Elite Centre for Manufacturing Skills

11 July 2017 – National Metalforming Centre
Elite Centre for Manufacturing Skills (ECMS)

• A £12m skills project in response to gaps in skills and provision highlighted by the Black Country Local Enterprise Partnership

• A collaboration between 4 organisations:-
  • Confederation of British Metalforming (CBM)
  • Cast Metals Federation (CMF)
  • University of Wolverhampton
  • Dudley College
Metalforming & Toolmaking Training Centre

• Based at the National Metalforming Centre (NMC), the home of the CBM
• To train the next generation of toolmakers along with process & tool design engineers
• The workshop will be operational in December 2017
What’s next !....
<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Speaker/Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.00</td>
<td>Welcome</td>
<td>Geraldine Bolton, CBM</td>
</tr>
<tr>
<td>15.05</td>
<td>Training centre machinery</td>
<td>Adrian Nicklin, CBM</td>
</tr>
<tr>
<td>15.20</td>
<td>Toolmaker / process &amp; tool design engineer curriculum / Trailblazers – Trailblazers</td>
<td>Ian Fitzpatrick, Wolverhampton University</td>
</tr>
<tr>
<td>15.30</td>
<td>Delivery of training</td>
<td>John Lockley, Dudley College</td>
</tr>
<tr>
<td>15.45</td>
<td>Apprenticeship recruitment</td>
<td>Trevor Codner, Wolverhampton University</td>
</tr>
<tr>
<td>15.55</td>
<td>Bite/Upskilling / Funded short courses</td>
<td>Colin Parker, Black Country Consortium</td>
</tr>
<tr>
<td>16.05</td>
<td>Finish</td>
<td></td>
</tr>
</tbody>
</table>
Training centre machinery
Adrian Nicklin, CBM
Elite Centre For Manufacturing Skills (ECMS) CBM Spoke
Opening January 2018
Trailblazer Level 3 Apprentice Training Toolmaker, Tool & Die Maintenance Technician (2 years) &
Trailblazer Level 6 (Degree Course) Apprentice Training Process & tool Design Engineer (3 years) (EOI)

By Adrian Nicklin CBM Specialist 11th July 2017
Planned Training at the
Elite Centre For Manufacturing Skills
CBM Spoke
Toolmaking Processes Sheet Metal
Apprenticeships & Continuing professional development (CPD)
ECMS Mini Press Shop (MPS)
Training Centre Equipment

Objectives

- The Presswork sector has a massive skills shortage identified from a CBM survey taken in 2016
- The CBM objective is to help reduce this problem for our sheet metal, presswork members.

The new MPS is the first Engineering centre of its kind in the UK to demonstrate, train & educate sheet metal forming processes linked to promoting process & press tool design & toolmaking skills as a long term career opportunity.

It gives the trainee the opportunity to have a hands on experience under the guidance of the workshop technician.

This facility is for;
- Apprentice trailblazer training
  - Upskilling existing workforce, Bite size courses
    - Engineering graduates (to understand the process)
    - Educating school children.

The MPS offers,
- Twin Power Press Cell
- Press Brake
- Mini Profile Rolling Machine
- Tool Repair Area
- CAE Classroom
CBM ECMS Workshop, Sheet Metal Processes Toolmaker Training Operational January 2018

- Twin Power Press Cell
  - Manual
  - Progression
  - Transfer
  - Deep Draw

- Tool Repair Area
  - Lathe
  - Guillotine

- Workshop
  - Press Brake
  - Mini Rolling Mill
  - Surface Grinder

- CAE Room Tooling Processes
TWIN POWER PRESS CELL (TPPC)

Linear Transfer System

Presses have a die cushion for deep draw ops

2 in 1 Combination Decoiler & Straightener

Power presses have light guards and inter locked exterior safety fence
TWIN POWER PRESS CELL (TPPC)

CHIN FONG POWER PRESS MODEL OCP-110 X 2
Open back, single crank power press with 100 tons stamping capacity.
- Tool area of 1150 x 680 mm
- Fixed stroke of 180 mm with motorised slide adjustment of 90 mm, and
- Running speed of 30-65spm.
- Including die cushion
- Operation
  - Manual load
  - Progression
  - Auto Linear Transfer
  - Deep Draw
Tray Component to be made on tooling through our Twin Power Press Cell by either manual feed or linear transfer equipment. Clip to be made from a progression tool from coil.

Presses to demonstrate the deep draw process.
Clip Board Forming Simulation
Presses to demonstrate the deep draw process

DEEP DRAWING OF SHEET METAL

1. 
   - Force 
   - Work 
   - Pressure-Pad 
   - Punch 
   - Die

2. 
   - Force 
   - Pressure-Pad 
   - Work 
   - Punch 
   - Die

3. 
   - Force 
   - Pressure-Pad 
   - Work 
   - Punch 
   - Die

Acceptable drawing ratio
Radius should be 6-8X the material's thickness
AMADA HFE II Series 5012 Press Brake

SPEC
Tonnage: 500kN
Overall Length: 1,270 mm
Control: CNC
6 Pass “U” Rollforming machine

This machine is of a Light duty construction and comprises of 6 forming passes mounted on raft plates to the existing configuration. The machine base is mounted on wheels to enable the machine to be portable in your workshop.

The machine will have 6 off passes with Ø30mm shafts and will be mounted on a light duty common baseframe with the shear. This baseframe will have all required drive mechanics, including an A.C. drive motor.
Tool Repair Machines

- Turret Mill
- Lathe
- Surface Grinder
- Bandsaw
- Pedestal Drill
FARO ScanArm
Contact/non-contact portable measurement system
Elite Centre For Manufacturing Skills at the CBM
To include a class room adjacent for CAE Training using:
  • Solidworks
  • LS Dyna
  • Qpack
  • Supported by:
    • [www.duttonsimulation.com](http://www.duttonsimulation.com)
    • [www.qform3d.co.uk](http://www.qform3d.co.uk)
Besides apprentice training we are planning upskilling, bitesize courses covering:

- Power Press setting including H&S
- Press tool handling lifting & splitting
- SMED
- Power Press Maintenance
- Tooling repair techniques
- Press tool design principals and matl selection
- Intro to all sheet metal forming processes
- Measuring techniques incl SPC
- H&S in the toolroom
- Checking fixture design

Utilising the Mini Press Shop and CAE Room

- Process design
- Problem solving
- Intro to forming simulation
- Cad tool design
- Blank development
- Material utilisation
- Capacity Planning
- Press selection
- Related Maths
- Estimating
- Quotation Analysis
- Geometric Dimensioning and Tolerancing (GD&T)
Any Questions?
Toolmaker / Process & tool design engineer
curriculum / Trailblazers
Ian Fitzpatrick, Wolverhampton University
Elite Centre for Manufacturing Skills

Metalforming Qualifications

- Level 3 Mechatronics Maintenance Technician
- Level 3 Product Design and Development Technician
- Level 3 Machining – Advanced Manufacturing Engineering
- Level 3 Toolmaker and Tool and Die Maintenance Technician
- Level 3 Fabrication Welder (Standard under development)
- Level 6 Process & tool design engineer curriculum (Standard under development)
Frameworks to Standards

- New Qualifications have a number of stages
- Foundation stage (Level 2)
- Development Stage (Level 3)
- Gateway assessment
- End point assessment
- EAL Level 3 Advanced Manufacturing and Engineering
- *Standard in development*, Level 6 has NVQ level 4, HNC and Degree, currently looking at using the 2 year PT manufacturing Degree
Frameworks to Standards

• New Qualifications have a number of stages
• Foundation stage (Level 2)
• Development Stage (Level 3)
• Gateway assessment
• End point assessment
• EAL Level 3 Advanced Manufacturing and Engineering
• *Standard in development*, Level 6 has NVQ level 4, HNC and Degree, currently looking at using the 2 year PT manufacturing Degree
How is this done?

