturing Senior Technician	Set up complex CNC production processing facilities for manufacturing operations, ensuring wherever possible these are as 'lean' as possible.
Senior Controls Technician (Mechanical Testing)	Work with other engineers and managers to discuss and develop rigs and systems design and support, to ensure smooth running of projects and effective delivery of the mechanical testing process
Senior Production Technician	Supervise and provide technical guidance to quality inspectors and junior engineering staff. Provide technical support to production and assist with product development. Solve technical issues within company and sub-contractors, suppliers and customers
Mechanical Systems Senior Technician	Apply scientific and mathematical principles to the design, manufacture and operation of efficient machines, processes and systems
Senior Quality Technician	Develop and define project quality programme and plans, ensure continuous and effective operation of project quality performance and plans, perform project quality assurance auditing of contractors and suppliers
Senior Environmental Test Technician (Defence)	Carry out and report on tests carried out on products to determine life cycles, safely compliance, environmental impact and customer specification requirements

Qualifications

Competence qualifications available to this pathway

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C1a	600/9529/5	City & Guilds	107	461	
C1b	600/9576/3	EAL	107	461	

C2 - *Level 4 NVQ Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C2a	600/9486/2	EAL	80	338	

Knowledge qualifications available to this pathway

K1 - Foundation Degree FdEng in Mechanical Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K1a	N/A	Swansea University via Gower College Swansea	240	N/A	

Knowledge qualifications available to this pathway (cont.)

K2 - HNC Operations Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K2a	N/A	University of Wales, Newport	150	750	

K3 - HNC Mechanical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K3a	N/A	University of Wales: Trinity St Davids	160	1600	

K4 - HNC Mechanical Technology

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K4a	N/A	Glyndwr University via Deeside College	150	576	

K5 - Foundation Degree FdEng in Industrial Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K5a	N/A	Glyndwr University	N/A	N/A	

Knowledge qualifications available to this pathway (cont.)

K6 - HNC Mechanical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K6a	N/A	University of Wales: Trinity St Davids (via SMU campus)	160	420	

K7 - Foundation Degree in Mechanical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K7a	N/A	University of Wales: Trinity St Davids (via Pembrokeshire College)	N/A	N/A	

K8 - Foundation Degree in Process Operations and Maintenance

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K8a	N/A	University of Wales: Trinity St Davids (via Pembrokeshire College)	N/A	N/A	

K9 - HNC Mechanical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K9a	N/A	University of South Wales	120	N/A	

Knowledge qualifications available to this pathway (cont.)

K10 - HND Mechanical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K10a	N/A	University of South Wales	240	N/A	

K11 - Foundation Degree FdSc Manufacturing Technology

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K11a	N/A	Staffordshire University	N/A	N/A	

K12 - Foundation Degree FdSc Mechanical Technology

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K12a	N/A	Staffordshire University	N/A	N/A	

K13 - Foundation Degree in Casting

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K13a	N/A	Leeds Metropolitan University via Bradford College	N/A	N/A	

Knowledge qualifications available to this pathway (cont.)

K14 - HNC Mechanical Technology

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K14a	N/A	Glyndwr University via Coleg Menai	150	576	

K15 - Foundation Degree FdEng Integrated Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K15a	N/A	Sheffield Hallam University	N/A	N/A	

K16 - Foundation Degree FdEng Materials Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K16a	N/A	Sheffield Hallam University	N/A	N/A	

K17 - Foundation Degree FdEng Mechanical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K17a	N/A	Sheffield Hallam University	N/A	N/A	

Knowledge qualifications available to this pathway (cont.)

K18 - HNC in Mechanical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K18a	N/A	University Of Wales Trinity St David	120	1200	

K19 - Pearson BTEC Level 4 Higher National Certificate in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K19a	603/0450/9	Pearson	120	480	

K20 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K20a	603/0485/6	Pearson	120	480	

K21 - FdEng in Advanced Manufacturing Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K21a	N/A	Swansea University via Coleg Cambria	240	N/A	

Knowledge qualifications available to this pathway (cont.)

K22 - Pearson BTEC Level 5 Higher National Diploma in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K22a	603/0451/0	Pearson	240	960	

K23 - University Certificate in Mechatronics

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K23a	N/A	University of South Wales	60	600	

K24 - Pearson BTEC Level 5 HND Diploma in General Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K24a	500/8825/7	Pearson	240	980	

K25 - Pearson BTEC Level 5 HND Diploma in Mechanical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K25a	500/8826/9	Pearson	240	980	

Knowledge qualifications available to this pathway (cont.)

K26 - Pearson BTEC Level 5 HND Diploma in Manufacturing Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K26a	500/8828/2	Pearson	240	980	

K27 - Pearson BTEC Level 4 HNC Diploma in Manufacturing Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K27a	500/8829/4	Pearson	120	480	

K28 - Pearson BTEC Level 4 HNC Diploma in General Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K28a	500/8827/0	Pearson	120	480	

K29 - Pearson BTEC Level 4 HNC Diploma in Mechanical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K29a	500/8824/5	Pearson	120	480	

Knowledge qualifications available to this pathway (cont.)

K30 - HNC in Advanced Manufactuing Operations					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K30a	N/A	University of Wales (Trinity St Davids)	120	N/A	N/A

Combined qualifications available to this pathway

N/A

Relationship between competence and knowledge qualifications

***Level 4 NVQ Diploma in Engineering Manufacture - for use by 25 years+ only (see below)**

K1 - K30 provide underpinning knowledge for C1 and C2

The designated Foundation Degrees and Technical Certificates underpin the knowledge elements of the competence qualification in this pathway. The knowledge qualifications deliver essential underpinning knowledge which supports the fundamental scientific and mathematical principles that equip apprentices with the understanding required to operate effectively and efficiently at a high level within this sub-sector.

Employers will select the knowledge qualification relevant to the job role of the Higher Apprentice. Note that Maths options must be included as part of the knowledge qualifications as this is a requirement of the job.

Higher Apprentices (age 18 to 24 years) must complete Level 4 NVQ Extended Diploma in Engineering Manufacture. However, if the relevant PEO units have already been achieved and certificated in a previous programme, for example applicants who have completed a Level 3 NVQ Extended Diploma as part of the Engineering Manufacture Level 3 framework, then they will be able to accredit these against the requirements of the Level 4 Extended Diploma.

*** Note:** The Level 4 NVQ Diploma in Engineering Manufacture may be used by adult apprentices 25 years old and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with the relevant health and safety training.

Assessment of the units in the competency qualification should be carried out in line with: 'The units must be assessed in a work environment and must be assessed in accordance with the Common Requirements for National Vocational Qualifications (NVQ)' which can be downloaded from Semta's website.

Additional assessment requirements have been published by Semta. These additional assessment requirements are set down in Semta's Engineering NVQ unit assessment strategy which can also be downloaded from Semta's website.

Delivery methods for knowledge based qualifications may vary, from a conventional college-based environment, to delivery through a combination of this and

written/web-based/distance learning materials.

Transferable skills (Wales)

Essential skills (Wales)

Subject	Minimum Level
Communication	2
Application of numbers	2
ICT/Digital literacy	2

For a full list of available proxies for starts on or after 14th October 2016 please see section 35 of the current SASW.

Progression routes into and from this pathway

Progression routes into the pathway include those who have:

- A or AS levels in Science, Technology, Engineering or Mathematics subjects and GCSEs in English, Maths and Science - grade C (new equivalent grade 4) or above or
- a Welsh Baccalaureate or
- completed a Level 3 Engineering Apprenticeship or have completed a 14 to 19 Advanced Diploma in Engineering or Manufacturing or
- previous work experience or employment in engineering at Level 3 or
- other relevant qualifications, experience or skills as given in the entry conditions.

It is a requirement that entrants should have completed the Essential Skills in Communication and Application of Number at Level 2 on entry to the framework. The industry has stated that Digital Literacy is relevant to effective performance and included in the required Essential Skills at Level 2. They could be also be obtained through achieving the recognised proxies for the new ESQ qualifications.

Essential Skills Wales qualifications achieved in the context of the Welsh Baccalaureate Qualification (WBQ) can be accepted, provided the specific certification of the title(s) and level(s) of those ESW/ESQ qualifications is provided.

Progression from this pathway for those who have completed a Higher Apprenticeship in Advanced Manufacturing Engineering (Mechanical):

- progression to the new Degree Apprenticeship in Manufacturing Engineering at Level 6
- progression to the Higher Apprenticeship framework for Advanced Manufacturing Engineering at Level 6

Please note that there is no Level 5 Higher Apprenticeship programme

- employment as a technician in mechanical engineering in a variety of job roles and functions (see job roles).

This Apprenticeship provides excellent preparation towards professional registration as an Engineering Technician and progression to Incorporated Engineer registration via the Degree Apprenticeship or Level 6 frameworks.It may also, where appropriate, provide progression to a range of honours degrees.

To further assist apprentices plan their careers we recommend they visit the following websites:

www.ucas.ac.uk/

www.engc.org.uk/

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

Professional recognition
The Institution of Mechanical Engineers (IMechE), the Institution of Engineering and Technology (IET) and the Royal Aeronautical Society (RAeS) recognise that this apprenticeship pathway provides the necessary skills, knowledge and experience to allow apprentices to apply for Engineering Technician status within their institutions. The apprenticeship does not confer automatic membership of any of these institutions as an Engineering Technician. Apprentices are free to apply to the institution of their choice and engage the process of registration. Please note each institution will charge a registration fee, details of these are available through the weblinks below.

aerosociety.com/

www.theiet.org/

www.imeche.org/

UCAS points for this pathway:

(No requirement specified)

Employee rights and responsibilities

Employee Rights and Responsibilities (ERR) is no longer compulsory, but Semta recommends that all apprentices receive it as part of their induction.

There are two methods of achieving ERR as set out below:

Method 1 - Qualifications

City & Guilds have produced a stand-alone qualification that can cover all 9 outcomes of ERR requirements.

Qualification details:
City & Guilds Level 2 Subsidiary Award in Employment and Personal Learning at Work
600/2819/1
Credit value: 2 credits
Training hours: 15

These qualifications will enable apprentices to both know and understand the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being. Apprentices achieving the qualifications will have demonstrated that they have the underpinning knowledge relevant for the engineering/manufacturing environment which satisfies the Specification for Apprenticeship Standards for Wales.

Method 2 - Workbook

Semta has produced an Apprentice ERR workbook that is available from:
customercare@eal.org.uk

The requirements for completing it must be explained to the apprentice right at the start of their training in order that they may take full advantage of their *company induction where significant amounts of information towards the national outcomes will be covered. The workbook is intended to enable apprentices to know, understand and record the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being.

***Please note:** All apprentices must receive a company induction programme.

Additional employer requirements

(No requirement specified)

Level 4, Pathway 3: Electrical / Electronics

Description of this pathway

1. Level 4 NVQ Extended Diploma in Engineering Manufacture - **for use with 18 to 24 year olds only or as an option for 25+**

Electrical/Electronics: Minimum credit value = 245 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,198

- Competence = 461 hours/ 107 credits
- Knowledge = minimum 403 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3) /18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 342 Hours Year 2 = 342 Hours Year 3= 342 Hours Year 4 = 172 Hours

Minimum off-the-job training hours = 737 training hours
Knowledge - minimum of 403 training hours plus 334 additional training hours for Essential Skills and Mentoring.

2. Level 4 NVQ Diploma in Engineering Manufacture - **for use with 25 years and over only**

Note: This NVQ Diploma qualification is for adult apprentices 25 years and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with relevant health and safety training.

Electrical/Electronics: Minimum credit value: 218 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,075

- Competence = 338 hours/ 80 credits
- Knowledge = minimum 403 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3)/18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 307 Hours Year 2 = 307 Hours Year 3= 307 Hours Year 4 = 154 Hours

Minimum off-the-job training hours = 737 training hours
Knowledge - minimum of 403 training hours plus 334 additional training hours for Essential Skills Wales, ERR and Mentoring.

