apprenticeship
FRAMEWORK

# Engineering and Advanced Manufacturing Degree Apprenticeship (Wales)

**IMPORTANT NOTIFICATION FOR ALL APPRENTICESHIP STARTS FROM 14 OCTOBER 2016**

Modifications to SASW came into effect on 14 October 2016. These changes relate to the **Essential Skills** and **Employer Rights and Responsibilities** requirements of a framework and they **ONLY** apply to **new Apprenticeship starts on, or after, 14th October**. Apprenticeship starts before this date must continue to meet the 2013 SASW requirements for Essential Skills and Employer Rights and Responsibilities.

For more details of the changes and how they will affect new apprenticeship starts, please read the following preface page to the framework document. NB: Please check the "Revising a Framework" section for information on any additional changes that may have been made to this framework.

## Latest framework version?

For any previous versions of this framework: www.acwcerts.co.uk/framework_library

Issue date: 1ST April 2020


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Prentisiaethau Apprenticeships

# Engineering and Advanced Manufacturing Degree Apprenticeship

## Contents

### Contents

# Framework information

## Information on the Issuing Authority for this framework:

**Welsh Government**

Enter Sector Description

| | |
|---|---|
| Issue number: 5 | **This framework includes:** |
| Framework ID:<br><br>FR05034 | Level 2 ☐<br>Level 3 ☐<br>Level 4-7 ☒ |
| Date this framework is to be reviewed by: 31/07/2024 | **This framework is for use in: Wales** |

## Short description

This Degree Apprenticeship programme at level 6 has been designed to provide the Engineering and Advanced Manufacturing sector in Wales with high quality Engineering and Advanced Manufacturing professionals.

The Engineering and Advanced Manufacturing Degree Apprentices will develop higher level applied practical skills, knowledge and competence combined within an applied honours degree programme in one of five areas of Engineering and Advanced Manufacturing discipline, including:

Mechanical Engineering
Electrical / Electronic Engineering
Advanced Manufacturing Engineering
Chemical Engineering Power

Engineering Roles in this framework are likely to fit into Standard Occupational Code (SOC): 21

# Contact information

## Proposer of this framework

Semta has worked closely with its employers to define National Occupational Standards (NOS) for Engineering and Advanced manufacturing.
Degree qualification specifications of learning and skills outcomes have been developed that are suitable for use within this degree apprenticeship framework.
This Engineering and Advanced Manufacturing Degree Apprenticeship (Wales) framework and the degree apprenticeship learning and skills outcomes has been developed in response to industry needs. The need for an Engineering and Advanced manufacturing degree apprenticeship framework was identified through employer consultation and five priority pathway themes were identified for the Engineering and Advanced Manufacturing Degree Apprenticeship for Wales. The applied degree qualification learning and skills outcomes specifications underpinning the degree apprenticeship framework have been developed through collaboration with employers in Wales between September 2018 and March 2019, and are informed by the relevant NOS.
Since then the framework has been reviewed by a large employer group together with their supply chains, including Tata Steel, Airbus, Kellogg's, Sony, Renishaw, Control Techniques, Calsonic Kansei, Kasai, Hayakawa International (UK) Ltd, BAe Systems, Spectrum Technologies Ltd, Dawson Shanahan Wales Ltd, GTS Flexible Materials Ltd, Wall Colmonoy, Celsa Manufacturing, Newport Wafer Fab Ltd., e-cube aero and Toyota.
The framework has also been consulted with and informed by the network of delivery colleges and universities in Wales.
This Engineering and Advanced Manufacturing Degree Apprenticeship framework will ensure that apprentices are given the appropriate skills, knowledge and understanding required in the workplace to support the wide range of roles that apprentices might be undertaking.
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**Developer of this framework**


| | |
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# Revising a framework

## Why this framework is being revised

This framework has been updated by ODAG Consultants Ltd. to add new degree qualifications.

## Summary of changes made to this framework

This framework has been updated by ODAG Consultants Ltd. to ensure all qualifications are up to date.

## Qualifications removed

N/A

## Qualifications added

Pathway 2:

- BEng (Hons) Degree Apprenticeship Electrical & Electronic Engineering - University of Wales Trinity Saint David

Pathway 6:

- BEng (Hons) Low Carbon Energy, Efficiency and Sustainability – Wrexham Glyndwr University

### Qualifications that have been extended

N/A

# Purpose of this framework

## Summary of the purpose of the framework

This Degree Apprenticeship framework has been designed to provide up-skilling, progression and re-skilling routes for those seeking to become Engineering and Advanced Manufacturing Professionals.