• Develop relevant, valuable skills and knowledge
• Using leading edge industry expertise and facilities
• Tutor-lead sessions
• Workshops and Tutorials
• Assessed practical work
• Self study assignments
• Support materials and workbooks
Delivery of training

John Lockley, Dudley College
<table>
<thead>
<tr>
<th>Knowledge Element</th>
<th>Transferrable Skills</th>
<th>Competence Element (NVQ)</th>
<th>Mandatory</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning, Preparation and Performance of Practical Activities</td>
<td></td>
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<td></td>
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<tr>
<td>Wiring and Testing Electrical Equipment and Circuits</td>
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<tr>
<td>Maintaining Electrical Equipment/Systems</td>
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<tr>
<td>Producing Components using Hand Fitting Techniques</td>
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</tbody>
</table>

The Foundation Phase Gateway Assessment comprises of practical scenario/s and a set of related tasks. The scenario/s will be based on specifications issued by EAL for a minimum of three of the units selected for the foundation phase gateway assessment. This assessment can be achieved by the apprentice completing the relevant practical tasks for three of the units selected. Apprentice's can achieve a Pass/Fail or be Refered.

Dependability & responsibility
- Problem solving orientation
- Safety mindset
- Quality Focus

The Foundation Phase Gateway Assessment is intended to assess the apprentice's individual ability to apply the skills, knowledge and competencies of their chosen units.

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- Problem solving orientation
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Dependability & responsibility
- Problem solving orientation
- Safety mindset
- Quality Focus
## Level 2

**Mechatronics Technician (Options & Combinations)**

- 1,620GLH = 36 hours per week for 45 weeks.

### Transferrable Skills
- English L2 (if not already achieved prior to starting the standard)
- Maths L2 (if not already achieved prior to starting the standard)

### Standard

#### Occupational / Employee Behaviours

<table>
<thead>
<tr>
<th>Safety minded</th>
<th>Mandatory selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong work ethic</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Respect for others</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Logical approach</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Problem solving orientation</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Quality focus</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Personal responsibility &amp; resilience</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Clear communicator</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Team player</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Applies lean manufacturing principles</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Adaptability</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Self-motivation</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Willingness to learn</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Commitment</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Dependability &amp; responsibility</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Positive attitude</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Honesty and integrity</td>
<td>Mandatory selection</td>
</tr>
</tbody>
</table>

### Knowledge Element

#### Mandatory

| AME2/001 GLH 60 | Working in an Engineering Environment | Selection not available |
| AME2/002 GLH 60 | Engineering Techniques - AME | Selection not available |
| AME2/003 GLH 60 | Engineering mathematics and science principles | Selection not available |
| AME2/004 GLH 70 | Fitting and Assembly Techniques - AME | Selection not available |
| AME2/005 GLH 70 | Business Improvement Techniques | Selection not available |

#### Optional

| AME2/006 GLH 80 | Principles of Turning & Milling | Selection not available |
| AME2/007 GLH 70 | Manual Turning Techniques | Selection not available |
| AME2/008 GLH 70 | Manual Milling Techniques | Selection not available |
| AME2/009 GLH 70 | Grinding Techniques - AME | Selection not available |
| AME2/010 GLH 80 | Principles of Computer Numerical Control (CNC) Machining/Fabrication | Selection not available |
| AME2/011 GLH 70 | Computer Numerical Control (CNC) Turning Techniques | Selection not available |
| AME2/012 GLH 70 | Computer Numerical Control (CNC) Milling Techniques | Selection not available |
| AME2/013 GLH 70 | Computer Aided Drawing (CAD) | Selection not available |

#### Assessment Route Title

- Complies with lean manufacturing principles
- Dudley College / ECMS

### Transferrable Skills

- English L2 (if not already achieved prior to starting the standard)
- Maths L2 (if not already achieved prior to starting the standard)

### Occupational / Employee Behaviours

- Safety minded
- Strong work ethic
- Respect for others
- Logical approach
- Problem solving orientation
- Quality focus
- Personal responsibility & resilience
- Clear communicator
- Team player
- Applies lean manufacturing principles
- Adaptability
- Self-motivation
- Willingness to learn
- Commitment
- Dependability & responsibility
- Positive attitude
- Honesty and integrity

### Knowledge Element

| AUEC2-001 (50GLH) | Complying with statutory regulations and organisational safety requirements | Mandatory selection |
| AUEC2-002 (50GLH) | Working efficiently and effectively in an engineering environment | Mandatory selection |
| AUEC2-003 (60GLH) | Using and communicating technical information | Mandatory selection |
| AUEC2-004 (80GLH) | Conducting business improvement activities | Mandatory selection |
| AUEC2-004A (80GLH) | Demonstrating Personal Accountability in an Engineering Environment | Mandatory selection |

#### Optional

| AUEC2-005 (140GLH) | Producing components using hand fitting techniques | Optional selection |
| AUEC2-006 (140GLH) | Maintaining mechanical devices and equipment | Additional optional selection |
| AUEC2-007 (140GLH) | Assembling and testing fluid power systems | Additional optional selection |
| AUEC2-008 (140GLH) | Maintaining fluid power equipment | Additional optional selection |
| AUEC2-009 (150GLH) | Maintaining electrical equipment/systems | Additional optional selection |
| AUEC2-010 (140GLH) | Wiring and testing electrical equipment and circuits | Additional optional selection |
| AUEC2-011 (150GLH) | Wiring and testing programmable controller based systems | Additional optional selection |
| AUEC2-012 (150GLH) | Producing mechanical assemblies | Additional optional selection |
| AUEC2-013 (150GLH) | Preparing and using lathes for turning operations | Additional optional selection |
| AUEC2-014 (150GLH) | Preparing and using milling machines | Additional optional selection |
| AUEC2-015 (150GLH) | Preparing and using semi-automatic MIG, MAG and flux cored arc welding equipment | Additional optional selection |
| AUEC2-016 (140GLH) | Assembling and testing electronic circuits | Additional optional selection |
| AUEC2-017 (150GLH) | Maintaining electronic equipment/systems | Additional optional selection |
| AUEC2-018 (140GLH) | Preparing and using industrial robots | Additional optional selection |
| AUEC2-019 (150GLH) | General turning, milling and welding applications | Additional optional selection |
### Foundation Phase Gateway Assessment

**Introduction to the assessment**

The Foundation Phase Gateway Assessment is intended to assess the apprentice's individual ability to apply the skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship. This qualification will not assess competence as this will have already been assessed as part of the Foundation Phase Competency Qualification. This qualification is not graded; apprentice's can achieve a Pass/Fail or be Refered.