Entry requirements for this pathway in addition to the framework entry requirements

There are no additional requirements other than the general entry conditions

Job title(s)	Job role(s)
Senior Electronics Production Technician	Liaison between Electronics, Design and Manufacturing facilities, actively co-ordinating and communicating electronics build, service allocation, and planning requirements
Electrical /Electronics Engineering Senior Technician (Aerospace Computer Systems)	Development, manufacture and testing of electrical/ electronic components for use in aerospace platforms, including instrumentation & power systems, ensuring compliance with relevant standards and quality requirements
Electrical / Electronics Senior Technician (Wind Power)	Design, manufacture and testing of electrical/ electronic components and systems for wind turbines, ensuring compliance to all relevant quality standards
Electronics Development Senior Technician	Design and develop analogue, digital, small power electronics and microprocessor systems for real time and industrial automation projects
Electronic Engineering Software / Hardware Senior Technician	The design and development of engineering application software for real-time embedded systems, testing systems and drafting related documentation

Qualifications

Competence qualifications available to this pathway

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C1a	600/9529/5	City & Guilds	107	461	
C1b	600/9576/3	EAL	107	461	

C2 - *Level 4 NVQ Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C2a	600/9846/2	EAL	80	338	

Knowledge qualifications available to this pathway

K1 - Pearson BTEC Level 4 HNC Diploma in Electrical and Electronic Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K1a	500/8831/2	Pearson	120	480	

Knowledge qualifications available to this pathway (cont.)

K2 - Foundation Degree in Electrical/ Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K2a	N/A	Swansea University via Gower College Swansea	240	N/A	

K3 - Pearson BTEC Level 4 HNC Diploma in Electrical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K3a	500/8257/7	Pearson	120	480	

K4 - Pearson BTEC Level 4 HNC Diploma in Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K4a	500/8830/0	Pearson	120	480	

K5 - HNC Electrical/ Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K5a	N/A	University of Wales: Trinity St Davids	160	1600	

Knowledge qualifications available to this pathway (cont.)

K6 - HNC Electrical/ Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K6a	N/A	Glyndwr University via Deeside College	150	576	

K7 - Foundation Degree FdEng in Industrial Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K7a	N/A	Glyndwr University	N/A	N/A	

K8 - HNC Electrical/ Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K8a	N/A	University of Wales: Trinity St Davids (via SMU campus)	160	420	

K9 - Foundation Degree FdSc Electrical and Electronic Technology

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K9a	N/A	Staffordshire University	N/A	N/A	

Knowledge qualifications available to this pathway (cont.)

K10 - Foundation Degree FdSc Manufacturing Technology

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K10a	N/A	Staffordshire University	N/A	N/A	

K11 - HNC Mechanical Technology

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K11a	N/A	Glyndwr University	150	576	

K12 - HNC Electrical and Electronic Technology

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K12a	N/A	Glyndwr University via Coleg Menai	150	576	

K13 - HNC Electrical and Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K13a	N/A	University of South Wales	120	N/A	

Knowledge qualifications available to this pathway (cont.)

K14 - HNC in Electrical and Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K14a	N/A	University Of Wales Trinity St David	120	1200	

K15 - Pearson BTEC Level 4 Higher National Certificate in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K15a	603/0450/9	Pearson	120	480	

K16 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K16a	603/0485/6	Pearson	120	480	

K17 - Foundation Degree FdEng in Advanced Manufacturing Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K17a	N/A	Swansea University via Coleg Cambria	240	N/A	

Knowledge qualifications available to this pathway (cont.)

K18 - Pearson BTEC Level 5 Higher National Diploma in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K18a	603/0451/0	Pearson	240	960	

K19 - University Certificate in Mechatronics

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K19a	N/A	University of South Wales	60	600	

K20 - Pearson BTEC Level 5 HND Diploma in Electrical and Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K20a	500/8834/8	Pearson	240	980	

K21 - Pearson BTEC Level 5 HND Diploma in Electrical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K21a	500/8255/3	Pearson	240	980	

Knowledge qualifications available to this pathway (cont.)

K22 - Pearson BTEC Level 5 HND Diploma in Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K22a	500/8833/6	Pearson	240	980	

K23 - Pearson BTEC Level 4 HNC Diploma in Manufacturing Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K23a	500/8829/4	Pearson	120	480	

K24 - HNC in Advanced Manufacturing Operations

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K24a	N/A	University of Wales (Trinity St Davids)	120	N/A	N/A

K25 - HND in Electrical and Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K25a	N/A	University of Wales (Trinity St Davids)	240	N/A	N/A

Combined qualifications available to this pathway

N/A

Relationship between competence and knowledge qualifications

***Level 4 NVQ Diploma in Engineering Manufacture - for use by 25 years+ only (see below)**

K1- K25 provide underpinning knowledge for C1 and C2

The designated Foundation Degrees and Technical Certificates underpin the knowledge elements of the competence qualification in this pathway. The knowledge qualifications deliver essential underpinning knowledge which supports the fundamental scientific and mathematical principles that equip apprentices with the understanding required to operate effectively and efficiently at a high level within this sub-sector.

Employers will select the knowledge qualification relevant to the job role of the Higher Apprentice. Note that Maths options must be included as part of the knowledge qualifications as this is a requirement of the job.

Higher Apprentices (age 18 to 24 years) must complete Level 4 NVQ Extended Diploma in Engineering Manufacture. However, if the relevant PEO units have already been achieved and certificated in a previous programme, for example applicants who have completed a Level 3 NVQ Extended Diploma as part of the Engineering Manufacture Level 3 framework, then they will be able to accredit these against the requirements of the Level 4 Extended Diploma.

*** Note:** The Level 4 NVQ Diploma in Engineering Manufacture may be used by adult apprentices 25 years old and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with the relevant health and safety training.

Assessment of the units in the competency qualification should be carried out in line with: 'The units must be assessed in a work environment and must be assessed in accordance with the Common Requirements for National Vocational Qualifications (NVQ)' which can be downloaded from Semta's website.

Additional assessment requirements have been published by Semta. These additional assessment requirements are set down in Semta's Engineering NVQ unit assessment strategy which can also be downloaded from Semta's website.

Delivery methods for knowledge based qualifications may vary, from a conventional college-based environment, to delivery through a combination of this and

written/web-based/distance learning materials.

Transferable skills (Wales)

Essential skills (Wales)

Subject	Minimum Level
Communication	2
Application of numbers	2
ICT/Digital literacy	2

For a full list of available proxies for starts on or after 14th October 2016 please see section 35 of the current SASW.

Progression routes into and from this pathway

Progression routes into the pathway include those who have:

- A or AS levels in Science, Technology, Engineering or Mathematics subjects and GCSEs in English, Maths and Science - grade C (new equivalent grade 4) or above or
- a Welsh Baccalaureate or
- completed a Level 3 Engineering Apprenticeship or have completed a 14 to 19 Advanced Diploma in Engineering or Manufacturing or
- previous work experience or employment in engineering at Level 3 or
- other relevant qualification, experience or skill as given in the entry conditions.

It is a requirement that entrants should have completed the Essential Skills in Communication and Application of Number at Level 2 on entry to the framework. The industry has stated that Digital Literacy is relevant to effective performance and included in the required Essential Skills at Level 2. They could be also be obtained through achieving the recognised proxies for the new ESQ qualifications.

Essential Skills Wales qualifications achieved in the context of the Welsh Baccalaureate Qualification (WBQ) can be accepted, provided the specific certification of the title(s) and level(s) of those ESW/ESQ qualifications is provided.

Progression from this pathway for those who have completed a Higher Apprenticeship in Advanced Manufacturing Engineering (Electrical/Electronics):

- progression to the new Degree Apprenticeship in Manufacturing Engineering at Level 6
- progression to the Higher Apprenticeship framework for Advanced Manufacturing Engineering at Level 6

Please note that there is no Level 5 Higher Apprenticeship programme

- employment as a technician in Electrical/Electronics engineering in a variety of job roles and functions (see job roles).

This Apprenticeship provides excellent preparation towards professional registration as an Engineering Technician and progression to Incorporated Engineer registration via the Degree Apprenticeship or Level 6 frameworks. It may also, where appropriate, provide progression to a range of honours degrees.

To further assist apprentices plan their careers we recommend they visit the following websites:

www.ucas.ac.uk/

www.engc.org.uk/

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

Professional recognition

The Institution of Mechanical Engineers (IMechE), the Institution of Engineering and Technology (IET) and the Royal Aeronautical Society (RAeS) recognise that this apprenticeship pathway provides the necessary skills, knowledge and experience to allow apprentices to apply for Engineering Technician status within their institutions. The apprenticeship does not confer automatic membership of any of these institutions as an Engineering Technician. Apprentices are free to apply to the institution of their choice and engage the process of registration. Please note each institution will charge a registration fee, details of these are available through the weblinks below.

aerosociety.com/

www.theiet.org/

www.imeche.org/

UCAS points for this pathway:

(No requirement specified)

Employee rights and responsibilities

Employee Rights and Responsibilities (ERR) is no longer compulsory, but Semta recommends that all apprentices receive it as part of their induction.

There are two methods of achieving ERR as set out below:

Method 1 - Qualifications

City & Guilds have produced a stand-alone qualification that can cover all 9 outcomes of ERR requirements.

Qualification details:
City & Guilds Level 2 Subsidiary Award in Employment and Personal Learning at Work
600/2819/1
Credit value: 2 credits
Training hours: 15

These qualifications will enable apprentices to both know and understand the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being. Apprentices achieving the qualifications will have demonstrated that they have the underpinning knowledge relevant for the engineering/manufacturing environment which satisfies the Specification for Apprenticeship Standards for Wales.

Method 2 - Workbook

Semta has produced an Apprentice ERR workbook that is available from:
customercare@eal.org.uk

The requirements for completing it must be explained to the apprentice right at the start of their training in order that they may take full advantage of their *company induction where significant amounts of information towards the national outcomes will be covered. The workbook is intended to enable apprentices to know, understand and record the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being.

***Please note:** All apprentices must receive a company induction programme.

Additional employer requirements

(No requirement specified)

Level 4, Pathway 4: Automotive

Description of this pathway

1. Level 4 NVQ Extended Diploma in Engineering Manufacture - **for use with 18 to 24 year olds only or as an option for 25+**

Automotive: Minimum credit value = 245 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,275

- Competence = 461 hours/ 107 credits
- Knowledge = minimum 480 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3) /18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 364 Hours Year 2 = 364 Hours Year 3= 364 Hours Year 4 = 183 Hours

Minimum off-the-job training hours = 814 training hours
Knowledge - minimum of 480 training hours plus 334 additional training hours for Essential Skills and Mentoring.

2. Level 4 NVQ Diploma in Engineering Manufacture - **for use with 25 years and over only**

Note: This NVQ Diploma qualification is for adult apprentices 25 years and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with relevant health and safety training.

Automotive: Minimum credit value: 218 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,152

- Competence = 338 hours/ 80 credits
- Knowledge = minimum 480 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3)/18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 329 Hours Year 2 = 329 Hours Year 3= 329 Hours Year 4 = 165 Hours

Minimum off-the-job training hours = 814 training hours
Knowledge - minimum of 480 training hours plus 334 additional training hours for Essential Skills and Mentoring.

Entry requirements for this pathway in addition to the framework entry requirements

There are no additional requirements other than the general entry conditions

Job title(s)	Job role(s)
Senior Production Technician	Plan the production run, redesign machine tools, equipment and processes to make new parts, monitor costs and production schedules, oversee quality control
Automotive Senior Technician - Design	Use draughting skills and computer-aided design software, to turn ideas into blueprints for development and testing. Weigh up issues such as reliability and safety, whether production would be cost-effective, potential environmental impact and the 'look'
Automotive Senior Technician - Development	Build and test development prototypes, use a combination of computer simulations and physical tests to assess strengths, weaknesses, performance and safety (e.g. test the design aerodynamics in a wind tunnel)
Senior Manufacturing Technician	Perform functions associated with all manufacturing operations, including working with engineers in set-up and calibration tasks, as well as performing rework and quality testing related to the production of parts, components, subassemblies and final assemblies
Motorsport Senior Technician (Mechanical)	Design and configuration of motorsport engines, transmissions, suspension, steering, brakes, fuel systems and other components both at the factory and trackside
Motorsport Senior Technician (Electrical / Electronics)	Setting up electrical and electronic systems on motorsport vehicles, testing performance and analysing results

Qualifications

Competence qualifications available to this pathway

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C1a	600/9529/5	City & Guilds	107	461	
C1b	600/9576/3	EAL	107	461	

C2 - *Level 4 NVQ Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C2a	600/9486/2	EAL	80	338	

Knowledge qualifications available to this pathway

K1 - Foundation Degree FdSc Automotive Management & Technologies					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K1a	N/A	Leeds Metropolitan University	240	N/A	

Knowledge qualifications available to this pathway (cont.)