Engineering and Advanced Manufacturing Degree Apprentices can work in the following broad areas:

Mechanical Engineering
Electrical / Electronic Engineering
Advanced Manufacturing
Chemical Engineering
Integrated Engineering
Renewable Energy Engineering

What is included in this Apprenticeship?

The apprenticeship is made up of a range of applied degree qualifications and learning that will provide apprentices with the skills and knowledge required to become competent in their chosen job role within Engineering and Advanced Manufacturing.

The framework includes the appropriate balance of technical, business and interpersonal knowledge and skills designed to ensure apprentices have an appropriate set of skills to operate in today's engineering and advanced manufacturing job roles.

Engineering and Advanced Manufacturing is a key sector for Wales. It spans a wide range of types of industry, including:

Metals, plastics and non-mineral products
Food and beverages
Shipbuilding
ICT / precision instruments
Automotive
Aerospace

Machinery
Equipment
Electrical / electronic products, semiconductors, chips, PCBs etc.
Chemicals Food and beverages
Pharmaceuticals)
High explosives
Electrical power generation
Nuclear electrical power generation
Renewables electrical power generation
Improvements to productivity and competitiveness across the Engineering and Advanced Manufacturing sector continue to present new technology skills investment paradigms.

The Engineering and Advanced Manufacturing sector includes both mature and "leading-edge" types of industry:

The "leading-edge" types include:
- Aerospace
- Automotive
- Electronics
- Marine (ship, boat and yacht building, maintenance and repair)

The "mature engineering" types include:
- Electrical
- Metal goods
- Mechanical
- Other Transport Equipment

Sector employment and establishments

Advanced Materials and Manufacturing is an exciting sector in Wales. The combined Advanced Manufacturing and Engineering (AME) sub-sectors in Wales employ over 150,000 people. An estimated 66,000 people are employed in technical roles such as professional engineers, scientists and technologists. This sector adds more value to the economy than most other sectors (Annual Business Survey ONS, 2015).

Many jobs in Advanced Materials and Manufacturing are highly skilled such as managers, professionals and engineers. The industry needs Science, Technology, Engineering and Maths graduates and employers are looking for higher skill levels requiring a degree qualification.

Key AME sub-sectors in Wales include metals (27% of AME employment), consultancy, testing and analysis (16%), electronics (15%), aerospace (14%) and automotive (10%). AME employment in Wales is concentrated in Flintshire (15%), Cardiff (9%), Neath Port Talbot

(8%) and Bridgend (6%).

Micro-sized establishments (less than 10 employees) account for 82% of total AME establishments, Small and Medium-sized Enterprises (SMEs (10 to 249 employees)) represent 17% of establishments and less than 1% of AME establishments in Wales are large (250 employees plus) – just 495 of approx. 120,480.

Demographics of the technical workforce in the AME sectors in Wales

Working status - 95% of the AME technical workforce is a company employee and 95% of the technical workforce is employed on a full-time basis.

Gender - only 9% of the technical workforce is female.
Age – only 6% of the technical workforce is aged 16-24 years old, with 9% aged 60 years and over.
Disability - only 8% of the technical workforce has some sort of disability.
Ethnicity - only 5% of the technical workforce is from an ethnic minority.

Occupations

In terms of technical occupations, approximately 12,500 people are employed as technicians, 19,670 people are employed in craft level occupations and 17,345 in operator level occupations. These three technical occupations account for 75% of total employment in technical occupations within the AME sectors in Wales.

Employment trends

The AME sectors in Wales have experienced a period of major restructuring. Between 2010 to 2014, there was a net gain of nearly 17,000 jobs (+21%), compared with an increase in employment of 3% across all sectors in Wales. In 2015, there were 433 postings for technical engineering jobs in Wales.

Employment projections

Taking into account retirements, for operator, craft and technician technical roles, there is expected to be a net requirement across the AME sectors in Wales for 4,000 new recruits (800 per annum) in these occupations between 2016-2020.

Vacancies

Employers in the AME sectors in Wales show a substantial demand for new recruits. In 2015, it is estimated that 18% of AME establishments in Wales had vacancies compared to 14% of

establishments across all sectors. In total, there were 1,400 vacancies across the AME sectors in Wales. Over three-quarters of all AME vacancies in Wales were from SMEs (50-249 employees). It is estimated that 10% of AME employers in Wales had hard-to-fill vacancies with a total of 660 hard-to-fill vacancies reported. Two-thirds of all hard-to-fill vacancies were in craft, technician and operator occupations. Skill shortages in applicants were the main reason for these hard-to-fill vacancies. Employers in Wales have increased their provision of off-the-job training from 47% in 2013 to 49% in 2015, reflecting an increased awareness of the need to tackle the problem themselves.