**What do this assessment cover?**

The Foundation Phase Gateway Assessment comprises of practical scenarios and a set of related tasks. The scenarios will be based on a typical situation that is likely to occur in the workplace. The tasks will provide explicit instructions about the activities that the apprentice will need to complete in a way that demonstrates skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship.

**This assessment comprises assessments which include:**

- Behaviours (assessed across all activities)
- Health & Safety (assessed across all activities)
- Planning, Preparation and Performance of Practical activities (assessed across all activities)

**The practical scenarios/ s will be derived from specifications issued by EAL for a minimum of three of the following disciplines:**

- Producing Components using Hand Fitting Techniques
- Maintaining Mechanical Devices and Equipment
- Maintaining Hydraulic Power Equipment
- Maintaining Electrical Power Equipment
- Wiring and Testing Electrical Equipment and Circuits
- Wiring and Testing Programmable Controller Based Systems
- Producing Mechanical Assemblies
- Assembling and Testing Electronic Circuits
- General Turning, Milling and Welding Applications
- Wiring and testing vehicle electrical equipment and circuits
- Stripping and rebuilding vehicle engines

### EAL Level 2 Foundation phase gateway assessment (Foundation Competence) Qualification Code: 601/9035/8

**Optional**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Additional optional selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUEC2-020</td>
<td>Forming and assembling pipework systems</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>AUEC2-021</td>
<td>Preparing and proving CNC machine tool programs</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>AUEC2-022</td>
<td>Producing sheet metal components and assemblies</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-023</td>
<td>Maintaining and testing process instrumentation and control devices</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-024</td>
<td>Producing components by rapid prototyping techniques</td>
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<tr>
<td>AUEC2-025</td>
<td>Wiring and testing vehicle electrical equipment and circuits</td>
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<tr>
<td>AUEC2-026</td>
<td>Maintaining vehicle electrical equipment/systems</td>
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<tr>
<td>AUEC2-027</td>
<td>Diagnosing and rectifying faults on vehicle systems</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-028</td>
<td>Stripping and rebuilding vehicle engines</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-029</td>
<td>Using computer software packages to assist with engineering activities</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>AUEC2-030</td>
<td>Producing CAD models (drawing) using a CAD system</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-031</td>
<td>Producing electrical or electronic engineering drawings using a CAD system</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-032</td>
<td>Producing engineering project plans</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-033</td>
<td>Preparing and Using Grinding Machines</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-034</td>
<td>Preparing and Using CNC Turning Machines</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-035</td>
<td>Preparing and Using CNC Milling Machines</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-036</td>
<td>Preparing and Using CNC Machining Centres</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-038</td>
<td>Producing Mechanical Engineering Drawings using a CAD System</td>
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<tr>
<td>AUEC2-039</td>
<td>Assembling, Wiring and Testing Electrical Panels/Components Mounted in Enclosures</td>
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<tr>
<td>AUEC2-040</td>
<td>Forming and Assembling Electrical Cable Enclosure and Support Systems</td>
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<tr>
<td>AUEC2-041</td>
<td>Preparing and Using Electro Discharge Machines</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-042</td>
<td>Preparing and Using Manual TIG or Plasma-arc Welding Equipment</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-043</td>
<td>Preparing and Using CNC Fabrication Equipment</td>
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<tr>
<td>AUEC2-044</td>
<td>General MIG and TIG Welding</td>
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<tr>
<td>AUEC2-045</td>
<td>Producing Tool and Die Assemblies</td>
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<tr>
<td>AUEC2-046</td>
<td>Producing Composite Mouldings Using Pre-Preg Techniques</td>
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<tr>
<td>AUEC2-047</td>
<td>Carrying Out Repairs to Composite Mouldings</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>AUEC2-048</td>
<td>General Machining, Fitting and Assembly Applications</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-049</td>
<td>General Fabrication and Welding Applications</td>
<td>Additional optional selection</td>
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<tr>
<td>AUEC2-050</td>
<td>General Electrical and Electronic Engineering Applications</td>
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<tr>
<td>AUEC2-051</td>
<td>General Maintenance Engineering Applications</td>
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<tr>
<td>AUEC2-052</td>
<td>Carrying Aircraft Detail Fitting Activities</td>
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<tr>
<td>AUEC2-053</td>
<td>Installing Aircraft Mechanical Fasteners</td>
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<tr>
<td>AUEC2-054</td>
<td>Producing Engineering Drawings using a CAD System</td>
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<tr>
<td>AUEC2-055</td>
<td>Preparing and Proving CNC Machine Tool Programs</td>
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<tr>
<td>AUEC2-056</td>
<td>Preparing and Proving CNC Milling Machine</td>
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<tr>
<td>AUEC2-057</td>
<td>Preparing and Proving CNC Machining Centres</td>
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<tr>
<td>AUEC2-058</td>
<td>Preparing and Proving CNC Turning Machine</td>
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<tr>
<td>AUEC2-059</td>
<td>Preparing and Proving CNC Milling Machine</td>
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<tr>
<td>AUEC2-060</td>
<td>Preparing and Proving CNC Machining Centres</td>
<td>Additional optional selection</td>
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</tbody>
</table>

**Marking should be undertaken within 4 weeks of the specified end date.**
Foundation phase gateway assessment. This assessment can be achieved by the apprentice completing the relevant practical tasks for three of units selected, for the foundation phase gateway assessment must align to the units that the apprentice has completed as part of the foundation phase of their apprenticeship.

### Optional FGA2-001 (7 GLH)
Producing components using hand fitting techniques

### Optional FGA2-002 (7 GLH)
Maintaining mechanical devices and equipment

### Optional FGA2-003 (7 GLH)
Maintaining fluid power equipment

### Optional FGA2-004 (7 GLH)
Maintaining electrical equipment/systems

### Optional FGA2-005 (7 GLH)
Wiring and testing electrical equipment and circuits

### Optional FGA2-006 (7 GLH)
Wiring and testing programmable controller based systems

### Optional FGA2-007 (7 GLH)
Producing mechanical assemblies

### Optional FGA2-008 (7 GLH)
Assembling and testing electronic circuits

### Optional FGA2-009 (7 GLH)
General turning, milling and welding applications

### Optional FGA2-010 (7 GLH)
Wiring and testing vehicle electrical equipment and circuits

### Optional FGA2-011 (7 GLH)
Stripping and rebuilding vehicle engines

<table>
<thead>
<tr>
<th>Rule of combination (assessment structure)</th>
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<tbody>
<tr>
<td>Optional FGA2-001 (7 GLH) Producing components using hand fitting techniques</td>
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<tr>
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<td>Optional FGA2-007 (7 GLH) Producing mechanical assemblies</td>
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<td>Optional FGA2-011 (7 GLH) Stripping and rebuilding vehicle engines</td>
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Centre marked scenario/s and related practical tasks.
### Transferrable Skills