K2 - Pearson BTEC Level 4 HNC Diploma in Electrical and Electronic Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K2a	500/8831/2	Pearson	120	480	

K3 - Foundation Degree FdEng in Industrial Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K3a	N/A	Glyndwr University	N/A	N/A	

K4 - Foundation Degree in Automotive Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K4a	N/A	University of South Wales	N/A	N/A	

K5 - Foundation Degree FdSc Manufacturing Technology					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K5a	N/A	Staffordshire University	N/A	N/A	

Knowledge qualifications available to this pathway (cont.)

K6 - HNC Electrical and Electronic Technology

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K6a	N/A	Glyndwr University	150	576	

K7 - Foundation Degree FdEng in Advanced Manufacturing Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K7a	N/A	Swansea University via Coleg Cambria	240	N/A	

K8 - Pearson BTEC Level 5 Higher National Diploma in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K8a	603/0451/0	Pearson	240	960	

K9 - Pearson BTEC Level 4 Higher National Certificate in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K9a	603/0450/9	Pearson	120	480	

Knowledge qualifications available to this pathway (cont.)

K10 - Pearson BTEC Level 5 HND Diploma in Manufacturing Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K10a	500/8828/2	Pearson	240	980	

K11 - Pearson BTEC Level 4 HNC Diploma in General Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K11a	00/8827/0	Pearson	120	480	

K12 - Pearson BTEC Level 4 HNC Diploma in Manufacturing Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K12a	500/8829/4	Pearson	120	480	

Combined qualifications available to this pathway

N/A

Relationship between competence and knowledge qualifications

***Level 4 NVQ Diploma in Engineering Manufacturing - for use by 25 years+ only (see below)**

K1 - K12 provide underpinning knowledge for C1 and C2

The designated Foundation Degrees and Technical Certificates underpin the knowledge elements of the competence qualification in this pathway. The knowledge qualifications deliver essential underpinning knowledge which supports the fundamental scientific and mathematical principles that equip apprentices with the understanding required to operate effectively and efficiently at a high level within this sub-sector.

Employers will select the knowledge qualification relevant to the job role of the Higher Apprentice. Note that Maths options must be included as part of the knowledge qualifications as this is a requirement of the job.

Higher Apprentices (age 18 to 24 years) must complete Level 4 NVQ Extended Diploma in Engineering Manufacture. However, if the relevant PEO units have already been achieved and certificated in a previous programme, for example applicants who have completed a Level 3 NVQ Extended Diploma as part of the Engineering Manufacture Level 3 framework, then they will be able to accredit these against the requirements of the Level 4 Extended Diploma.

*** Note:** The Level 4 NVQ Diploma in Engineering Manufacture may be used by adult apprentices 25 years old and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with the relevant health and safety training.

Assessment of the units in the competency qualification should be carried out in line with: 'The units must be assessed in a work environment and must be assessed in accordance with the Common Requirements for National Vocational Qualifications (NVQ)' which can be downloaded from Semta's website.

Additional assessment requirements have been published by Semta. These additional assessment requirements are set down in Semta's Engineering NVQ unit assessment strategy which can also be downloaded from Semta's website.

Delivery methods for knowledge based qualifications may vary, from a conventional college-based environment, to delivery through a combination of this and

written/web-based/distance learning materials.

Transferable skills (Wales)

Essential skills (Wales)

Subject	Minimum Level
Communication	2
Application of numbers	2
ICT/Digital literacy	2

For a full list of available proxies for starts on or after 14th October 2016 please see section 35 of the current SASW.

Progression routes into and from this pathway

Progression routes into the pathway include those who have:

- A or AS levels in Science, Technology, Engineering or Mathematics subjects and GCSEs in English, Maths and Science - grade C (new grade 4) or above or
- a Welsh Baccalaureate or
- a Level 3 Engineering Apprenticeship or have completed a 14 to 19 Advanced Diploma in Engineering or Manufacturing or
- previous work experience or employment in engineering at Level 3 or
- other relevant qualifications, experience or skills as given in the entry conditions.

It is a requirement that entrants should have completed the Essential Skills in Communication and Application of Number at Level 2 on entry to the framework. The industry has stated that Digital Literacy is relevant to effective performance and included in the required Essential Skills at Level 2. They could be also be obtained through achieving the recognised proxies for the new ESQ qualifications.

Essential Skills Wales qualifications achieved in the context of the Welsh Baccalaureate Qualification (WBQ) can be accepted, provided the specific certification of the title(s) and level(s) of those ESW/ESQ qualifications is provided.

Progression from this pathway for those who have completed a Higher Apprenticeship in Advanced Manufacturing Engineering (Automotive):

- progression to the new Degree Apprenticeship in Manufacturing Engineering at Level 6
- progression to the Higher Apprenticeship framework for Advanced Manufacturing Engineering at Level 6

Please note that there is no Level 5 Higher Apprenticeship programme
- employment as a technician in automotive engineering in a variety of job roles and functions (see job roles).

This Apprenticeship provides excellent preparation towards professional registration as an Engineering Technician and progression to Incorporated Engineer registration via the Degree Apprenticeship or Level 6 frameworks. Iit may also, where appropriate, provide progression to a range of honours degrees.

To further assist apprentices plan their careers we recommend they visit the following websites:

www.ucas.ac.uk/

www.engc.org.uk/

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

Professional recognition
The Institution of Mechanical Engineers (IMechE), the Institution of Engineering and Technology (IET) and the Royal Aeronautical Society (RAeS) recognise that this apprenticeship pathway provides the necessary skills, knowledge and experience to allow apprentices to apply for Engineering Technician status within their institutions. The apprenticeship does not confer automatic membership of any of these institutions as an Engineering Technician. Apprentices are free to apply to the institution of their choice and engage the process of registration. Please note each institution will charge a registration fee, details of these are available through the weblinks below.

aerosociety.com/

www.theiet.org/

www.imeche.org/

UCAS points for this pathway:

(No requirement specified)

Employee rights and responsibilities

Employee Rights and Responsibilities (ERR) is no longer compulsory, but Semta recommends that all apprentices receive it as part of their induction.

There are two methods of achieving ERR as set out below:

Method 1 - Qualifications

City & Guilds have produced a stand-alone qualification that can cover all 9 outcomes of ERR requirements.

Qualification details:
City & Guilds Level 2 Subsidiary Award in Employment and Personal Learning at Work
600/2819/1
Credit value: 2 credits
Training hours: 15

These qualifications will enable apprentices to both know and understand the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being. Apprentices achieving the qualifications will have demonstrated that they have the underpinning knowledge relevant for the engineering/manufacturing environment which satisfies the Specification for Apprenticeship Standards for Wales.

Method 2 - Workbook

Semta has produced an Apprentice ERR workbook that is available from:
customercare@eal.org.uk

The requirements for completing it must be explained to the apprentice right at the start of their training in order that they may take full advantage of their *company induction where significant amounts of information towards the national outcomes will be covered. The workbook is intended to enable apprentices to know, understand and record the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being.

***Please note:** All apprentices must receive a company induction programme.

Additional employer requirements

(No requirement specified)

Level 4, Pathway 5: Maintenance

Description of this pathway

1. Level 4 NVQ Extended Diploma in Engineering Manufacture - **for use with 18 to 24 year olds only or as an option for 25+**

Maintenance: Minimum credit value = 245 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,215

- Competence = 461 hours/ 107 credits
- Knowledge = minimum 420 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3) /18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 347 Hours Year 2 = 347 Hours Year 3= 347 Hours Year 4 = 174 Hours

Minimum off-the-job training hours = 754 training hours
Knowledge - minimum of 420 training hours plus 334 additional training hours for Essential Skills and Mentoring.

2. Level 4 NVQ Diploma in Engineering Manufacturing - **for use with 25 years and over only**

Note: This NVQ Diploma qualification is for adult apprentices 25 years and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with relevant health and safety training.

Maintenance: Minimum credit value: 218 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,092

- Competence = 338 hours/ 80 credits
- Knowledge = minimum 420 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3)/18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 312 Hours Year 2 = 312 Hours Year 3 = 312 Hours Year 4 = 156 Hours

Minimum off-the-job training hours = 754 training hours
Knowledge - minimum of 420 training hours plus 334 additional training hours for Essential Skills Wales, ERR and Mentoring.

Entry requirements for this pathway in addition to the framework entry requirements

There are no additional requirements other than the general entry conditions

Job title(s)	Job role(s)
Systems Maintenance Senior Technician	Co-ordinate and lead a team of maintenance technicians to ensure that the systems correctly function and by implementing a systematic approach to improving the maintenance activities undertaken
Manufacturing Plant Maintenance Senior Technician	Co-ordinate and lead a team of manufacturing plant maintenance technicians to ensure that the production equipment operates efficiently and safely by implementing a systematic approach to improving the maintenance activities including condition and performance monitoring
Engineering Services Maintenance Senior Technician	Co-ordinate and lead a team of maintenance engineers to ensure that the service supplies are working efficiently and safely by implementing a systematic approach to improving the service requirements including reducing the downtime required
Nuclear Maintenance Technician	Use diagnostic techniques to identify faults in plant, systems and components and lead scheduled maintenance of plant and equipment ensuring nuclear safety requirements are met
Biomedical Equipment Maintenance Specialist	Co-ordinate and lead a team of maintenance technicians to ensure that the biomedical equipment correctly functions by implementing a systematic approach to improving the maintenance activities undertaken

Qualifications

Competence qualifications available to this pathway

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C1a	600/9529/5	City & Guilds	107	461	
C1b	600/9576/3	EAL	107	461	

C2 - *Level 4 NVQ Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C2a	600/9486/2	EAL	80	338	

Knowledge qualifications available to this pathway

K1 - Pearson BTEC Level 4 HNC Diploma in Electrical and Electronic Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K1a	500/8831/2	Pearson	120	480	

Knowledge qualifications available to this pathway (cont.)

K2 - HNC Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K2a	N/A	University of Wales, Newport	160	640	

K3 - HND Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K3a	N/A	University of Wales, Newport	240	640	

K4 - HNC Mechanical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K4a	N/A	University of Wales: Trinity St Davids	160	1600	

K5 - HNC Electrical/ Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K5a	N/A	University of Wales: Trinity St Davids	160	1600	

Knowledge qualifications available to this pathway (cont.)

K6 - Foundation Degree FdEng in Industrial Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K6a	N/A	Glyndwr University	N/A	N/A	

K7 - HNC Instrumentation Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K7a	N/A	University of Wales: Trinity St Davids (via SMU campus)	160	420	

K8 - HND Power Systems Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K8a	N/A	University of Wales: Trinity St Davids	160	420	

K9 - Foundation Degree Instrumentation and Electrical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K9a	N/A	University of Wales: Trinity St Davids (via Pembrokeshire College)	N/A	N/A	

Knowledge qualifications available to this pathway (cont.)

K10 - Foundation Degree FdSc Manufacturing Technology

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K10a	N/A	Staffordshire University	N/A	N/A	

K11 - HNC in Mechanical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K11a	N/A	University Of Wales Trinity St David	120	1200	

K12 - HNC in Electrical and Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K12a	N/A	University Of Wales Trinity St David	120	1200	

K13 - Pearson BTEC Level 4 Higher National Certificate in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K13a	603/0450/9	Pearson	120	480	

Knowledge qualifications available to this pathway (cont.)

K14 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K14a	603/0485/6	Pearson	120	480	

K15 - Foundation Degree FdEng in Advanced Manufacturing Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K15a	N/A	Swansea University via Coleg Cambria	240	N/A	

K16 - Pearson BTEC Level 5 Higher National Diploma in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K16a	603/0451/0	Pearson	240	960	

K17 - Pearson BTEC Level 5 HND Diploma in Operations Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K17a	500/8959/6	Pearson	240	980	

Knowledge qualifications available to this pathway (cont.)

K18 - Pearson BTEC Level 4 HNC Diploma in General Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K18a	500/8827/0	Pearson	120	480	

K19 - Pearson BTEC Level 4 HNC Diploma in Manufacturing Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K19a	500/8829/4	Pearson	120	480	

K20 - Pearson BTEC Level 4 HNC Diploma in Mechanical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K20a	500/8824/5	Pearson	120	480	

K21 - Pearson BTEC Level 4 HNC Diploma in Operations Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K21a	500/8960/2	Pearson	120	480	

Knowledge qualifications available to this pathway (cont.)