Drivers of skills change

The engineering sectors felt that the main drivers of future skills requirements would be new legislative or regulatory requirements, introduction of new technologies or equipment, development of new products and services, introduction of new working practices and increased competitive pressure. Large and medium-sized employers were most likely to expect a change in their skills needs from the key drivers identified.

Skill needs and gaps

26% of AME establishments in Wales reported skills gaps. The incidence of skills gaps increases by size of establishment, ranging from 20% of micro-sized establishments to 46% of large establishments.

It is estimated that 7% of the AME workforce in Wales have skills gaps. The main reason for skills gaps in the AME sectors is a lack of experience/being recently recruited. The main skills cited as lacking in employees were technical, practical or job specific skills (approximately three quarters of establishments reporting skills gaps). Employers were most likely to have technical skills gaps with craft, operator and technician occupations. The other main skills gaps highlighted include problem solving, team working, oral communications and management skills.

The main action taken to overcome skills gaps by AME employers was to increase higher qualification level recruitment and invest in training activity/spend or increase/expand trainee programmes.

The Degree Apprenticeship suite in this Engineering and Advanced Manufacturing framework has been developed to address critical skills gaps and shortages as detailed above and contains six pathways:

Pathway 1 Mechanical Engineering
Pathway 2 Electrical / Electronic Engineering
Pathway 3 Advanced Manufacturing

Pathway 4 Chemical Engineering
Pathway 5 Integrated Engineering
Pathway 6 Renewable Energy Engineering

These have been identified as priorities to addressing the skills needs and gaps highlighted. The framework format will allow greater tailoring of qualifications to meet employers' skills needs, so higher take-up levels are anticipated.

## 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

The Engineering and Advanced Manufacturing Degree Apprenticeship framework at Level 6 is primarily suitable for applicants who have either completed A levels appropriate for university entrance, or who may have already completed a related apprenticeship at Levels 3, 4 or 5.

Please note: Applicants for this apprenticeship framework are likely to be 19+ years.

Initial Assessment

It is likely that applicants may be asked to undertake a variety of tests which will include English, maths and problem solving, supported by an employer interview. These are not meant as a barrier to entry, but more to gauge the ability of the applicant to achieve the programme outcomes and to tailor the individual learning plan to meet their needs and those of the employer.

Rules to avoid repeating qualifications

Processes exist to make sure that applicants with relevant prior knowledge, qualifications and/or experience are not disadvantaged by having to repeat learning. Colleges and universities will be able to advise on the current rules for accrediting prior learning and recognising prior experience.

Essential Skills Wales Key skills are accepted as alternatives to Essential Skills Wales qualifications, provided the Key Skills Certificate(s) attained are at the same level(s) as those specified for Essential Skills Wales qualifications. However, Key Skills cannot be completed as part of this framework.

It is a requirement that entrants should have completed the Essential Skills in Communication, Application of Number and IT at Level 3 on entry to programmes that are listed in the framework. These could be achieved either through completing Essential/Key Skills at Level 3, or GCSEs / O levels grade C or above.

# Level 6

Title for this framework at level 6

## Engineering and Advanced Manufacturing Degree Apprenticeship

Pathways for the framework at level 6:

| | |
|---|---|
| Pathway 1: | Mechanical Engineering Degree Apprenticeship |
| Pathway 2: | Electrical / Electronic Engineering Degree Apprenticeship |
| Pathway 3: | Advanced Manufacturing Engineering Degree Apprenticeship |
| Pathway 4: | Chemical Engineering Degree Apprenticeship |
| Pathway 5: | Integrated Engineering Degree Apprenticeship |
| Pathway 6: | Renewable Energy Engineering Degree Apprenticeship |

# Level 6, Pathway 1: Mechanical Engineering Degree Apprenticeship

## Description of this pathway

Pathway duration approximately 36 months

The requirements for the Mechanical Engineering pathway are:

- Competence and knowledge applied degree qualification = 360 credits
- Essential Skills Wales (where not already satisfied) 3 x 6 credits =18 credits

## 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) |
| --- | --- |
| Mechanical Engineer | Mechanical engineers undertake research and produce specifications for the installation, operation and maintenance of mechanical components or systems. This includes; engines, machines, aircraft, vehicle and ships' structures, building services and other mechanical items. |
| Mechanical Design Engineer | Mechanical design engineers are responsible for the process of designing new mechanical components and products, receiving and developing requirement specifications. They research and develop ideas and processes for new products, and improve the performance and design of existing products. |