- English L2 (if not already achieved prior to starting the standard)
- Maths L2 (if not already achieved prior to starting the standard)

### Standard

<table>
<thead>
<tr>
<th>Occupational / Employee Behaviours</th>
<th>Mandatory Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety mindset</td>
<td>Mandatorv selection</td>
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<tr>
<td>Strong Work ethic</td>
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<tr>
<td>Respect for others</td>
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<tr>
<td>Problem solving orientation</td>
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<tr>
<td>Quality Focus</td>
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<tr>
<td>Personal Responsibility &amp; resilience</td>
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<tr>
<td>Clear Communicator</td>
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<tr>
<td>Team Player</td>
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<tr>
<td>Applies lean manufacturing principles</td>
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<tr>
<td>Adaptability</td>
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<tr>
<td>Self-motivation</td>
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<tr>
<td>Willingness to learn</td>
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<tr>
<td>Commitment</td>
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<tr>
<td>Dependability &amp; responsibility</td>
<td></td>
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<tr>
<td>Positive attitude</td>
<td></td>
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<tr>
<td>Honesty and Integrity</td>
<td></td>
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</tbody>
</table>

### Knowledge Element

<table>
<thead>
<tr>
<th>Knowledge Element</th>
<th>Assessment Route Title</th>
<th>Selection available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mandatory AME2/001 GLH 60</td>
<td>Working in an Engineering Environment</td>
<td>Selection not available</td>
</tr>
<tr>
<td>Mandatory AME2/002 GLH 60</td>
<td>Engineering Techniques - AME</td>
<td>Selection not available</td>
</tr>
<tr>
<td>Mandatory AME2/003 GLH 60</td>
<td>Engineering mathematics and science principles</td>
<td>Selection not available</td>
</tr>
<tr>
<td>Mandatory AME2/004 GLH 70</td>
<td>Fitting and Assembly Techniques - AME</td>
<td>Selection not available</td>
</tr>
<tr>
<td>Mandatory AME2/005 GLH 70</td>
<td>Business Improvement Techniques</td>
<td>Selection not available</td>
</tr>
<tr>
<td>Optional AME2/006 GLH 80</td>
<td>Principles of Turning &amp; Milling</td>
<td>Selection not available</td>
</tr>
<tr>
<td>Optional AME2/007 GLH 70</td>
<td>Manual Turning Techniques</td>
<td>Selection not available</td>
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<tr>
<td>Optional AME2/008 GLH 70</td>
<td>Manual Milling Techniques</td>
<td>Selection not available</td>
</tr>
<tr>
<td>Optional AME2/009 GLH 70</td>
<td>Grinding Techniques - AME</td>
<td>Selection not available</td>
</tr>
<tr>
<td>Optional AME2/010 GLH 80</td>
<td>Principles of Computer Numerical Control (CNC) Machining/Fabrication</td>
<td>Selection not available</td>
</tr>
<tr>
<td>Optional AME2/011 GLH 70</td>
<td>Computer Numerical Control (CNC) Turning Techniques</td>
<td>Selection not available</td>
</tr>
<tr>
<td>Optional AME2/012 GLH 70</td>
<td>Computer Numerical Control (CNC) Milling Techniques</td>
<td>Selection not available</td>
</tr>
<tr>
<td>Optional AME2/013 GLH 70</td>
<td>Computer Aided Drawing (CAD)</td>
<td>Selection not available</td>
</tr>
</tbody>
</table>

### Diploma in Machining Foundation Knowledge (Technical Certificate) Qualification Code: 601/90/34/6

<table>
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<tr>
<th>Knowledge Element</th>
<th>Assessment Route Title</th>
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</thead>
<tbody>
<tr>
<td>Mandatory AUEC2-001 (50GLH)</td>
<td>Complying with statutory regulations and organisational safety requirements</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Mandatory AUEC2-002 (50GLH)</td>
<td>Working efficiently and effectively in an engineering environment</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Mandatory AUEC2-003 (40GLH)</td>
<td>Using and communicating technical information</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Mandatory AUEC2-004 (40GLH)</td>
<td>Conducting business improvement activities</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Mandatory AUEC2-004a (80GLH)</td>
<td>Demonstrating Personal Accountability in an Engineering Environment</td>
<td>Mandatory selection</td>
</tr>
<tr>
<td>Optional AUEC2-005 (140GLH)</td>
<td>Producing components using hand fitting techniques</td>
<td>Optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-006 (140GLH)</td>
<td>Maintaining mechanical devices and equipment</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-007 (140GLH)</td>
<td>Assembling and testing fluid power systems</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-008 (140GLH)</td>
<td>Maintaining fluid power equipment</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-009 (130GLH)</td>
<td>Maintaining electrical equipment/systems</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-010 (140GLH)</td>
<td>Wiring and testing electrical equipment and circuits</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-011 (130GLH)</td>
<td>Wiring and testing programmable controller based systems</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-012 (130GLH)</td>
<td>Producing mechanical assemblies</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-013 (130GLH)</td>
<td>Preparing and using lathes for turning operations</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-014 (130GLH)</td>
<td>Preparing and using milling machines</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-015 (130GLH)</td>
<td>Preparing and using semi-automatic Mig, MAG and flux cored arc welding equipment</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-016 (140GLH)</td>
<td>Assembling and testing electronic circuits</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-017 (130GLH)</td>
<td>Maintaining electronic equipment/systems</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-018 (140GLH)</td>
<td>Preparing and using industrial robots</td>
<td>Additional optional selection</td>
</tr>
<tr>
<td>Optional AUEC2-019 (150GLH)</td>
<td>General turning, milling and welding applications</td>
<td>Additional optional selection</td>
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The Foundation Phase Gateway Assessment is intended to assess the apprentice's individual ability to apply the skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship. This qualification will not assess competence as this will have already been assessed as part of the Foundation Phase Competency Qualification. This qualification is not graded; apprentice’s can achieve a Pass/Fail or be Refered.

What do this assessment cover?

The Foundation Phase Gateway Assessment comprises of practical scenarios and a set of related tasks. The scenarios will be based on a typical situation that is likely to occur in the workplace. The tasks will provide explicit instructions about the activities that the apprentice will need to complete in a way that demonstrates skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship.

This assessment comprises assessments which include:
- Behaviours (assessed across all activities)
- Health & Safety (assessed across all activities)
- Planning, Preparation and Performance of Practical activities (assessed across all activities)

The practical scenarios/s will be derived from specifications issued by EAL for a minimum of three of the following disciplines:

- Producing Components using Hand Fitting Techniques
- Maintaining Mechanical Devices and Equipment
- Maintaining Fluid Power Equipment
- Maintaining Electrical Equipment/Systems
- Wiring and Testing Electrical Equipment and Circuits
- Wiring and Testing Programmable Controller Based Systems
- Producing Mechanical Assemblies
- Assembling and Testing Electronic Circuits
- General Turning, Milling and Welding Applications
- Wiring and Testing Vehicle Electrical Equipment and Circuits
- Stripping and Rebuilding Vehicle Engines

### Introduction to the assessment

The Foundation Phase Gateway Assessment is intended to assess the apprentice's individual ability to apply the skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship. This qualification will not assess competence as this will have already been assessed as part of the Foundation Phase Competency Qualification. This qualification is not graded; apprentice’s can achieve a Pass/Fail or be Refered.