K22 - HNC in Advanced Manufacturing Operations					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K22a	N/A	University of Wales (Trinity St Davids)	120	N/A	N/A

Combined qualifications available to this pathway

N/A

Relationship between competence and knowledge qualifications

Level 4 NVQ Diploma in Engineering Manufacture - for use by 25 years+ only (see below)

K1 - K22 provide underpinning knowledge for C1 and C2

The designated Foundation Degrees and Technical Certificates underpin the knowledge elements of the competence qualification in this pathway. The knowledge qualifications deliver essential underpinning knowledge which supports the fundamental scientific and mathematical principles that equip apprentices with the understanding required to operate effectively and efficiently at a high level within this sub-sector.

Employers will select the knowledge qualification relevant to the job role of the Higher Apprentice. Note that Maths options must be included as part of the knowledge qualifications as this is a requirement of the job.

Higher Apprentices (age 18 to 24 years) must complete Level 4 NVQ Extended Diploma in Engineering Manufacture. However, if the relevant PEO units have already been achieved and certificated in a previous programme, for example applicants who have completed a Level 3 NVQ Extended Diploma as part of the Engineering Manufacture Level 3 framework, then they will be able to accredit these against the requirements of the Level 4 Extended Diploma.

*** Note:** The Level 4 NVQ Diploma in Engineering Manufacture may be used by adult apprentices 25 years old and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with the relevant health and safety training.

Assessment of the units in the competency qualification should be carried out in line with: 'The units must be assessed in a work environment and must be assessed in accordance with the Common Requirements for National Vocational Qualifications (NVQ)' which can be downloaded from Semta's website.

Additional assessment requirements have been published by Semta. These additional assessment requirements are set down in Semta's Engineering NVQ unit assessment strategy which can also be downloaded from Semta's website.

Delivery methods for knowledge based qualifications may vary, from a conventional college-based environment, to delivery through a combination of this and

written/web-based/distance learning materials.

Transferable skills (Wales)

Essential skills (Wales)

Subject	Minimum Level
Communication	2
Application of numbers	2
ICT/Digital literacy	2

For a full list of available proxies for starts on or after 14th October 2016 please see section 35 of the current SASW.

Progression routes into and from this pathway

Progression routes into the pathway include those who have:

- A or AS levels in Science, Technology, Engineering or Mathematics subjects and GCSEs in English, Maths and Science - grade C (new equivalent grade 4) or above or
- a Welsh Baccalaureate or
- completed a Level 3 Engineering Apprenticeship or have completed a 14 to 19 Advanced Diploma in Engineering or Manufacturing or
- have previous work experience or employment in engineering at Level 3 or
- other relevant qualifications, experience or skills as given in the entry conditions.

It is a requirement that entrants should have completed the Essential Skills in Communication and Application of Number at Level 2 on entry to the framework. The industry has stated that Digital Literacy is relevant to effective performance and included in the required Essential Skills at Level 2. They could be also be obtained through achieving the recognised proxies for the new ESQ qualifications.

Essential Skills Wales qualifications achieved in the context of the Welsh Baccalaureate Qualification (WBQ) can be accepted, provided the specific certification of the title(s) and level(s) of those ESW/ESQ qualifications is provided.

Progression from this pathway for those who have completed a Higher Apprenticeship in Advanced Manufacturing Engineering (Maintenance):

- progression to the new Degree Apprenticeship in Manufacturing Engineering at Level 6
- progression to the Higher Apprenticeship framework for Advanced Manufacturing Engineering at Level 6

Please note that there is no Level 5 Higher Apprenticeship programme
- employment as a technician in maintenance engineering in a variety of job roles and functions (see job roles).

This Apprenticeship provides excellent preparation towards professional registration as an Engineering Technician and progression to Incorporated Engineer registration via the Degree Apprenticeship or Level 6 framework. It may also, where appropriate, provide progression to a range of honours degrees.

To further assist apprentices plan their careers we recommend they visit the following websites:

www.ucas.ac.uk/

www.engc.org.uk/

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

Professional recognition
The Institution of Mechanical Engineers (IMechE), the Institution of Engineering and Technology (IET) and the Royal Aeronautical Society (RAeS) recognise that this apprenticeship pathway provides the necessary skills, knowledge and experience to allow apprentices to apply for Engineering Technician status within their institutions. The apprenticeship does not confer automatic membership of any of these institutions as an Engineering Technician. Apprentices are free to apply to the institution of their choice and engage the process of registration. Please note each institution will charge a registration fee, details of these are available through the weblinks below.

aerosociety.com/

www.theiet.org/

http://www.imeche.org/

UCAS points for this pathway:

(No requirement specified)

Employee rights and responsibilities

Employee Rights and Responsibilities (ERR) is no longer compulsory, but Semta recommends that all apprentices receive it as part of their induction.

There are two methods of achieving ERR as set out below:

Method 1 - Qualifications

City & Guilds have produced a stand-alone qualification that can cover all 9 outcomes of ERR requirements.

Qualification details:
City & Guilds Level 2 Subsidiary Award in Employment and Personal Learning at Work
600/2819/1
Credit value: 2 credits
Training hours: 15

These qualifications will enable apprentices to both know and understand the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being. Apprentices achieving the qualifications will have demonstrated that they have the underpinning knowledge relevant for the engineering/manufacturing environment which satisfies the Specification for Apprenticeship Standards for Wales.

Method 2 - Workbook

Semta has produced an Apprentice ERR workbook that is available from:
customercare@eal.org.uk

The requirements for completing it must be explained to the apprentice right at the start of their training in order that they may take full advantage of their *company induction where significant amounts of information towards the national outcomes will be covered. The workbook is intended to enable apprentices to know, understand and record the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being.

***Please note:** All apprentices must receive a company induction programme.

Additional employer requirements

(No requirement specified)

Level 4, Pathway 6: Wind Generation

Description of this pathway

1. Level 4 NVQ Extended Diploma in Engineering Manufacture - **for use with 18 to 24 year olds only or as an option for 25+**

Wind Generation: Minimum credit value = 245 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,275

- Competence = 461 hours/ 107 credits
- Knowledge = minimum 480 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3) /18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 364 Hours Year 2 = 364 Hours Year 3 = 364 Hours Year 4 = 183 Hours

Minimum off-the-job training hours = 814 training hours
Knowledge - minimum of 480 training hours plus 334 additional training hours for Essential Skills and Mentoring.

2. Level 4 NVQ Diploma in Engineering Manufacture - **for use with 25 years and over only**

Note: This NVQ Diploma qualification is for adult apprentices 25 years and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with relevant health and safety training.

Wind Generation: Minimum credit value: 218 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,152

- Competence = 338 hours/ 80 credits
- Knowledge = minimum 480 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3)/18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 329 Hours Year 2 = 329 Hours Year 3 = 329 Hours Year 4 = 165 Hours

Minimum off-the-job training hours = 814 training hours
Knowledge - minimum of 480 training hours plus 334 additional training hours for Essential Skills Wales, ERR and Mentoring.

Entry requirements for this pathway in addition to the framework entry requirements

There are no additional requirements other than the general entry conditions

Job title(s)	Job role(s)
Electrical / Electronics Senior Technician (Wind Power)	Design, manufacture and testing of electrical/ electronic components and systems for wind turbines. Ensuring compliance to all relevant quality standards
Mechanical Senior Technician (Wind Power)	Design, operation, control, monitoring and optimisation of gearboxes, hydraulic systems and wind turbine structural components
Senior Warranty Technician (Wind Power)	Combine engineering experience with strong business experience directly related to wind turbines. To be a customer interface for complex serious and detailed serial defects
Senior Blade Technician (Wind Power)	Apply stress analysis techniques to blades and composite components used in the development, manufacture, and repair of wind turbine blades
Control and Instrumentation Senior Technician (Wind Power)	Design, selection, installation and verification of sensors and related control systems, including total load control, turbine condition monitoring and other electronic asset protection systems
Technical Sales Specialist (Wind Turbine Components)	Interpret customer technical requirements, specifications and standards for all wind turbine systems. Provide in-service support, preparation of costings and quotes, managing customer relationships and contracts
Senior Process Technician (Wind Power)	Design, operation, control and optimisation of wind process plant, selection, installation of control systems. Compliance with sector specific quality and regulatory systems
Safety and Performance Senior Technician	Application of risk assessment methodologies to include HAZAN, HAZOP, FMEA, PSA
Senior Manufacturing Technician (Wind Power)	Development and optimisation of manufacturing systems, application of manufacturing codes and standards specific to large scale production of wind turbines and their components

Qualifications

Competence qualifications available to this pathway

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C1a	600/9529/5	City & Guilds	107	461	
C1b	600/9576/3	EAL	107	461	

C2 - *Level 4 NVQ Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C2a	600/9486/2	EAL	80	338	

Knowledge qualifications available to this pathway

K1 - Pearson BTEC Level 4 HNC Diploma in Electrical and Electronic Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K1a	500/8831/2	Pearson	120	480	

Knowledge qualifications available to this pathway (cont.)

K2 - Foundation Degree FdEng in Industrial Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K2a	N/A	Glyndwr University	N/A	N/A	

K3 - Pearson BTEC Level 4 Higher National Certificate in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K3a	603/0450/9	Pearson	120	480	

K4 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K4a	603/0485/6	Pearson	120	480	

K5 - Pearson BTEC Level 5 Higher National Diploma in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K5a	603/0451/0	Pearson	240	960	

Knowledge qualifications available to this pathway (cont.)

K6 - Pearson BTEC Level 5 HND Diploma in General Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K6a	500/8825/7	Pearson	240	980	

K7 - Pearson BTEC Level 5 HND Diploma in Operations Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K7a	500/8959/6	Pearson	240	980	

K8 - Pearson BTEC Level 4 HNC Diploma in General Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K8a	500/8827/0	Pearson	120	480	

K9 - Pearson BTEC Level 4 HNC Diploma in Mechanical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K9a	500/8824/5	Pearson	120	480	

Knowledge qualifications available to this pathway (cont.)

K10 - Pearson BTEC Level 4 HNC Diploma in Operations Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K10a	500/8960/2	Pearson	120	480	

Combined qualifications available to this pathway

N/A

Relationship between competence and knowledge qualifications

***Level 4 NVQ Diploma in Engineering Manufacture - for use by 25 years+ only (see below)**

K1 - K10 provide underpinning knowledge for C1 and C2

The designated Foundation Degrees and Technical Certificates underpin the knowledge elements of the competence qualification in this pathway. The knowledge qualifications deliver essential underpinning knowledge which supports the fundamental scientific and mathematical principles that equip apprentices with the understanding required to operate effectively and efficiently at a high level within this sub-sector.

Employers will select the knowledge qualification relevant to the job role of the Higher Apprentice. Note that Maths options must be included as part of the knowledge qualifications as this is a requirement of the job.

Higher Apprentices (age 18 to 24 years) must complete Level 4 NVQ Extended Diploma in Engineering Manufacture. However, if the relevant PEO units have already been achieved and certificated in a previous programme, for example applicants who have completed a Level 3 NVQ Extended Diploma as part of the Engineering Manufacture Level 3 framework, then they will be able to accredit these against the requirements of the Level 4 Extended Diploma.

*** Note:** The Level 4 NVQ Diploma in Engineering Manufacture may be used by adult apprentices 25 years old and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with the relevant health and safety training.

Assessment of the units in the competency qualification should be carried out in line with: 'The units must be assessed in a work environment and must be assessed in accordance with the Common Requirements for National Vocational Qualifications (NVQ)' which can be downloaded from Semta's website.

Additional assessment requirements have been published by Semta. These additional assessment requirements are set down in Semta's Engineering NVQ unit assessment strategy which can also be downloaded from Semta's website.

Delivery methods for knowledge based qualifications may vary, from a conventional college-based environment, to delivery through a combination of this and

written/web-based/distance learning materials.

Transferable skills (Wales)

Essential skills (Wales)

Subject	Minimum Level
Communication	2
Application of numbers	2
ICT/Digital literacy	2

For a full list of available proxies for starts on or after 14th October 2016 please see section 35 of the current SASW.