# Qualifications

## Competence qualifications available to this pathway

N/A

## Knowledge qualifications available to this pathway

N/A

## Combined qualifications available to this pathway

B1 – BEng (Hons) Mechanical Engineering

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B1a | nil | University of South Wales | 360 | 3600 | X. |

B2 – BSc (Hons) Mechanical Engineering

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B2a | nil | University of South Wales | 360 | 3600 | X. |
| B2b | nil | University of Wales Trinity Saint David | 360 | 3600 | |

B3 – BEng (Hons) Mechanical and Manufacturing Engineering

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B3a | nil | University of Wales Trinity Saint David | 360 | 3600 | X. |

B4 – BEng (Hons) Materials Science

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B4a | nil | University of Wales Trinity Saint David | 360 | 3600 | X. |

B5 – BEng (Hons) Industrial Engineering Design - Mechanical

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B5a | nil | Glyndwr University | 360 | 3600 | X. |

| B6 – BEng (Hons) Applied Mechanical Engineering Systems | | | | | |
|---|---|---|---|---|---|
| **No.** | **Ref no.** | **Awarding organisation** | **Credit value** | **Guided learning hours** | **UCAS points value** |
| B6a | nil | Bangor University | 360 | 3600 | X. |

## Relationship between competence and knowledge qualifications

The This is a combined degree qualification that delivers both the knowledge and competence requirements with minimum of 360 credits as set out in the Engineering and Advanced Manufacturing degree apprenticeship learning and skills framework outcomes specification, March 2019.

# Essential Skills

An apprenticeship framework must specify as a Welsh certificate requirement the expected achievement levels of Essential Skills in Communication and the Application of Number, and Digital Literacy (where required).

## ESSENTIAL SKILLS WALES

| | |
|---|---|
| **Communication** | **Min.Level 2** |
| **Application of Number** | **Min.Level 2** |
| **ICT/Digital Literacy** | **Min.Level 2** |

For the current list of acceptable proxy qualifications and appropriate minimum grade/level requirements, please refer to the most recent version of SASW on the gov.wales website. Additional guidance materials can be found on the Knowledge Base section of the ACW website.

# Progression routes into and from this pathway

Progression routes into this pathway include those who:

- have completed the Higher Apprenticeship at Level 4 or 5 and have undertaken a relevant Foundation Degree linked to the Honours degrees listed in this framework
- have completed a relevant HNC/HND that links to the Honours degrees listed in this framework.

Progression from this pathway for those who have completed a degree apprenticeship in Mechanical Engineering (Level 6):

- employment as a Mechanical Engineer in the job roles (or similar) as stated in this framework
- Masters Degrees in the relevant specialism.

## UCAS points for this pathway:

*(No requirement specified)*

# Employee rights and responsibilities

Please note that for Apprenticeship starts from 14/10/2016 onwards ERR is no longer a **mandatory** requirement in all frameworks.

However, it may still be included in some frameworks and where it is not explicitly stated that ERR is not a requirement then confirmation of an Apprentice's ERR achievement will still remain a requirement for Apprenticeship certification purposes.

Is ERR a requirement for this framework? **YES** ☐ **NO** ☒

Framework Developer to complete with relevant info

# Level 6, Pathway 2: Electrical / Electronic Engineering Degree Apprenticeship

## Description of this pathway

The requirements for the Electrical / Electronic Engineering pathway are:

- Competence and knowledge applied degree qualification = 360 credits
- Essential Skills Wales (where not already satisfied) 3 x 6 credits =18 credits

## 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 Engineer | Electrical engineers undertake research, direct installation and construction and manage the operation and maintenance of electrical equipment, power stations, building control systems and other electrical products and systems. |
| Electronic Engineer | Electronics engineers install and maintain electronic components, software, products, or systems for commercial, industrial, medical, military, or scientific applications. |
| Electrical / Electronic Design Engineer | Electrical / electronic design engineers are responsible for developing system specifications and layouts and the process of designing new electrical and electronic systems for various applications. They research systems ideas and develop system designs using specialised design software. |

# Qualifications

## Competence qualifications available to this pathway

N/A

## Knowledge qualifications available to this pathway

N/A

## Combined qualifications available to this pathway

B1 – BEng (Hons) Electrical and Electronic Engineering

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B1a | nil | University of South Wales | 360 | 3600 | X. |