### What do this assessment cover?

The Foundation Phase Gateway Assessment comprises of practical scenarios and a set of related tasks. The scenarios will be based on a typical situation that is likely to occur in the workplace. The tasks will provide explicit instructions about the activities that the apprentice will need to complete in a way that demonstrates skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship.

### This assessment comprises assessments which include:

- Behaviours (assessed across all activities)
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- Planning, Preparation and Performance of Practical activities (assessed across all activities)

### The practical scenarios/s will be derived from specifications issued by EAL for a minimum of three of the following disciplines:

- Producing Components using Hand Fitting Techniques
- Maintaining Mechanical Devices and Equipment
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- Wiring and Testing Electrical Equipment and Circuits
- Wiring and Testing Programmable Controller Based Systems
- Producing Mechanical Assemblies
- Assembling and Testing Electronic Circuits
- General Turning, Milling and Welding Applications
- Wiring and testing vehicle electrical equipment and circuits
- Stripping and rebuilding vehicle engines

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| Optional | AUEC2-010 (140GLH) | Producing and using MIG and TIG welding | Additional optional selection |
| Optional | AUEC2-009 (140GLH) | Producing electrical or electronic engineering drawings using a CAD system | Additional optional selection |
| Optional | AUEC2-008 (130GLH) | Carrying out Heat Treatment of Engineering Materials | Additional optional selection |
| Optional | AUEC2-007 (90GLH) | Preparing and Using ADA Inspection and Testing Equipment | Additional optional selection |
| Optional | AUEC2-006 (90GLH) | Developing Specialised Project Plans | Additional optional selection |
| Optional | AUEC2-005 (80GLH) | Preparing and Using CNC Milling Machines | Additional optional selection |
| Optional | AUEC2-004 (80GLH) | Preparing and Using CNC Turning Machines | Additional optional selection |
| Optional | AUEC2-003 (80GLH) | Preparing and Using Grinding Machines | Additional optional selection |
| Optional | AUEC2-002 (80GLH) | Preparing and Using CNC Machining Centres | Additional optional selection |
| Optional | AUEC2-001 (80GLH) | producing mechanical assemblies | Additional optional selection |
| Optional | AUEC2-020 (140GLH) | producing electrical or electronic engineering drawings using a CAD system | Additional optional selection |
| Optional | AUEC2-019 (140GLH) | producing electrical or electronic engineering drawings using a CAD system | Additional optional selection |
| Optional | AUEC2-018 (130GLH) | producing mechanical engineering drawings using a CAD System | Additional optional selection |
| Optional | AUEC2-017 (90GLH) | producing mechanical drawings using CAD systems | Additional optional selection |
| Optional | AUEC2-016 (90GLH) | producing drawing boards using CAD systems | Additional optional selection |
| Optional | AUEC2-015 (90GLH) | producing drawing boards using CAD systems | Additional optional selection |
| Optional | AUEC2-014 (90GLH) | producing drawing boards using CAD systems | Additional optional selection |
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| Optional | AUEC2-002 (90GLH) | producing drawing boards using CAD systems | Additional optional selection |
| Optional | AUEC2-001 (90GLH) | producing drawing boards using CAD systems | Additional optional selection |
Foundation phase gateway assessment. This assessment can be achieved by the apprentice completing the relevant practical tasks for three of the units selected. For the foundation phase gateway assessment, the assessment must align to the units that the apprentice has completed as part of their foundation phase of their apprenticeship.

| Optional   | FGA2-001 (7 GLH) | Producing components using hand fitting techniques |
| Optional   | FGA2-002 (7 GLH) | Maintaining mechanical devices and equipment     |
| Optional   | FGA2-003 (7 GLH) | Maintaining fluid power equipment               |
| Optional   | FGA2-004 (7 GLH) | Maintaining electrical equipment/systems        |
| Optional   | FGA2-005 (7 GLH) | Wiring and testing electrical equipment and circuits |
| Optional   | FGA2-006 (7 GLH) | Wiring and testing programmable controller based systems |
| Optional   | FGA2-007 (7 GLH) | Producing mechanical assemblies                 |
| Optional   | FGA2-008 (7 GLH) | Assembling and testing electronic circuits       |
| Optional   | FGA2-009 (7 GLH) | General turning, milling and welding applications |
| Optional   | FGA2-010 (7 GLH) | Wiring and testing vehicle electrical equipment and circuits |
| Optional   | FGA2-011 (7 GLH) | Stripping and rebuilding vehicle engines         |
Level 3 Machinis

Dudley College / ECMS

Level 3 Diploma in Machining (Development Knowledge) 603/1033/9

Mandatory units:
- AME3/001 GLH 75 Engineering & Environmental Health and Safety
- AME3/002 GLH 75 Engineering Communications
- AME3/003 GLH 60 Properties and Applications of Engineering Materials
- AME3/004 GLH 75 Engineering Mathematics

Optional units:
- AME2/005 GLH 75 Computer Aided Drawing (CAD)
- AME2/006 GLH 75 Advanced Manufacturing Techniques Computer Numerical Control - CNC
- AME2/007 GLH 75 Precision Grinding
- AME2/008 GLH 75 Gear Cutting
- AME2/009 GLH 75 Advanced Milling
- AME2/010 GLH 75 Advanced Turning
- AME2/011 GLH 75 Specialist Machining
- AME2/012 GLH 75 Advanced Manufacturing Techniques
- AME2/013 GLH 75 Computer Numerical Control (CNC) Programming/Machining
- AME2/014 GLH 75 Further Engineering Mathematics
- AME2/015 GLH 75 Engineering Inspection and Quality Control
- AME2/016 GLH 75 Engineering Organisational Efficiency and Improvement
- AME2/017 GLH 75 Mechanical Engineering Principles
- AME2/018 GLH 75 Engineering Design Process

Assessment Route Options:
- A minimum of four optional units must be completed from the following:

Level 3 Diploma in Advanced Manufacturing and Engineering Machinist (Development Competence) 600/1034/0

Mandatory units:
- AEUC3-001 GLH 13 Complying with Statutory Regulations and Organisational Safety Requirements
- AEUC3-002 GLH 13 Using and Interpreting Engineering Data and Documentation
- AEUC3-003 GLH 42 Working Efficiently and Effectively in Advanced Manufacturing and Engineering

Optional units:
- AEUC3-165 GLH 899 CNC Machining (One optional unit must be completed from the following)

Additional units:
- AEUC3-166 GLH 479 Additional optional selection
- AEUC3-167 GLH 479 Additional optional selection
- AEUC3-168 GLH 479 Additional optional selection
- AEUC3-169 GLH 479 Additional optional selection
- AEUC3-170 GLH 479 Additional optional selection

Competency Element:
- AEUC3-171 GLH 217 Complying with Statutory Regulations and Organisational Safety Requirements
- AEUC3-172 GLH 679 Additional optional selection

Safety mindset
- Strong Work ethic
- Respect for others
- Logical approach
- Problem solving orientation
- Quality Focus
- Personal Responsibility & Resilience
- Clear Communication
- Team Player
- Applies lean manufacturing principles
- Adaptability
- Self-motivation
- Willingness to learn
- Commitment
- Dependability & Responsibility
- Positive attitude
- Honesty and Integrity

This qualification will be obtained by the learner once they have successfully completed the all four mandatory units, and four units from the listed optional units.