Progression routes into and from this pathway

Progression routes into the pathway include those who have:

- A or AS levels in Science, Technology, Engineering or Mathematics subjects and GCSEs in English, Maths and Science - grade C (new equivalent grade 4) or above or
- a Welsh Baccalaureate or
- completed a Level 3 Engineering Apprenticeship or have completed a 14 to 19 Advanced Diploma in Engineering or Manufacturing or
- previous work experience or employment in engineering at Level 3 or
- other relevant qualifications, experience or skills as given in the entry conditions.

It is a requirement that entrants should have completed the Essential Skills in Communication and Application of Number at Level 2 on entry to the framework. The industry has stated that Digital Literacy is relevant to effective performance and included in the required Essential Skills at Level 2. They could be also be obtained through achieving the recognised proxies for the new ESQ qualifications.

Essential Skills Wales qualifications achieved in the context of the Welsh Baccalaureate Qualification (WBQ) can be accepted, provided the specific certification of the title(s) and level(s) of those ESW/ESQ qualifications is provided.

Progression from this pathway for those who have completed a Higher Apprenticeship in Advanced Manufacturing Engineering (Wind Generation):

- progression to the new Degree Apprenticeship in Manufacturing Engineering at Level 6
- progression to the Higher Apprenticeship framework for Advanced Manufacturing Engineering at Level 6

Please note that there is no Level 5 Higher Apprenticeship programme
- employment as a technician in wind generation engineering in a variety of job roles and functions (see job roles).

This Apprenticeship provides excellent preparation towards professional registration as an Engineering Technician and progression to Incorporated Engineer registration via the Degree Apprenticeship or Level 6 framework.It may also, where appropriate, provide progression to a range of honours degrees.

To further assist apprentices plan their careers we recommend they visit the following websites:

www.ucas.ac.uk/

www.engc.org.uk/

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

Professional recognition
The Institution of Mechanical Engineers (IMechE), the Institution of Engineering and Technology (IET) and the Royal Aeronautical Society (RAeS) recognise that this apprenticeship pathway provides the necessary skills, knowledge and experience to allow apprentices to apply for Engineering Technician status within their institutions. The apprenticeship does not confer automatic membership of any of these institutions as an Engineering Technician. Apprentices are free to apply to the institution of their choice and engage the process of registration. Please note each institution will charge a registration fee, details of these are available through the weblinks below.

aerosociety.com/

www.theiet.org/

www.imeche.org/

UCAS points for this pathway:

(No requirement specified)

Employee rights and responsibilities

Employee Rights and Responsibilities (ERR) is no longer compulsory, but Semta recommends that all apprentices receive it as part of their induction.

There are two methods of achieving ERR as set out below:

Method 1 - Qualifications

City & Guilds have produced a stand-alone qualification that can cover all 9 outcomes of ERR requirements.

Qualification details:
City & Guilds Level 2 Subsidiary Award in Employment and Personal Learning at Work
600/2819/1
Credit value: 2 credits
Training hours: 15

These qualifications will enable apprentices to both know and understand the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being. Apprentices achieving the qualifications will have demonstrated that they have the underpinning knowledge relevant for the engineering/manufacturing environment which satisfies the Specification for Apprenticeship Standards for Wales.

Method 2 - Workbook

Semta has produced an Apprentice ERR workbook that is available from:
customercare@eal.org.uk

The requirements for completing it must be explained to the apprentice right at the start of their training in order that they may take full advantage of their *company induction where significant amounts of information towards the national outcomes will be covered. The workbook is intended to enable apprentices to know, understand and record the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being.

***Please note:** All apprentices must receive a company induction programme.

Additional employer requirements

(No requirement specified)

Level 4, Pathway 7: Marine

Description of this pathway

1. Level 4 NVQ Extended Diploma in Engineering Manufacturing - **for use with 18 to 24 year olds only or as an option for 25+**

Marine: Minimum credit value = 245 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,275

- Competence = 461 hours/ 107 credits
- Knowledge = minimum 480 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3) /18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 364 Hours Year 2 = 364 Hours Year 3 = 364 Hours Year 4 = 183 Hours

Minimum off-the-job training hours = 814 training hours
Knowledge - minimum of 480 training hours, plus 334 additional training hours for Essential Skills and Mentoring.

2. Level 4 NVQ Diploma in Engineering Manufacture - **for use with 25 years and over only**

Note: This NVQ Diploma qualification is for adult apprentices 25 years and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with relevant health and safety training.

Marine: Minimum credit value: 218 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,152

- Competence = 338 hours/ 80 credits
- Knowledge = minimum 480 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3)/18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 339 Hours Year 2 = 329 Hours Year 3 = 329 Hours Year 4 = 165 Hours

Minimum off-the-job training hours = 814 training hours
Knowledge - minimum of 480 training hours plus 334 additional training hours for Essential Skills Wales, ERR and Mentoring.

Entry requirements for this pathway in addition to the framework entry requirements

There are no additional requirements other than the general entry conditions

Job title(s)	Job role(s)
Marine Systems Senior Mechanical Technician	Use diagnostic techniques to identify faults in marine plant, systems and components. Co-ordinate regular planned maintenance to improve serviceability and reduce downtime in production
Marine Senior Design Technician	Design of marine mechanical, structural systems for bespoke projects using design software. Create production drawings demonstrating regulatory compliance to customer specification
Marine Electrical / Electronic Senior Technician	Design, develop and manufacture electrical and electronic components and systems for marine based projects ensuring compliance with relevant quality and regulatory procedures
Marine Senior Quality Technician	Work with engineers to ensure quality programmes are appropriate, maintained and delivered within company procedures (ISO 14001 and 18001)
Marine Senior Production Technician	Supervise and provide technical guidance to production employees. Resolve technical and production issues within the company, sub-contractors and customers.

Qualifications

Competence qualifications available to this pathway

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C1a	600/9529/5	City & Guilds	107	461	
C1b	600/9576/3	EAL	107	461	

C2 - *Level 4 NVQ Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C2a	600/9486/2	EAL	80	338	

Knowledge qualifications available to this pathway

K1 - Pearson BTEC Level 4 HNC Diploma in Electrical and Electronic Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K1a	500/8831/2	Pearson	120	480	

Knowledge qualifications available to this pathway (cont.)

K2 - Pearson BTEC Level 4 HNC Diploma in Electrical Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K2a	500/8257/7	Pearson	120	480	

K3 - Pearson BTEC Level 4 HNC Diploma in Electronic Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K3a	500/8830/0	Pearson	120	480	

K4 - Pearson BTEC Level 4 Higher National Certificate in Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K4a	603/0450/9	Pearson	120	480	

K5 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K5a	603/0485/6	Pearson	120	480	

Knowledge qualifications available to this pathway (cont.)

K6 - Pearson BTEC Level 5 Higher National Diploma in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K6a	603/0451/0	Pearson	240	960	

K7 - Pearson BTEC Level 5 HND Diploma in Electrical and Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K7a	500/8834/8	Pearson	240	980	

K8 - Pearson BTEC Level 5 HND Diploma in Electrical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K8a	500/8255/3	Pearson	240	980	

K9 - Pearson BTEC Level 5 HND Diploma in Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K9a	500/8833/6	Pearson	240	980	

Knowledge qualifications available to this pathway (cont.)

K10 - Pearson BTEC Level 5 HND Diploma in General Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K10a	500/8825/7	Pearson	240	980	

K11 - Pearson BTEC Level 4 HNC Diploma in General Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K11a	500/8827/0	Pearson	120	480	

Combined qualifications available to this pathway

N/A

Relationship between competence and knowledge qualifications

***Level 4 NVQ Diploma in Engineering Manufacture - for use by 25 years+ only (see below)**

K1 - K11 provide underpinning knowledge for C1 and C2

The designated Foundation Degrees and Technical Certificates underpin the knowledge elements of the competence qualification in this pathway. The knowledge qualifications deliver essential underpinning knowledge which supports the fundamental scientific and mathematical principles that equip apprentices with the understanding required to operate effectively and efficiently at a high level within this sub-sector.

Employers will select the knowledge qualification relevant to the job role of the Higher Apprentice. Note that Maths options must be included as part of the knowledge qualifications as this is a requirement of the job.

Higher Apprentices (age 18 to 24 years) must complete Level 4 NVQ Extended Diploma in Engineering Manufacture. However, if the relevant PEO units have already been achieved and certificated in a previous programme, for example applicants who have completed a Level 3 NVQ Extended Diploma as part of the Engineering Manufacture Level 3 framework, then they will be able to accredit these against the requirements of the Level 4 Extended Diploma.

*** Note:** The Level 4 NVQ Diploma in Engineering Manufacture may be used by adult apprentices 25 years old and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with the relevant health and safety training.

Assessment of the units in the competency qualification should be carried out in line with: 'The units must be assessed in a work environment and must be assessed in accordance with the Common Requirements for National Vocational Qualifications (NVQ)' which can be downloaded from Semta's website.

Additional assessment requirements have been published by Semta. These additional assessment requirements are set down in Semta's Engineering NVQ unit assessment strategy which can also be downloaded from Semta's website.

Delivery methods for knowledge based qualifications may vary, from a conventional college-based environment, to delivery through a combination of this and

written/web-based/distance learning materials.

Transferable skills (Wales)

Essential skills (Wales)

Subject	Minimum Level
Communication	2
Application of numbers	2
ICT/Digital literacy	2

For a full list of available proxies for starts on or after 14th October 2016 please see section 35 of the current SASW.

Progression routes into and from this pathway

Progression routes into the pathway include those who have:

- A or AS levels in Science, Technology, Engineering or Mathematics subjects and GCSEs in English, Maths, and Science - grade C (new equivalent grade 4) or above or
- a Welsh Baccalaureate or
- completed a Level 3 Engineering Apprenticeship or have completed a 14 to 19 Advanced Diploma in Engineering or Manufacturing or
- previous work experience or employment in engineering at Level 3 or
- other relevant qualifications, experience or skills as given in the entry conditions.

It is a requirement that entrants should have completed the Essential Skills in Communication and Application of Number at Level 2 on entry to the framework. The industry has stated that Digital Literacy is relevant to effective performance and included in the required Essential Skills at Level 2. They could be also be obtained through achieving the recognised proxies for the new ESQ qualifications.

Essential Skills Wales qualifications achieved in the context of the Welsh Baccalaureate Qualification (WBQ) can be accepted, provided the specific certification of the title(s) and level(s) of those ESW/ESQ qualifications is provided.

Progression from this pathway for those who have completed a Higher Apprenticeship in Advanced Manufacturing Engineering (Marine):

- progression to the new Degree Apprenticeship in Manufacturing Engineering at Level 6
- progression to the Higher Apprenticeship framework for Advanced Manufacturing Engineering at level 6

Please note that there is no Level 5 Higher Apprenticeship programme

- employment as a senior technician in marine engineering in a variety of job roles and functions (see job roles).

This Apprenticeship provides excellent preparation towards professional registration as an Engineering Technician and progression to Incorporated Engineer registration via the Degree Apprenticeship or Level 6 framework. It may also, where appropriate, provide progression to a range of honours degrees.

To further assist apprentices plan their careers we recommend they visit the following websites:

www.ucas.ac.uk/

www.engc.org.uk/

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

Professional recognition
The Institution of Mechanical Engineers (IMechE), the Institution of Engineering and Technology (IET) and the Royal Aeronautical Society (RAeS) recognise that this apprenticeship pathway provides the necessary skills, knowledge and experience to allow apprentices to apply for Engineering Technician status within their institutions. The apprenticeship does not confer automatic membership of any of these institutions as an Engineering Technician. Apprentices are free to apply to the institution of their choice and engage the process of registration. Please note each institution will charge a registration fee, details of these are available through the weblinks below.

aerosociety.com/

www.theiet.org/

www.imeche.org/

UCAS points for this pathway:

(No requirement specified)

Employee rights and responsibilities

Employee Rights and Responsibilities (ERR) is no longer compulsory, but Semta recommends that all apprentices receive it as part of their induction.

There are two methods of achieving ERR as set out below:

Method 1 - Qualifications

City & Guilds have produced a stand-alone qualification that can cover all 9 outcomes of ERR requirements.

Qualification details:
City & Guilds Level 2 Subsidiary Award in Employment and Personal Learning at Work
600/2819/1
Credit value: 2 credits
Training hours: 15

These qualifications will enable apprentices to both know and understand the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being. Apprentices achieving the qualifications will have demonstrated that they have the underpinning knowledge relevant for the engineering/manufacturing environment which satisfies the Specification for Apprenticeship Standards for Wales.