B2 – BSc (Hons) Electrical and Electronic Engineering

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B2a | nil | University of South Wales | 360 | 3600 | X. |
| B2b | nil | University of Wales Trinity Saint David | 360 | 3600 | |

B3 – BSc (Hons) Semiconductor Technologies

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B3a | nil | University of South Wales | 360 | 3600 | X. |

B4 – BEng (Hons) Industrial Engineering Design - Electrical & Electronic

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B4a | nil | Glyndwr University | 360 | 3600 | X. |

B5 – BEng (Hons) Applied Electrical/Electronic Engineering Systems

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B5a | nil | Bangor University | 360 | 3600 | X. |

## Relationship between competence and knowledge qualifications

*Framework Developer to complete with relevant info*

# Essential Skills

An apprenticeship framework must specify as a Welsh certificate requirement the expected achievement levels of Essential Skills in Communication and the Application of Number, and Digital Literacy (where required).

## ESSENTIAL SKILLS WALES

| | |
|---|---|
| **Communication** | **Min.Level 2** |
| **Application of Number** | **Min.Level 2** |
| **ICT/Digital Literacy** | **Min.Level 2** |

For the current list of acceptable proxy qualifications and appropriate minimum grade/level requirements, please refer to the most recent version of SASW on the gov.wales website. Additional guidance materials can be found on the Knowledge Base section of the ACW website.

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# Progression routes into and from this pathway

A Progression routes into this pathway include those who:

have completed a relevant Higher Apprenticeship at Level 4 or 5 or have undertaken a Foundation Degree linked to the Honours degrees listed in this framework.

have completed a relevant HNC/HND that links to the Honours degrees listed in this framework.

Progression from this pathway for those who have completed a degree apprenticeship in Electrical / Electronic Engineering (Level 6):

- employment as an Electrical / Electronic Engineer in the job roles (or similar) as stated in this framework
- Masters degrees in the relevant specialism.

## UCAS points for this pathway:

*(No requirement specified)*

# Employee rights and responsibilities

Please note that for Apprenticeship starts from 14/10/2016 onwards ERR is no longer a **mandatory** requirement in all frameworks.

However, it may still be included in some frameworks and where it is not explicitly stated that ERR is not a requirement then confirmation of an Apprentice's ERR achievement will still remain a requirement for Apprenticeship certification purposes.

Is ERR a requirement for this framework? **YES** ☐ **NO** ☒

# Level 6, Pathway 3: Advanced Manufacturing Engineering Degree Apprenticeship

## Description of this pathway

Pathway duration approximately 36 months

The requirements for the Advanced Manufacturing Engineering pathway are:

Competence and knowledge applied degree qualification = 360 credits
Essential Skills Wales (where not already satisfied) 3 x 6 credits =18 credits

## 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 Engineer | Manufacturing Engineers design manufacturing systems, develop, evaluate and improve manufacturing processes by applying knowledge of product design, fabrication, assembly, tooling, materials and by studying product and manufacturing methods. |

# Qualifications

## Competence qualifications available to this pathway

**N/A**

## Knowledge qualifications available to this pathway

## Combined qualifications available to this pathway

B1 – BEng (Hons) Advanced Manufacturing Operations

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B1a | nil | University of Wales Trinity Saint David | 360 | 3600 | X. |

B2 – BEng (Hons) Manufacturing Systems Engineering

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B2a | nil | University of Wales Trinity Saint David | 360 | 3600 | X. |

B3 – BEng (Hons) Advanced Manufacturing Engineering

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B3a | nil | Swansea University | 360 | 3600 | X. |

B4 – BEng (Hons) Aeronautical and Manufacturing Engineering

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B4a | nil | Swansea University | 360 | 3600 | X. |

B5 – BEng (Hons) Production Engineering

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B5a | nil | Glyndwr University | 360 | 3600 | X. |

## Relationship between competence and knowledge qualifications

*Framework Developer to complete with relevant info*

# Essential Skills

An apprenticeship framework must specify as a Welsh certificate requirement the expected achievement levels of Essential Skills in Communication and the Application of Number, and Digital Literacy (where required).

## ESSENTIAL SKILLS WALES

| | |
|---|---|
| **Communication** | **Min.Level 2** |
| **Application of Number** | **Min.Level 2** |
| **ICT/Digital Literacy** | **Min.Level 2** |

For the current list of acceptable proxy qualifications and appropriate minimum grade/level requirements, please refer to the most recent version of SASW on the gov.wales website. Additional guidance materials can be found on the Knowledge Base section of the ACW website.