Applies lean manufacturing principles

Technical certificate

Machinist - Advanced Manufacturing Engineering
(Options & Combinations)

Transferrable Skills
- English L2 (if not already achieved prior to starting the standard)
- Maths L2 (if not already achieved prior to starting the standard)

Technical certificate

Machinist - Advanced
Manufacturing Engineering
(Options & Combinations)

Level 3 Diploma in Machining (Development Knowledge) 603/1033/9

Mandatory AUEC3-001 GLH 13 Complying with Statutory Regulations and Organisational Safety Requirements

Mandatory AUEC3-002 GLH 13 Using and Interpreting Engineering Data and Documentation

Mandatory AUEC3-003 GLH 42 Working Efficiently and Effectively in Advanced Manufacturing and Engineering

Assessment Route Options:

Mandatory AUEC3-004 GLH 75 Engineering Mathematics

Optional AEUC3-005 GLH 75 Computer Aided Drawing (CAD)

Optional AEUC3-006 GLH 75 Advanced Manufacturing Techniques Computer Numerical Control - CNC

Optional AEUC3-007 GLH 75 Precision Grinding

Optional AEUC3-008 GLH 75 Gear Cutting

Optional AEUC3-009 GLH 75 Advanced Milling

Optional AEUC3-010 GLH 75 Advanced Turning

Optional AEUC3-011 GLH 75 Specialist Machining

Optional AEUC3-012 GLH 75 Advanced Manufacturing Techniques

Optional AEUC3-013 GLH 75 Computer Numerical Control (CNC) Programming/Machining

Optional AEUC3-014 GLH 75 Further Engineering Mathematics

Optional AEUC3-015 GLH 75 Engineering Inspection and Quality Control

Optional AEUC3-016 GLH 75 Engineering Organisational Efficiency and Improvement

Optional AEUC3-017 GLH 75 Mechanical Engineering Principles

Optional AEUC3-018 GLH 75 Engineering Design Process

Optional AEUC3-165 GLH 899 CNC Machining (One optional unit must be completed from the following)

Additional units:

Optional AEUC3-166 GLH 479 Additional optional selection

Optional AEUC3-167 GLH 479 Additional optional selection

Optional AEUC3-168 GLH 479 Additional optional selection

Optional AEUC3-169 GLH 479 Additional optional selection

Optional AEUC3-170 GLH 479 Additional optional selection

Competency Element:

Optional AEUC3-171 GLH 217 Complying with Statutory Regulations and Organisational Safety Requirements

Optional AEUC3-172 GLH 679 Additional optional selection

Optional AEUC3-173 GLH 679 Setting CNC Turning Machines

Optional AEUC3-174 GLH 679 Machining Components using CNC Turning Machines

Additional optional selection

Additional optional selection

Additional optional selection

Additional optional selection

Additional optional selection
EAL Level 3 End point Assessment assessment (Development Competence) Qualification Code:  

Introduction to the assessment

The Foundation Phase Gateway Assessment is intended to assess the apprentice’s individual ability to apply the skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship. This qualification will not assess competence as this will have already been assessed as part of the Foundation Phase Competency Qualification. This qualification is not graded, apprentice’s can achieve a Pass/Fail or be Refered.

What do the assessment cover?

The Foundation Phase Gateway Assessment comprises of practical scenarios and a set of related tasks. The scenarios will be based on a typical situation that is likely to occur in the workplace. The tasks will provide explicit instructions about the activities that the apprentice will need to complete in a way that demonstrates skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship.

The practical scenarios will be derived from specifications issued by EAL for a minimum of three of the following disciplines:

- Producing Components using Hand Fitting Techniques
- Maintaining Mechanical Devices and Equipment
- Maintaining Fluid Power Equipment
- Maintaining Electrical Equipment/Systems
- Wiring and Testing Electrical Equipment and Circuits
- Wiring and Testing Programmable Controller Based Systems
- Producing Mechanical Assemblies
- Assembling and Testing Electronic circuits
- General Turning, Milling and Welding Applications
- Wiring and testing vehicle electrical equipment and circuits
- Stripping and rebuilding vehicle engines

Rule of combination (assessment structure)

Foundation phase gateway assessment This assessment can be achieved by the apprentice completing the relevant practical tasks for three of units selected, for the foundation phase gateway assessment must align to the units that the apprentice has completed as part of the foundation phase of their apprenticeship.

Optional FGA2-001 (7 GLH) Producing Components using Hand Fitting Techniques
Optional FGA2-002 (7 GLH) Maintaining Mechanical Devices and Equipment
Optional FGA2-003 (7 GLH) Maintaining Fluid Power Equipment
Optional FGA2-004 (7 GLH) Maintaining Electrical Equipment/Systems
Optional FGA2-005 (7 GLH) Wiring and Testing Electrical Equipment and Circuits
Optional FGA2-006 (7 GLH) Wiring and Testing Programmable Controller Based Systems
Optional FGA2-007 (7 GLH) Producing Mechanical Assemblies
Optional FGA2-008 (7 GLH) Assembling and Testing Electronic Circuits
Optional FGA2-009 (7 GLH) General Turning, Milling and Welding Applications
Optional FGA2-010 (7 GLH) Wiring and Testing Vehicle Electrical Equipment and Circuits
Optional FGA2-011 (7 GLH) Stripping and Rebuilding Vehicle Engines
### Level 2

**Dudley College / ECMS**

**Technical Certificate**

- **Product Design and Development Technician (Options & Combinations)**
  - Technical certificate (360GLH) + Advanced Units of Employer Competence (920GLH)
  - Functional Skills (180GLH)
  - Employer Originated Behaviours.

1,460GLH = 32.4 Hours per week for 45 weeks.