Method 2 - Workbook

Semta has produced an Apprentice ERR workbook that is available from:
customercare@eal.org.uk

The requirements for completing it must be explained to the apprentice right at the start of their training in order that they may take full advantage of their *company induction where significant amounts of information towards the national outcomes will be covered. The workbook is intended to enable apprentices to know, understand and record the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for **their own well-being.**

***Please note:** All apprentices must receive a company induction programme.

Additional employer requirements

(No requirement specified)

Level 4, Pathway 8: Space Engineering

Description of this pathway

1. Level 4 NVQ Extended Diploma in Engineering Manufacture - **for use with 18 to 24 year olds only or as an option for 25+**

Space Engineering - total minimum credit value = 245 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,275

- Competence = 461 hours/ 107 credits
- Knowledge = minimum 480 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3) /18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 364 Hours Year 2 = 364 Hours Year 3 = 364 Hours Year 4 = 183 Hours

Minimum off-the-job training hours = 814 training hours
Knowledge - minimum of 480 training hours, plus 334 additional training hours for Essential Skills and Mentoring.

2. Level 4 NVQ Diploma in Engineering Manufacture - **for use with 25 years and over only**

Note: This NVQ Diploma qualification is for adult apprentices 25 years and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at level 2, along with the relevant health and safety training.

Space Engineering - total minimum credit value = 218 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,152

- Competence = 338 hours/ 80 credits
- Knowledge = minimum 480 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3)/18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 329 Hours Year 2 = 329 Hours Year 3 = 329 Hours Year 4 = 165 Hours

Minimum off-the-job training hours = 814 training hours
Knowledge - minimum of 480 training hours plus 334 additional training hours for Essential Skills and Mentoring.

Entry requirements for this pathway in addition to the framework entry requirements

There are no additional requirements other than the general entry conditions

Job title(s)	Job role(s)
Software Engineer (Space Engineering)	Develop software code based on NI LabVIEW and TestStand in support of rf and microwave test systems. Reporting to the Software Manager. Involves ability to understand requirements and create derived specifications together with strong code writing ability.
Hardware Engineer (Space Engineering)	Develop system designs for rf/microwave test systems based on customers specifications with ability to draw out key requirements. Knowledge of rf and microwave measurement is critical as is the ability to be able to understand the system aspects of the tasks. Reporting to the Technical Director.
Test Engineer (Space Engineering)	Has a strong background in rf and microwave testing with the ability to fault find to component level. Familiarity with NI LabVIEW and Test Stand is required. Reporting to the Manufacturing Manager. Will be involved with testing company products on bespoke test systems.
Manufacturing Technician (Space Engineering)	Reporting to the Manufacturing Manager - responsible for assembly of circuit boards,sub modules, modules and general assembly tasks to appropriate standards.
Test Technician (Space Engineering)	Reporting to the Test Manager - responsible for running test sequences using automatic, semi-automatic and manual test equipment and basic fault finding
Systems Engineer (Space Engineering)	Reporting to the Technical Director - responsible for system design including apportionment of technical specifications to unit, chain and complete transponder level

Qualifications

Competence qualifications available to this pathway

C1 - Level 4 Extended Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C1a	600/9529/5	City & Guilds	107	461	
C1b	600/9576/3	EAL	107	461	

C2 - *Level 4 NVQ Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C2a	600/9486/2	EAL	80	338	

Knowledge qualifications available to this pathway

K1 - Foundation Degree in Space Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K1a	N/A	Leicester University	N/A	N/A	

Knowledge qualifications available to this pathway (cont.)

K2 - Pearson BTEC Level 4 Higher National Certificate in Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K2a	603/0450/9	Pearson	120	480	

K3 - Pearson BTEC Level 4 Higher National Certificate in Aeronautical Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K3a	603/0485/6	Pearson	120	480	

Combined qualifications available to this pathway

N/A

Relationship between competence and knowledge qualifications

***Level 4 NVQ Diploma in Engineering Manufacture - for use by 25 years+ only (see below)**

K1 - K3 provide underpinning knowledge for C1-C2

The designated Foundation Degrees and Technical Certificates underpin the knowledge elements of the competence qualification in this pathway. The knowledge qualifications deliver essential underpinning knowledge which supports the fundamental scientific and mathematical principles that equip apprentices with the understanding required to operate effectively and efficiently at a high level within this sub-sector.

Employers will select the knowledge qualification relevant to the job role of the Higher Apprentice. Note that Maths options must be included as part of the knowledge qualifications as this is a requirement of the job.

Higher Apprentices (age 18 to 24 years) must complete the Level 4 NVQ Extended Diploma in Engineering Manufacture. However, if the relevant PEO units have already been achieved and certificated in a previous programme, for example applicants who have completed a Level 3 NVQ Extended Diploma as part of the Engineering Manufacture Level 3 framework, then they will be able to accredit these against the requirements of the Level 4 Extended Diploma.

*** Note:** The Level 4 NVQ Diploma in Engineering Manufacture may be used by adult apprentices 25 years old and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with the relevant health and safety training.

Assessment of the units in the competency qualification should be carried out in line with: 'The units must be assessed in a work environment and must be assessed in accordance with the Common Requirements for National Vocational Qualifications (NVQ)' which can be downloaded from Semta's website.

Additional assessment requirements have been published by Semta. These additional assessment requirements are set down in Semta's Engineering NVQ unit assessment strategy which can also be downloaded from Semta's website.

Delivery methods for knowledge based qualifications may vary, from a conventional college-based environment, to delivery through a combination of this and

written/web-based/distance learning materials.

Transferable skills (Wales)

Essential skills (Wales)

Subject	Minimum Level
Communication	2
Application of numbers	2
ICT/Digital literacy	2

For a full list of available proxies for starts on or after 14th October 2016 please see section 35 of the current SASW.

Progression routes into and from this pathway

Progression routes into the pathway include those who have:

- have A or AS levels in Science, Technology, Engineering or Mathematics subjects and GCSEs in English, Maths, and Science - grade C (new equivalent grade 4) or above or
- have completed a Level 3 Engineering Apprenticeship or have completed a 14 to 19 Advanced Diploma in Engineering or Manufacturing or
- have previous work experience or employment in engineering at Level 3 or
- other relevant qualifications, experience or skills as given in the entry conditions.

It is a requirement that entrants should have completed the Essential Skills in Communication and Application of Number at Level 2 on entry to the framework. The industry has stated that Digital Literacy is relevant to effective performance and included in the required Essential Skills at Level 2. They could be also be obtained through achieving the recognised proxies for the new ESQ qualifications.

Essential Skills Wales qualifications achieved in the context of the Welsh Baccalaureate Qualification (WBQ) can be accepted, provided the specific certification of the title(s) and level(s) of those ESW/ESQ qualifications is provided.

Progression from this pathway for those who have completed a Higher Apprenticeship in Advanced Manufacturing Engineering (Space Engineering):

- progression to the new Degree Apprenticeship in Manufacturing Engineering at Level 6
- progression to the Higher Apprenticeship framework for Advanced Manufacturing at level 6
  Please note that there is no Level 5 Higher Apprenticeship programme

- employment as a senior technician in space engineering in a variety of job roles and functions (see job roles)

This Apprenticeship provides excellent preparation towards professional registration as an Engineering Technician and progression to Incorporated Engineer registration via the Degree Apprenticeship or Level 6 frameworks.It may also, where appropriate, provide progression to a range of honours degrees.

To further assist apprentices plan their careers we recommend they visit the following websites:

www.ucas.ac.uk/

www.engc.org.uk/

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

Professional recognition
The Institution of Mechanical Engineers (IMechE), the Institution of Engineering and Technology (IET) and the Royal Aeronautical Society (RAeS) recognise that this apprenticeship pathway provides the necessary skills, knowledge and experience to allow apprentices to apply for Engineering Technician status within their institutions. The apprenticeship does not confer automatic membership of any of these institutions as an Engineering Technician. Apprentices are free to apply to the institution of their choice and engage the process of registration. Please note each institution will charge a registration fee, details of these are available through the weblinks below.

aerosociety.com/

www.theiet.org/

www.imeche.org/

UCAS points for this pathway:

(No requirement specified)

Employee rights and responsibilities

Employee Rights and Responsibilities (ERR) is no longer compulsory, but Semta recommends that all apprentices receive it as part of their induction.

There are two methods of achieving ERR as set out below:

Method 1 - Qualifications

City & Guilds have produced a stand-alone qualification that can cover all 9 outcomes of ERR requirements.

Qualification details:
City & Guilds Level 2 Subsidiary Award in Employment and Personal Learning at Work
600/2819/1
Credit value: 2 credits
Training hours: 15

These qualifications will enable apprentices to both know and understand the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being. Apprentices achieving the qualifications will have demonstrated that they have the underpinning knowledge relevant for the engineering/manufacturing environment which satisfies the Specification for Apprenticeship Standards for Wales.

Method 2 - Workbook

Semta has produced an Apprentice ERR workbook that is available from:
customercare@eal.org.uk

The requirements for completing it must be explained to the apprentice right at the start of their training in order that they may take full advantage of their *company induction where significant amounts of information towards the national outcomes will be covered. The workbook is intended to enable apprentices to know, understand and record the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being.

***Please note**: All apprentices must receive a company induction programme.

Additional employer requirements

(No requirement specified)

Level 4, Pathway 9: Rail Engineering

Description of this pathway

1. Level 4 NVQ Extended Diploma in Engineering Manufacture - **for use with 18 to 24 year olds only or as an option for 25+**

Rail Engineering: Minimum credit value = 245 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,155

- Competence = 461 hours/ 107 credits
- Knowledge = minimum 360 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3) /18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 330 Hours Year 2 = 330 Hours Year 3 = 330 Hours Year 4 = 165 Hours

Minimum off-the-job training hours = 694 training hours
Knowledge - minimum of 360 training hours, plus 334 additional training hours for Essential Skills and Mentoring.

2. Level 4 NVQ Diploma in Engineering Manufacture - **for use with 25 years and over only**

Note: This NVQ Diploma qualification is for adult apprentices 25 years and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with relevant health and safety training.

Rail Engineering: Minimum credit value: 218 credits

Pathway duration approximately 42 months depending on the qualification and unit options selected

Pathway with minimum total training hours = 1,032

- Competence = 338 hours/ 80 credits
- Knowledge = minimum 360 hours (based on the smallest technical certificate training hours)
- Knowledge = minimum 120 credits (based on the smallest technical certificate credit)
- Essential Skills (notional value 60 hours x 3)/18 credits
- Mentoring (154 weeks x 1 hour/week) = 154 hours

Year 1 = 295 Hours Year 2 = 295 Hours Year 3 = 295 Hours Year 4 = 147 Hours

Minimum off-the-job training hours = 694 training hours
Knowledge - minimum of 360 training hours plus 334 additional training hours for Essential Skills and Mentoring.