# Progression routes into and from this pathway

Progression routes into this pathway include those who:

have completed a relevant Higher Apprenticeship at Level 4 or 5 or have undertaken a Foundation Degree linked to the Honours degrees listed in this framework.

have completed a relevant HNC/HND that links to the Honours degrees listed in this framework.

Progression from this pathway for those who have completed a degree apprenticeship in Advanced Manufacturing Engineering (Level 6):

- employment as a Manufacturing Engineer in the job roles (or similar) as stated in this framework
- Masters degrees in the relevant specialism.

## UCAS points for this pathway:

*(No requirement specified)*

# Employee rights and responsibilities

Please note that for Apprenticeship starts from 14/10/2016 onwards ERR is no longer a **mandatory** requirement in all frameworks.

However, it may still be included in some frameworks and where it is not explicitly stated that ERR is not a requirement then confirmation of an Apprentice's ERR achievement will still remain a requirement for Apprenticeship certification purposes.

Is ERR a requirement for this framework? **YES** ☐ **NO** ☒

# Level 6, Pathway 4: Chemical Engineering Degree Apprenticeship

## Description of this pathway

Framework Developer to complete with relevant info

Pathway duration approximately 36 months

The requirements for the Chemical Engineering pathway are:

- Competence and knowledge applied degree qualification = 360 credits
- Essential Skills Wales (where not already satisfied) 3 x 6 credits =18 credits

## 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) |
| --- | --- |
| Chemical Engineer | Chemical engineers apply the principles of chemistry, biology, physics, and mathematics to solve problems that involve the production or use of chemicals, fuel, drugs, food, and other products. They design new processes and equipment for manufacturing and maintain and optimise existing plant. |
| Ordnance, Munitions & Explosives (OME) Engineer | OME engineers design, test and coordinate development of chemical based explosive ordnance material to meet specifications. They carry out a range of technical, engineering and scientific activities which includes laboratory-based investigations, energetic studies and scientific experimentation. |

# Qualifications

## Competence qualifications available to this pathway

N/A

## Knowledge qualifications available to this pathway

N/A

## Combined qualifications available to this pathway

B1 – BSc (Hons) Ordnance, Munitions & Explosives (Technical Research & Development)

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B1a | nil | University of Wales Trinity Saint David | 360 | 3600 | X. |

B2 – BEng (Hons) Ordnance, Munitions & Explosives (Safety)

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B2a | nil | University of Wales Trinity Saint David | 360 | 3600 | X. |

B3 – BEng (Hons) Ordnance, Munitions & Explosives (Manufacturing & Processing)

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B3a | nil | University of Wales Trinity Saint David | 360 | 3600 | X. |

B4 – BEng (Hons) Ordnance, Munitions & Explosives (Breakdown & Disposal)

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B4a | nil | University of Wales Trinity Saint David | 360 | 3600 | X. |

B5 – BEng (Hons) Ordnance, Munitions & Explosives (Test & Evaluation)

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| B5a | nil | University of Wales Trinity Saint David | 360 | 3600 | X. |

## Relationship between competence and knowledge qualifications

*Framework Developer to complete with relevant info*

# Essential Skills

An apprenticeship framework must specify as a Welsh certificate requirement the expected achievement levels of Essential Skills in Communication and the Application of Number, and Digital Literacy (where required).

## ESSENTIAL SKILLS WALES

| | |
|---|---|
| **Communication** | **Min.Level 2** |
| **Application of Number** | **Min.Level 2** |
| **ICT/Digital Literacy** | **Min.Level 2** |

For the current list of acceptable proxy qualifications and appropriate minimum grade/level requirements, please refer to the most recent version of SASW on the gov.wales website. Additional guidance materials can be found on the Knowledge Base section of the ACW website.

# Progression routes into and from this pathway

Progression routes into this pathway include those who:

have completed a relevant Higher Apprenticeship at Level 4 or 5 or have undertaken a Foundation Degree linked to the Honours degrees listed in this framework.

have completed a relevant HNC/HND that links to the Honours degrees listed in this framework.

Progression from this pathway for those who have completed a degree apprenticeship in Chemical Engineering (Level 6):

- employment as a Chemical Engineer in the job roles (or similar) as stated in this framework
- Masters degrees in the relevant specialism.

## UCAS points for this pathway:

*(No requirement specified)*

# Employee rights and responsibilities

Please note that for Apprenticeship starts from 14/10/2016 onwards ERR is no longer a **mandatory** requirement in all frameworks.

However, it may still be included in some frameworks and where it is not explicitly stated that ERR is not a requirement then confirmation of an Apprentice's ERR achievement will still remain a requirement for Apprenticeship certification purposes.