### Transferrable Skills

- English L2 (if not already achieved prior to starting the standard)
- Maths L2 (if not already achieved prior to starting the standard)

### Standard

**Occupational / Employee Behaviours**

- Safety minded
- Strong Work ethic
- Respect for others
- Logical approach
- Problem solving orientation
- Quality Focus
- Personal Responsibility & resilience
- Clear Communicator
- Team Player
- Applies lean manufacturing principles
- Adaptability
- Self-motivation
- Willingness to learn
- Commitment
- Dependability & responsibility
- Positive attitude
- Honesty and Integrity

### Occupational / Employee Behaviours

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<th>Assessment Route Title</th>
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<td>AME2/002 GLH 60</td>
</tr>
<tr>
<td>Mandatory</td>
<td>AME2/003 GLH 60</td>
</tr>
<tr>
<td>Mandatory</td>
<td>AME2/004 GLH 70</td>
</tr>
<tr>
<td>Mandatory</td>
<td>AME2/005 GLH 70</td>
</tr>
<tr>
<td>Optional</td>
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### Diploma in Machining Foundation Knowledge (Technical Certificate) Qualification Code: 601/90/34/6

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<tr>
<th>Knowledge Element</th>
<th>Assessment Route Title</th>
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<tr>
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<tr>
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<tr>
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<table>
<thead>
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<th>Knowledge Element</th>
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<tr>
<td>Optional</td>
<td>AUEC2-019 (150GLH)</td>
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The Foundation Phase Gateway Assessment comprises of practical scenarios and a set of related tasks. The scenarios will base on a typical situation that is likely to occur in the workplace. The tasks will provide explicit instructions about the activities that the apprentice will need to complete in a way that demonstrates skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship. This qualification will not assess competence as this will have already been assessed as part of the Foundation Phase Competency Qualification. This qualification is not graded; apprentice's can achieve a Pass/Fail or be Refered.

What do this assessment cover?

The Foundation Phase Gateway Assessment comprises of practical scenarios and a set of related tasks. The scenarios will be based on a typical situation that is likely to occur in the workplace. The tasks will provide explicit instructions about the activities that the apprentice will need to complete in a way that demonstrates skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship.

This assessment comprises assessments which include:

- Behaviours (assessed across all activities)
- Health & Safety (assessed across all activities)
- Planning, Preparation and Performance of Practical activities (assessed across all activities)

The practical scenarios/s will be derived from specifications issued by EAL for a minimum of three of the following disciplines:

- Producing Components using Hand Fitting Techniques
- Maintaining Mechanical Devices and Equipment
- Maintaining Fluid Power Equipment
- Maintaining Electrical Equipment/Systems
- Wiring and Testing Electrical Equipment and Circuits
- Wiring and Testing Programmable Controller Based Systems
- Producing Mechanical Assemblies
- Assembling and Testing Electronic Circuits
- General Turning, Milling and Welding Applications
- Wiring and testing vehicle electrical equipment and circuits
- Stripping and rebuilding vehicle engines

Introduction to the assessment

The Foundation Phase Gateway Assessment is intended to assess the apprentice's individual ability to apply the skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship. This qualification will not assess competence as this will have already been assessed as part of the FoundationPhase Competency Qualification. This qualification is not graded; apprentice's can achieve a Pass/Fail or be Refered.

EAL Level 2 Foundation phase gateway assessment (Foundation Competence) Qualification Code: 601/9035/8
Foundation phase gateway assessment. This assessment can be achieved by the apprentice completing the relevant practical tasks for three of units selected, for the foundation phase gateway assessment must align to the units that the apprentice has completed as part of the foundation phase of their apprenticeship.

<table>
<thead>
<tr>
<th>Optional FGA2-001 (7 GLH)</th>
<th>Producing components using hand fitting techniques</th>
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<tr>
<td>Optional FGA2-002 (7 GLH)</td>
<td>Maintaining mechanical devices and equipment</td>
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<tr>
<td>Optional FGA2-003 (7 GLH)</td>
<td>Maintaining fluid power equipment</td>
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<tr>
<td>Optional FGA2-004 (7 GLH)</td>
<td>Maintaining electrical equipment/systems</td>
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<tr>
<td>Optional FGA2-005 (7 GLH)</td>
<td>Wiring and testing electrical equipment and circuits</td>
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<tr>
<td>Optional FGA2-006 (7 GLH)</td>
<td>Wiring and testing programmable controller based systems</td>
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<tr>
<td>Optional FGA2-007 (7 GLH)</td>
<td>Producing mechanical assemblies</td>
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<tr>
<td>Optional FGA2-008 (7 GLH)</td>
<td>Assembling and testing electronic circuits</td>
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<tr>
<td>Optional FGA2-009 (7 GLH)</td>
<td>General turning, milling and welding applications</td>
</tr>
<tr>
<td>Optional FGA2-010 (7 GLH)</td>
<td>Wiring and testing vehicle electrical equipment and circuits</td>
</tr>
<tr>
<td>Optional FGA2-011 (7 GLH)</td>
<td>Stripping and rebuilding vehicle engines</td>
</tr>
</tbody>
</table>
# Level 3 Toolmaking

## Transferrable Skills
- English L2 (if not already achieved prior to starting the standard)
- Maths L2 (if not already achieved prior to starting the standard)

## Standard

### Occupational / Employee Behaviours
- Safety orientation
- Strong work ethic
- Respect for others
- Logical approach
- Problem solving orientation
- Quality focus
- Personal responsibility & resilience
- Clear communicator
- Team player
- Applies lean manufacturing principles
- Flexibility
- Willingness to learn
- Commitment
- Dependability & responsibility
- Positive attitude
- Honesty and integrity

## Knowledge Element

### Mandatory
- AMEDK3/001 GLH 60 Health and Safety in the Engineering Workplace
- AMEDK3/002 GLH 60 Communications for Engineering Technicians
- AMEDK3/003 GLH 75 Mathematics for Engineering Technicians

### Optional
- AMEDK3/013 GLH 75 Application and Principles of Programmable Logic Controllers (PLCs)
- AMEDK3/014 GLH 75 Further Mathematics for Engineering Technicians
- AMEDK3/015 GLH 75 Engineering Maintenance Procedures and Techniques
- AMEDK3/016 GLH 75 Maintenance of Mechanical Systems
- AMEDK3/017 GLH 75 Installation of Electrical Equipment
- AMEDK3/018 GLH 60 Features and Applications of Electrical Machines
- AMEDK3/019 GLH 61 Three Phase Motors and Drives
- AMEDK3/020 GLH 60 Principles of Fluid Power Systems and Components
- AMEDK3/021 GLH 60 Applications of Mechanical Systems in Engineering
- AMEDK3/022 GLH 60 Further Mechanical Principles of Engineering Systems
- AMEDK3/023 GLH 60 Electrical and Electronic Principles in Engineering
- AMEDK3/024 GLH 60 Properties and Applications of Engineering Materials
- AMEDK3/025 GLH 60 Engineering Project
- AMEDK3/026 GLH 75 Health and Safety in the Engineering Workplace
- AMEDK3/027 GLH 75 Communications for Engineering Technicians
- AMEDK3/028 GLH 75 Mathematics for Engineering Technicians

### Assessment Route Title
- Mandatory AUEC3-003 GLH 42 Working Efficiently and Effectively in Advanced Manufacturing and Engineering
- Mandatory AUEC3-001 GLH 13 Complying with Statutory Regulations and Organisational Safety Requirements
- Mandatory AUEC3-002 GLH 13 Using and Interpreting Engineering Data and Documentation
- Mandatory AUEC3-003 GLH 42 Working Efficiently and Effectively in Advanced Manufacturing and Engineering