Entry requirements for this pathway in addition to the framework entry requirements

There are no additional requirements other than the general entry conditions

Job title(s)	Job role(s)
Senior Technical Officer	Responsible for supporting either the track maintenance or renewals engineer by undertaking detailed surveys of track condition, undertaking detailed planning of maintenance or renewals activities, and completing quality management activities on site.
Track Designer	Responsible for producing, integrated non-principles design details for track layouts for new installations or renewals of existing track layouts confirming that it meets the requirements given in the scope of works and that the operational, technical and safety principles have been met.
Maintenance Manager – Electrification & Plant Systems	Maintenance Managers will manage a maintenance group or supervise a number of teams engaged in maintenance, and asset management of E&P systems including electrical traction distribution, overhead line, or fixed plant
Installation Manager- Electrification & Plant Systems	Plan and deliver the installation of E&P systems equipment, including traction distribution, overhead line and fixed plant, ensuring resources are identified and utilised, documentation generated, plan and installation are monitored, for testing and commissioning
Installation Manager (Signal Engineering)	Plan and deliver the installation of railway signalling equipment, ensuring resources are identified and utilised, documentation is provided to installation staff, and the achievement of the plan and installation are monitored, and the installation is handed over to testing and commissioning
Maintenance Manager (Signal Engineering)	Manage a maintenance group or supervise a number of teams engaged in maintenance, fault finding and asset management of signalling equipment
Project Engineer (Signal Engineering)	Responsible for the effective use of signalling engineering resources within the project, which include directly employed staff, contractors, and sub-contractors. Advise on decisions effecting signalling systems
Signalling Designer	Responsible for producing, integrated non-principles design details for relevant parts of a new or altered signalling system (or layout) confirming that it meets the requirements given in the scope of works and that the operational, technical and safety principles have been met
Signal Testing & Commissioning Technician	Covers the role of undertaking the testing and inspection activities of signalling systems and equipment to provide suitable and sufficient evidence to confirm that they comply with the design specification, meet the requirements appropriate to the application and are fit for entry into service
Track Renewals Manager	Plan and deliver the installation or renewals of railway track, ensuring resources are identified and utilised, documentation is provided to renewals staff, and the achievement of the plan and quality of installation are monitored, and the worksite is handed over to traffic in line with procedures

Maintenance Manager (Track)	Manage a maintenance group or supervise a number of teams engaged in maintenance, and asset management of track
Project Engineer (Track Engineering)	Responsible for directly employed staff, contractors, and sub-contractors. Advise the project manager on decisions effecting track, assess the impact of requested changes to the track design, and propose effective solutions in co-operation with the other engineering functions and the customer

Qualifications

Competence qualifications available to this pathway

C1 - Level 4 NVQ Extended Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C1a	600/9529/5	City & Guilds	107	461	
C1b	600/9576/3	EAL	107	461	

C2 - *Level 4 NVQ Diploma in Engineering Manufacture					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total Qualification Time**
C2a	600/9486/2	EAL	80	338	

Knowledge qualifications available to this pathway

K1 - Foundation Degree FdEng Railway Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K1a	N/A	Sheffield Hallam University	N/A	N/A	

Knowledge qualifications available to this pathway (cont.)

K2 - HNC Railway Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K2a	N/A	Sheffield Hallam University	150	360	

K3 - Pearson BTEC Level 4 HNC Diploma in Electrical and Electronic Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K3a	500/8831/2	Pearson	120	480	

K4 - Pearson BTEC Level 4 HNC Diploma in Electrical Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K4a	500/8257/7	Pearson	120	480	

K5 - Pearson BTEC Level 4 Higher National Certificate in Engineering

No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	Total qualification time
K5a	603/0450/9	Pearson	120	480	

Knowledge qualifications available to this pathway (cont.)

K6 - Pearson BTEC Level 4 HNC Diploma in Mechanical Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K6a	500/8824/5	Pearson	120	480	

K7 - Pearson BTEC Level 4 HNC Diploma in Operations Engineering					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**Total qualification time**
K7a	500/8960/2	Pearson	120	480	

Combined qualifications available to this pathway

N/A

Relationship between competence and knowledge qualifications

***Level 4 NVQ Diploma in Engineering Manufacture - for use by 25 years+ only (see below)**

K1 - K7 provide underpinning knowledge for C1 and C2

The designated Foundation Degrees and Technical Certificates underpin the knowledge elements of the competence qualification in this pathway. The knowledge qualifications deliver essential underpinning knowledge which supports the fundamental scientific and mathematical principles that equip apprentices with the understanding required to operate effectively and efficiently at a high level within this sub-sector.

Employers will select the knowledge qualification relevant to the job role of the Higher Apprentice. Note that Maths options must be included as part of the knowledge qualifications as this is a requirement of the job.

Higher Apprentices (age 18 to 24 years) must complete Level 4 NVQ Extended Diploma in Engineering Manufacture. However, if the relevant PEO units have already been achieved and certificated in a previous programme, for example applicants who have completed a Level 3 NVQ Extended Diploma as part of the Engineering Manufacture Level 3 framework, then they will be able to accredit these against the requirements of the Level 4 Extended Diploma.

*** Note:** The Level 4 NVQ Diploma in Engineering Manufacture may be used by adult apprentices 25 years old and over, who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with the relevant health and safety training.

Assessment of the units in the competency qualification should be carried out in line with: 'The units must be assessed in a work environment and must be assessed in accordance with the Common Requirements for National Vocational Qualifications (NVQ)' which can be downloaded from Semta's website.

Additional assessment requirements have been published by Semta. These additional assessment requirements are set down in Semta's Engineering NVQ unit assessment strategy which can also be downloaded from Semta's website.

Delivery methods for knowledge based qualifications may vary, from a conventional college-based environment, to delivery through a combination of this and

written/web-based/distance learning materials.

Transferable skills (Wales)

Essential skills (Wales)

Subject	Minimum Level
Communication	2
Application of numbers	2
ICT/Digital literacy	2

For a full list of available proxies for starts on or after 14th October 2016 please see section 35 of the current SASW.

Progression routes into and from this pathway

Progression routes into the pathway include those who have:

- A or AS levels in Science, Technology, Engineering or Mathematics subjects and GCSEs in English, Maths, and Science - grade C (new equivalent grade 4) or above or
- a Welsh Baccalaureate or
- completed a Level 3 Engineering Apprenticeship or a Rail Engineering Apprenticeship or have completed a 14 to 19 Advanced Diploma in Engineering or Manufacturing or
- previous work experience or employment in rail engineering at Level 3 or
- other relevant qualifications, experience or skills as given in the entry conditions.

It is a requirement that entrants should have completed the Essential Skills in Communication and Application of Number at Level 2 on entry to the framework. The industry has stated that Digital Literacy is relevant to effective performance and included in the required Essential Skills at Level 2. They could be also be obtained through achieving the recognised proxies for the new ESQ qualifications.

Essential Skills Wales qualifications achieved in the context of the Welsh Baccalaureate Qualification (WBQ) can be accepted, provided the specific certification of the title(s) and level(s) of those ESW/ESQ qualifications is provided.

Progression from this pathway for those who have completed a Higher Apprenticeship in Advanced Manufacturing Engineering (Rail Engineering):

- progression to the new Degree Apprenticeship in Manufacturing Engineering at Level 6
- progression to the Higher Apprenticeship framework for Advanced Manufacturing at Level 6

Please note that there is no Level 5 Higher Apprenticeship programme
- employment as a technician in rail engineering in a variety of job roles and functions (see job roles)

This Apprenticeship provides excellent preparation towards professional registration as an Engineering Technician and progression to Incorporated Engineer registration via the Degree Apprenticeship or Level 6 frameworks (Mechanical or Electrical/Electronics pathways). It may also, where appropriate, provide progression to a range of honours degrees

To further assist apprentices plan their careers we recommend they visit the following websites:

www.ucas.ac.uk/

www.engc.org.uk/

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

Professional Recognition
The Institution of Mechanical Engineers (IMechE), the Institution of Engineering and Technology (IET) and the Royal Aeronautical Society (RAeS) recognise that this apprenticeship pathway provides the necessary skills, knowledge and experience to allow apprentices to apply for Engineering Technician status within their institutions. The apprenticeship does not confer automatic membership of any of these institutions as an Engineering Technician. Apprentices are free to apply to the institution of their choice and engage the process of registration. Please note each institution will charge a registration fee, details of these are available through the weblinks below.

aerosociety.com/

www.theiet.org/

www.imeche.org/

UCAS points for this pathway:

(No requirement specified)

Employee rights and responsibilities

Employee Rights and Responsibilities (ERR) is no longer compulsory, but Semta recommends that all apprentices receive it as part of their induction.

There are two methods of achieving ERR as set out below:

Method 1 - Qualifications

City & Guilds have produced a stand-alone qualification that can cover all 9 outcomes of ERR requirements.

Qualification details:
City & Guilds Level 2 Subsidiary Award in Employment and Personal Learning at Work
600/2819/1
Credit value: 2 credits
Training hours: 15

These qualifications will enable apprentices to both know and understand the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being. Apprentices achieving the qualifications will have demonstrated that they have the underpinning knowledge relevant for the engineering/manufacturing environment which satisfies the Specification for Apprenticeship Standards for Wales.

Method 2 - Workbook

Semta has produced an Apprentice ERR workbook that is available from:
customercare@eal.org.uk

The requirements for completing it must be explained to the apprentice right at the start of their training in order that they may take full advantage of their *company induction where significant amounts of information towards the national outcomes will be covered. The workbook is intended to enable apprentices to know, understand and record the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being.

***Please note:** All apprentices must receive a company induction programme.

Additional employer requirements

(No requirement specified)

The remaining sections apply to all levels and pathways within this framework.

How equality and diversity will be met

Cogent, Improve, ProSkills and Semta recognise the business benefits of having apprentices from a wide variety of diverse backgrounds to contribute to the talent pool. In particular the sector faces an aging workforce and the probability of skill shortages, therefore, we must look to attract new entrants from a much more diverse recruitment pool.

We are committed to ensuring that equality and diversity drives all aspects of apprentice selection and recruitment and recognise that this is a challenge in a sector which is traditionally white and male-dominated:

• Process and Manufacturing Industries workforce historically has a poor image and a misconception that jobs in these industries are carried out in dark, dirty and potentially dangerous environments. On the contrary, nowadays Process and Manufacturing Industries are very high tech and largely controlled by sophisticated computer technology.
• Science, engineering and technology - women make up 50% of the labour market, yet they make up less than 20% of the labour market in science, engineering and technology despite the Women into Science and Engineering projects run in the past.

Despite the encouraging numbers of both female participants and ethnic minorities on the 14 to 19 Engineering and Manufacturing Diplomas and Young Apprenticeship programmes, the Engineering sector still has a significant way to go to encourage women into engineering and manufacturing careers.

As partners in this apprenticeship we are taking the following actions to help address these imbalances:

Cogent
• Introduced a series of industry specific case studies and Careers Pathways on the Cogent Careers web site (www.cogent-careers.com) to encourage people from all backgrounds to enter the nuclear industry
• Works very closely with the National Skills Academy for Nuclear to promote various initiatives such as Energy Foresight within schools (www.nuclear.nsacademy.co.uk)
• Regularly supports regional/national careers fairs/skills events to promote apprenticeships, providing an ideal opportunity to address issues faced by women and ethnic minorities
• Works with representative groups such as the United Kingdom Resource Centre, engaging with their Women in Science and Engineering Work programmes.

National Skills Academy Food and Drink (formerly Improve)
• Ongoing monitoring of data to identify any issues and intervene where necessary
• Developing careers materials that are accessible to all
• Identifying a process to make it easier for potential apprentices to gain information, e.g.by NSAFD's web site.

Semta
• Signing up to the Government's United Kingdom Resource Centre (UKRC) leading body for advanced gender equality in science, engineering and technology and the CEO's charter in a bid to step up female recruitment
• Semta's careers and qualifications centre includes an emag and articles encouraging more women into science and engineering
• Statement on our website that "Semta Apprenticeships Service encourages and supports equal opportunities in the engineering and manufacturing industry. Applications for apprenticeship positions are encouraged from all sections of the community to ensure the industry's workforce reflects the communities in which companies are based. Applications from people with disabilities are encouraged, however it is recognised that the nature of some employment may limit access for those with certain disabilities".
• Attend national careers fairs to promote science and engineering to a wide audience.

Apprenticeships are seen as a vital route to encourage and facilitate, a greater diversity of individuals into the industry, therefore entry conditions to this framework are extremely flexible and mentoring has been included to contribute towards increasing retention and achievement rates.

Semta as the Issuing Authority expects providers and employers to comply with the Equality Act 2010 to ensure that applicants are not discriminated against in terms of entry to and promotion within the sector using the 9 protected characteristics of:
1. Age
2. Disability
3. Gender
4. Gender reassignment
5. Marriage and civil partnerships
6. Pregnancy and maternity
7. Race
8. Religion and Belief
9. Sexual orientation

Download the guidance on the Equality Act here:
www.equalityhumanrights.com/advice-and-guidance/new-equality-act-guidance/

Cogent, Improve, ProSkills and Semta will monitor take up and achievement through the Higher Apprenticeship Steering Group and take steps to address any barriers to take up and achievement as part of our Sector Qualifications Strategies.

On and off the job training (Wales)

Summary of on- and off-the-job training

For the Apprenticeship, the hours outlined in the pathways may vary depending on previous experience and attainment of the apprentice. Where a learner enters an apprenticeship agreement having previously attained or acquired some or all of the appropriate competence or knowledge, this prior learning needs to be recognised and documented using the Recognition of Prior Learning (RPL) procedures.