Is ERR a requirement for this framework? **YES** ☐ **NO** ☒

# Level 6, Pathway 5: Integrated Engineering Degree Apprenticeship

## Description of this pathway

Pathway duration approximately 36 months

The requirements for the Integrated Engineering pathway are:

Competence and knowledge applied degree qualification = 360 credits
Essential Skills Wales (where not already satisfied) 3 x 6 credits =18 credits

## 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) |
| --- | --- |
| Integrated Engineer | Integrated engineers undertake research and produce specifications for the installation, operation and maintenance of integrated mechanical and electrical / electronic components & systems. This includes; engines, machines, aircraft, vehicle and ships structures and other combined items. |

# Qualifications

## Competence qualifications available to this pathway

**N/A**

## Knowledge qualifications available to this pathway

**N/A**

## Combined qualifications available to this pathway

| B1 – BEng (Hons) Integrated Engineering | | | | | |
|---|---|---|---|---|---|
| **No.** | **Ref no.** | **Awarding organisation** | **Credit value** | **Guided learning hours** | **UCAS points value** |
| B1a | nil | Cardiff University | 360 | 3600 | X. |

## Relationship between competence and knowledge qualifications

This is a combined degree qualification that delivers both the knowledge and competence requirements with minimum of 360 credits as set out in the Engineering and Advanced Manufacturing degree apprenticeship learning and skills framework outcomes specification, March 2019.

# Essential Skills

An apprenticeship framework must specify as a Welsh certificate requirement the expected achievement levels of Essential Skills in Communication and the Application of Number, and Digital Literacy (where required).

## ESSENTIAL SKILLS WALES

| | |
|---|---|
| **Communication** | **Min.Level 2** |
| **Application of Number** | **Min.Level 2** |
| **ICT/Digital Literacy** | **Min.Level 2** |

For the current list of acceptable proxy qualifications and appropriate minimum grade/level requirements, please refer to the most recent version of SASW on the gov.wales website. Additional guidance materials can be found on the Knowledge Base section of the ACW website.

□□

# Progression routes into and from this pathway

Progression routes into this pathway include those who:

have completed the Higher Apprenticeship at Level 4 or 5 and have undertaken a relevant Foundation Degree linked to the Honours degrees listed in this framework have completed a relevant HNC/HND that links to the Honours degrees listed in this framework. Progression from this pathway for those who have completed a degree apprenticeship in Industrial Engineering (Level 6):

employment as an Industrial Engineer in the job roles (or similar) as stated in this framework Masters Degrees in the relevant specialism.

## UCAS points for this pathway:

*(No requirement specified)*

# Employee rights and responsibilities

Please note that for Apprenticeship starts from 14/10/2016 onwards ERR is no longer a **mandatory** requirement in all frameworks.

However, it may still be included in some frameworks and where it is not explicitly stated that ERR is not a requirement then confirmation of an Apprentice's ERR achievement will still remain a requirement for Apprenticeship certification purposes.

Is ERR a requirement for this framework? **YES** ☐ **NO** ☒

# Level 6, Pathway 6: Renewable Energy Engineering Degree Apprenticeship

## Description of this pathway

Pathway duration approximately 36 months

The requirements for the Mechanical Engineering pathway are:

- Competence and knowledge applied degree qualification = 360 credits
- Essential Skills Wales (where not already satisfied) 3 x 6 credits =18 credits

## 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) |
| --- | --- |
| Renewable Energy Engineer | Brief role descriptionRenewable energy engineers work on the production of energy from renewable or sustainable sources, including low carbon, wind, solar and hydro or marine power. They research and develop new machinery and equipment, production processes and ways to minimise impact on the environment. |

# Qualifications

## Competence qualifications available to this pathway

N/A

## Knowledge qualifications available to this pathway

N/A

## Combined qualifications available to this pathway

B1 – BEng (Hons) Low Carbon Energy, Efficiency and Sustainability

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|---|---|---|---|---|---|
| B1a | nil | Glyndwr University | 360 | 3600 | X. |

## Relationship between competence and knowledge qualifications

The This is a combined degree qualification that delivers both the knowledge and competence requirements with minimum of 360 credits as set out in the Engineering and Advanced Manufacturing degree apprenticeship learning and skills framework outcomes specification, March 2019.

# Essential Skills

An apprenticeship framework must specify as a Welsh certificate requirement the expected achievement levels of Essential Skills in Communication and the Application of Number, and Digital Literacy (where required).