The amount of 'on-the-job' training required to complete the apprenticeship under the apprenticeship agreement may then be reduced accordingly, provided the total numbers of'on-the-job' hours for this framework can be verified for apprenticeship certification. Those apprentices who commence training under a new apprenticeship agreement with a new employer may bring a range of prior experience with them. When an apprentice can claim 5% or more hours towards the 'on-the-job' framework total through prior learning acquired from previous full-time education, employment or other vocational programme, then the apprentice's learning programme should include "customisation".

Training providers and colleges are encouraged to identify additional 'on-the-job' training programmes that customise the learning to the new workplace. Customisation programmes may include selecting appropriate additional unit(s) from qualifications, or relevant units recognised as Quality Assured Lifelong Learning (QALL) through a CQFW recognised body, or follow Essential Skills at a level higher than that specified in the framework, or other competency-based qualifications/units relevant to the workplace.

Note
The Higher Apprenticeship framework for Advanced Manufacturing primarily addresses the training needs of apprentices involved in engineering and manufacturing. In many cases this means those who work in an engineering manufacturing environment. Having discussed the requirement for Essential Skills, it was felt that all three qualifications would be required for a framework at this level. For an apprentice who has already achieved the relevant qualification, they must have been certificated within 5 years from the date of application for the Higher Apprenticeship Certificate.

Any off-the-job training undertaken before the apprentice started may count towards the off-the-job training required for the apprenticeship if it was undertaken in relation to an accredited qualification contained in the framework for which an apprenticeship certificate is

applied for. Both on and off-the-job training hours need to be planned, reviewed and jointly evaluated between the apprentice, training instructor, tutor or lecturer and workplace supervisor and where relevant the apprentices's mentor. The apprentice should have access to training support at all times whether carrying out on or off-the job training.

On and off-the job training hours should be delivered through a variety of learning methods, individual and group teaching; team-working; e-learning; distance learning; coaching; mentoring; feedback and assessment.

Evidence requirements for claiming an Apprenticeship Certificate
FISSS (The Federation of Industry Sector Skills & Standards), who were formerly known as The Alliance of Sector Skills Councils, have recently been appointed as the certificating authority for Welsh Apprenticeships. FISSS have developed a new online system called ACW (Apprenticeship Certification Wales) for Welsh Apprenticeship certification which superseded the paper based system from 2nd September 2013 onwards. This means that all Apprenticeship completion certificates must be claimed via the new ACW online system from this date onwards.

If you are a Training Provider claiming an Apprenticeship completion certificate on behalf of an apprentice then you will need to register on ACW for a user name and password before you are able to register apprentices and claim certification.

If you are an apprentice claiming an Apprenticeship completion certificate for yourself then you will need to go to the ACW for an application form.

Off-the-job training

The minimum training hours for each pathway are summarised in the pathway descriptions.

How this requirement will be met

Off-the-job training needs to:

- achieve clear and specific outcomes which contribute directly to the successful achievement of the framework and this may include accredited and non-accredited elements of the framework
- be planned, reviewed and evaluated jointly between the apprentice and a tutor, teacher, mentor or manager
- allow the apprentice access as, and when required to tutors, teachers, mentor(s) or manager
- be delivered through one or more of the following methods: individual and group

tutoring, e-learning, distance learning, coaching, mentoring, feedback and assessment, collaborative/networked learning with peers or guided study.

Providers will not be required to record individual on and off the job training hours. However for certification purposes, the provider will be required to declare that the apprentice has completed the on and off the job training hours requirement as set out in this Apprenticeship framework.

Training hours delivered under an apprenticeship agreement may vary depending on the previous experience and attainment of the apprentice. The amount of off-the-job training required to complete the apprenticeship under the apprenticeship agreement may then be reduced accordingly, provided the total number of off-the-job hours for this framework can be verified for apprenticeship certification.

Previous attainment

Where a learner enters an apprenticeship agreement having previously attained parts or all of the relevant qualifications, this prior learning needs to be recognised.

For apprentices who have already achieved the relevant qualifications, they must have been certificated within 5 years of applying for the Higher Apprenticeship Certificate.

Previous experience

Where a learner enters an apprenticeship agreement with previous work-related experience, this prior learning needs to be recognised. To count towards apprenticeship certification, previous experience must be recorded using the appropriate Awarding Organisation's 'Recognition of Prior Learning' procedures and the hours recorded may then count towards the off-the-job hours required to complete the apprenticeship.

For apprentices with prior uncertificated learning experience, the off-the-job learning must have been acquired within five years of application for the Apprenticeship Certificate or have been continuously employed in the relevant job role in the industry for five years duration.

Foundation Degrees

All of the Foundation Degrees in this Framework have been supported by employers. They also meet the guidance relating to the minimum credit values for the Higher Education Credit Framework for Wales. The number of training hours required to complete the qualification will vary significantly depending on a number of factors including the academic starting point of the apprentice, the units/modules selected and the bespoke delivery and assessment model agreed between the education institution and the employer. Whilst this Framework document has specified the number Credit Accumulation and Transfer System (CATS) credits. It is also understood that many of the Higher Education qualifications included conform to the European

Credit Transfer and Accumulation System (ECTS) where 5 ECTS credits are equivalent to 10 CATS credits.

In the qualifications section of the framework document we have included the Awarding University. In many cases the delivery of the Foundation Degree will be franchised out to one or more Colleges of Further Education. Please contact the relevant Awarding University for details of delivery locations.

Off-the-job training

It is recommended that a mentor is appointed for each apprentice to review their progress on a regular basis and all apprentices are entitled to receive at least one hour a week mentoring and this is included in the off-the-job training hours. It is recommended that a mentor may well exceed this one hour per week contact time as and when required with the higher apprentice. This activity will take place off-the-job and is inclusive within the off-the-job hours quoted in the previous section.

Evidence of off-the-job hours and off-the-job training must be formally recorded, either in a diary, workbook, portfolio or be verified by attendance records. This evidence needs to be checked and signed by the assessor and employer.

Evidence of off-the-job training

The range of evidence requirements are as follows:

1. Copy of Awarding Organisation certificates for Communication & Application of Number (Essential Skills Wales) or Key skills at the same level as Essential Skills Wales or Essential Skills Qualifications (ESQ)*
2. Copy of the Awarding Organisation certificate for the ERR qualification or completed countersigned ERR workbook (if completed)
3. Copy of the Awarding Organisation certificate for the knowledge qualification

***Note:**

Apprentices registered on a SASW Apprenticeship on or after 1st January 2016 must complete the required mandatory new Essential Skills Qualifications (ESQ) at Level 1: Essential Communication Skills and Essential Application of Number Skills and Essential Digital Literacy Skills.

Apprentices who have enrolled prior to 31st December 2015 can continue to work towards either Key Skills / Essential Skills Wales (AON, Comms, and ICT / Digital Literacy) as required by the framework, which will be accepted within SASW.

For apprentices registered on or after 14th October 2016, recognised proxies for the new ESQ

qualifications are accepted - these are listed in the front of this framework document. This includes the Welsh Baccalaureate Qualification (WBQ) with ESQ and GCSE components.

Candidates undertaking the new WBQ will not be required to provide individual certificates as evidence.
Apprenticeship starts before the 14th October 2016 must continue to meet the 2013 SASW requirements for Essential Skills. Essential Skills Wales qualifications achieved in the context of the Welsh Baccalaureate Qualification (WBQ) can be accepted as long as the specific certification of the title(s) and level(s) of those ESW/ESQ qualifications is provided. The WBQ certificate itself does not provide this specific evidence.

Wider Key Skills are no longer required for this framework.

On-the-job training

Refer to each pathway description for a summary of the minimum on-the-job training hours

Occupational Competence Qualifications - on-the-job training.

Again working closely with employers across the Engineering, Manufacturing and Advanced Technology Sectors, Semta has ensured that the competence qualifications included in the Framework are flexible enough through a core and options approach, to be able to encompass a wide range of occupational areas that have been requested by employers and articulated in the Framework pathways such as:

- Product and System Design
- New Product Introduction
- Testing and Commissioning
- Production Planning and Control
- Project Planning and Management
- Quality Control and Assurance
- Equipment and Systems Maintenance
- Compliance, Risk and Safety Assessment
- Technical Support, Sales and Marketing

As well as a range of technical engineering and manufacturing options the qualifications may also include a number of generic competencies covering areas such as:

- Problem Solving
- Implementing Change
- Supporting Team Members
- Developing Working Relationships
- Supporting Learning and Development

- Managing processes, systems and/or people

The benefits to the employer and apprentice of having access to range of occupational competence unit options linked to a broad selection of technical knowledge and understanding qualifications is that they can:

• select the most appropriate balance and mix of technical engineering/manufacturing units along with generic and transferable knowledge and understanding units that meet the requirements of the business, the relevant job role and the apprentice's current capabilities, learning styles and career aspirations

• design a bespoke work place training and development plan to ensure that the apprentice:

- gains a broad understanding of business processes and theoretical concepts
- has the opportunity to apply the knowledge and understanding in the workplace
- develops a good understanding of their workplace including people, products, processes and procedures
- is able to acquire the relevant job role competencies in order to ensure a smooth transition into the working environment on completion of the apprenticeship programme
- has the potential for career progression and access to further /higher education programmes.

How this requirement will be met

The recommended on-the-job hours are described in each pathway description.

On-the-job training hours should:

- achieve clear and specific outcomes which contribute directly to the successful achievement of the framework and this may include accredited and non-accredited elements of the framework
- be planned, reviewed and evaluated jointly between the apprentice and a tutor, teacher, mentor or manager
- allow access as and when required by the apprentice either to a tutor, teacher, mentor or manager
- be delivered during contracted working hours.

Examples of on-the-job guided learning in an engineering manufacturing context might be:

- environmental awareness
- employability skills
- team working and communications
- task-specific workplace instructions or team briefings
- taught sessions by the workplace line manager/instructor

- induction where activities are covered within normal work duties
- coaching of apprentices

Providers will not be required to record individual on the job training hours. However for certification purposes, the provider will be required to declare that the apprentice has completed the on-the-job training hour requirement as set out in this Apprenticeship framework.

These hours may vary depending on previous experience and attainment of the apprentice. Where a learner enters an apprenticeship agreement having previously attained or acquired the appropriate competencies or knowledge, this prior learning needs to be recognised and documented using the relevant RPL procedures (as off-the-job above).

The amount of on-the-job training required to complete the apprenticeship under the apprenticeship agreement may then be reduced accordingly, provided the total number of on-the-job hours for this framework can be verified for apprenticeship certification.

Apprentices who commence training under a new apprenticeship agreement with a new employer may bring a range of prior experience with them. When an apprentice can claim a percentage or more hours towards the on-the-job framework total through prior learning acquired from previous full-time education, employment or other vocational programmes, then the apprentice's learning programme should include 'customisation'.

Training providers are encouraged to identify additional on-the-job training programmes that customise the learning to the new workplace. Customisation programmes may include selecting appropriate additional unit(s) from qualifications, or relevant units recognised as Quality Assured Lifelong Learning (QALL) through a CQFW recognised body, following Essential Skills at a level higher than that specified in the framework or other competency-based qualifications/units relevant to the workplace.

For apprentices who have already achieved the relevant qualifications, they must have been certificated within 5 years from the date of application for the Apprenticeship Certificate or have been continuously employed in the industry for 5 years. Job roles within the manufacturing and engineering Industry require a thorough level of technical competence and knowledge, which will be undertaken through work-based training, practice and experience.

All apprentices are required to generate evidence in the work place to demonstrate completion of the competence qualification, this may be through:

- apprentices generating a portfolio to record evidence of unit completion in accordance with the awarding organisation's requirements and this will be regularly reviewed by the assessor and mentor. A period of one hour per week has been set aside for mentors to review the ongoing progress of their apprentice

or

- apprentices generating portfolio evidence based on jobs undertaken will need to get this signed as having been completed by a responsible work colleague. This is then examined and agreed by the assessor as a contribution to demonstrating competence in the workplace.

Generation of portfolio evidence may be paper based, electronic with other mediums such as video evidence. Evidence may be gathered throughout the whole apprenticeship period.

Essential employability skills (Wales)

Essential employability skills

(No requirement specified)

apprenticeship
FRAMEWORKS ONLINE

For more information visit
www.afo.sscalliance.org