## ESSENTIAL SKILLS WALES

| | |
|---|---|
| **Communication** | **Min.Level 2** |
| **Application of Number** | **Min.Level 2** |
| **ICT/Digital Literacy** | **Min.Level 2** |

For the current list of acceptable proxy qualifications and appropriate minimum grade/level requirements, please refer to the most recent version of SASW on the gov.wales website. Additional guidance materials can be found on the Knowledge Base section of the ACW website.

# Progression routes into and from this pathway

Progression routes into this pathway include those who:

- have completed the Higher Apprenticeship at Level 4 or 5 and have undertaken a relevant Foundation Degree linked to the Honours degrees listed in this framework
- have completed a relevant HNC/HND that links to the Honours degrees listed in this framework.

Progression from this pathway for those who have completed a degree apprenticeship in Renewable Energy Engineering (Level 6):

- employment as a Renewable Energy Engineer in the job roles (or similar) as stated in this framework
- Masters Degrees in the relevant specialism.

## UCAS points for this pathway:

*(No requirement specified)*

# Employee rights and responsibilities

Please note that for Apprenticeship starts from 14/10/2016 onwards ERR is no longer a **mandatory** requirement in all frameworks.

However, it may still be included in some frameworks and where it is not explicitly stated that ERR is not a requirement then confirmation of an Apprentice's ERR achievement will still remain a requirement for Apprenticeship certification purposes.

Is ERR a requirement for this framework? **YES** ☐ **NO** ☒

*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

## Summary of on- and off-the-job training

Total on and off the job training for all pathways
At Level 6, degree apprentices will only be required to undertake the further competence and knowledge training as specified in the qualifications section of the relevant pathway. The knowledge and skills requirement is met throug h the achievement of an Honours degree in the relevant pathway that aligns with appropriate degree learning and skills specification – unspecified hours.
Duration of training is measured in years and semesters and delivery of honours degrees will typically vary between three and four years. All the degrees specified within the pathways within this framework are part time.
On and off the job training hours must be planned, reviewed and evaluated jointly between the apprentice, university tutor and employer, mentor or manager. Education and training support via a tutor, teacher, mentor or manager may be delivered through one or more of the following methods:

- individual and group teaching
- e-learning
- distance learning
- coaching
- mentoring
- feedback and assessment
- collaborative/networked learning.

## Off-the-job training

All degree apprentices must achieve the Honours degree in the relevant pathway, including Essential Skills Wales, or Wider Key Skills requirements. The off-the job training are those learning activities undertaken away from normal work duties. The minimum required is 900 hours. This is made up of: Degree qualification: 720 hours (80%)

Essential Skills Wales for apprentices without the required levels: 180 hours (20%)

**How this requirement will be met**

Off-the job learning will be required for the apprentice to achieve the designated module credits of the combined degree qualification. This may involve a combination of day release, block release, web based learning, mentoring and coaching.

Achievement of the designated module credits and Essential Skills (if required) will be the evidence of completion of the required number of off the job Guided Learning Hours (GLH).

## On-the-job training

An apprentice must receive a minimum of 500 hours on the job training for each pathway .

Note: The total number of hours required will be determined by the actual modules, their directed study and assessment requirements.

### How this requirement will be met

A degree apprenticeship programme is fundamenta lly designed to be a work-based programme, whereby HE delivered learning can be immediately applied by apprentices in a real work context.

The degree qualifications contained in the framework reflect the overall design of a degree apprenticeship, containing modules which are designed to be delivered partly within the HE and in the workplace through their directed study and assessment requirements.

Wherever possible, the assessment is undertaken using project based methods with real world workplace examples, ensuring that any knowledge element s in the modules are learned in the work and organisational context.

Off-the-job training needs to achieve the learning outcomes and skills contained in the relevant degree specification.

This will be planned, reviewed and evaluated jointly between the apprentice, university lecturers, employer, mentor/manager through:

- directed study projects
- feedback and assessment
- collaborative/networking learning.

# Wider key skills assessment and recognition

While Wider Key Skills are not a **mandatory** part of the framework, training providers are encouraged to provide apprentices the opportunity to achieve them.

For this framework, there are natural opportunities for Wider Key Skills to be embedded within the mandatory units of the following qualifications:
Enter Qualification Names

## Improving own learning and performance

Give examples - signpost to specific units in framework qualifications that would meet these requirements

## Working with others

Give examples - signpost to specific units in framework qualifications that would meet these requirements

## Problem solving

Give examples - signpost to specific units in framework qualifications that would meet these requirements

apprenticeship
FRAMEWORK

For more information visit-
www.acwcerts.co.uk/framework_library