### Mandatory selection
- Complying with Statutory Regulations and Organisational Safety Requirements
- Using and Interpreting Engineering Data and Documentation
- Working Efficiently and Effectively in Advanced Manufacturing and Engineering

### Optional selection
- Producing/finishing mould, press tool or die components using hand fitting techniques
- Assembling dies
- Assembling press tools
- Assembling injection mould tools
- Assembling blow mould tools
- Assembling vacuum forming tools
- Assembling press tools
- Repairing or modifying mould, press tool or die components
- Producing mould, Press tool or die components by manual machining
- Checking that toolroom assemblies comply with specification
- Handling and confirming the completion of mould, press tool or die equipment
- Preparing and setting power presses
- Trying out and proving dies
- Trying out and proving injection moulds
- Setting a range of machines to produce toolroom components
- Machining toolroom components using a range of machines

### Pathway 1: Toolmaker: A minimum of one optional unit must be completed

### Pathway 2: Tool & Die Equipment Maintenance: All three of the following units must be completed.
The Foundation Phase Gateway Assessment comprises of practical scenarios/s and a set of related tasks. The scenarios/s will be based on a typical situation that is likely to occur in the workplace. The tasks will provide explicit instructions about the activities that the apprentice will need to complete in a way that demonstrates skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship.

This assessment comprises assessments which include:

- Behaviours (assessed across all activities)
- Health & Safety (assessed across all activities)
- Planning, Preparation and Performance of Practical activities (assessed across all activities)

The practical scenarios/s will be derived from specifications issued by EAL for a minimum of three of the following disciplines:

- Manufacturing/Mechanical
- Electrical/Electronic
- Food/Drink
- Building Services
- Process Engineering
- Marine Engineering
- Automation Systems
- Health and Safety
- General Skills

Introduction to the assessment

The Foundation Phase Gateway Assessment is intended to assess the apprentice's individual ability to apply the skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship. This qualification will not assess competence (assessed across all activities)

What do this assessment cover?

The Foundation Phase Gateway Assessment comprises of practical scenarios/s and a set of related tasks. The scenarios/s will be based on a typical situation that is likely to occur in the workplace. The tasks will provide explicit instructions about the activities that the apprentice will need to complete in a way that demonstrates skills, knowledge and behaviours they have learnt and developed within the foundation phase of their apprenticeship.

Pathway 3: Jig and Fixture Manufacture: A minimum of three optional units must be completed from the following:

- Producing Mechanical Assemblies
- Maintaining Fluid Power Equipment
- Maintaining Mechanical Devices and Equipment
- Producing Components using Hand Fitting Techniques
- Fabricating Structural Components for Jigs and Fixtures
- Assembling Jigs and Fixtures using Mechanical Methods
- Assembling Jigs and Fixture Structures Using a Manual Welding Process
- Carrying Out Repairs or Modifications to Jigs or Fixtures
Apprenticeship recruitment
Trevor Codner, Wolverhampton University
Elite Centre for Manufacturing Skills
Benefits of Apprenticeships

• According to The National Apprenticeship Service\(^1\):

- 96% of employers that take on an apprentice reports benefits to their business.
- 72% of businesses report improved productivity as a result of employing an apprentice.
- 80% of employers feel that apprenticeships reduce staff turnover.
- 70% of surveyed employers said apprenticeships improved product quality and service\(^2\).
- The average apprenticeship increases business productivity by £214 per week.
Apprenticeship Levy

- Levy Payers and Non-Levy payers
- Started April 2017 and the funds will be collected by the HMRC
- Only employers with a wage bill of £3m or more will pay the levy
- This will then be banked in the Digital Apprenticeship Service (account)
- The Apprenticeship levy can only be spent on apprenticeships
- Non levy payer will get 90% of the apprenticeship training cost paid by the government and 10% will be paid by the employer
- If the Apprentice is 16yrs-18yrs then 100% of the Apprenticeship training cost is paid but employer must have less than 50 employees.
- This does not include wages.
The Apprenticeship

The engagement of Apprentices

- **New employees** (via normal recruitment processes)
- **Existing workforce**
- **ECMS recruitment drives**
- Apprentices can be any age from 16 upwards
- Entry requirements will vary and we will support individuals with low levels of achievement as well as high level achievers.
The offer

- State of the art training equipment
- Toolmaking
- Foundry
- Patternmaking
- Metalforming
- Advanced Computer Numerical Control
- Manufacturing Management, Leadership and Project Management
- Up to 42 months Apprenticeship training period
- Day(s) release or block release
- CPD and short bite size courses for existing workforce
Qualifications

Apprenticeship training for level 2 – 6 New Standards

<table>
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<tr>
<th>CMF/ICME</th>
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<tr>
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<td>Pattern making</td>
<td>Metal forming</td>
<td>Mechatronics (system control)</td>
<td>Welding</td>
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<td>Advance diploma in Engineering and Manufacturing skills</td>
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What is a Higher Apprenticeship?
Like intermediate (Level 2) and advanced apprenticeships (Level 3), higher apprenticeships combine on the job training while studying.
Next steps

• Training needs analysis visit to employers by BDM.
• Agree standards and Apprentice attendance.
• Sign up process
• Apprentice starts on 4th September (Mandatory Units)
• Starting dates will be monthly
Bite sized / upskilling / funded short courses
Colin Parker, Black Country Skills Factory
The Black Country Skills Factory
Bite-sized Courses programme
Fully funded bite sized training courses for your employees
Black Country Skills Factory ESF Programme

Address your specific skills needs via a ‘Tapas’ menu of bite-sized courses you tailor to your needs.

• Bite-sized courses of 2 – 4 hours
• Delivered by “best in region” training providers
• Delivery in the Black Country
• Fully funded via European Social Fund
• New courses developed to meet employer demand
Black Country Skills Factory ESF Programme

Benefits to You.

• Fully funded – no cost to you
• Minimal time away from your business
• Focussed & Specific training topics
• Tapas selection - you select
• No limit on the number of courses an employee can attend
  No limit on the number of employees an employer can send
• Increase you profitability through a more skilled workforce
Current Bite-sized courses.
A range of 80+ course under categories including :-

- Autocad
- Microsoft Excel
- Team Leader management training
- Welding, Pneumatics, Hydraulics
- Lean and Quality Control systems
- Office Skills & personal development
- Health & Safety
Who is Eligible?

**Employees** of any size of Black Country based businesses (including sole traders).

Note: Employees currently undertaking an Apprenticeship are not eligible.

Businesses **must be based in the Black Country** in one of the following sectors:

- Advanced Manufacturing (including Food & Drink)
- Transport technologies, including logistics & warehousing
- Construction, including building technologies
- Environmental technologies
- Business Services
What training is available?

www.blackcountryskillsfactory.co.uk

Click on Bitesize Course icon
What training is available?

Download the full Course Calendar. Find a Course.
How to Book & Find Course content?

Select Category of Your Course
Black Country Skills Factory ESF Programme

How to Book & Find Course content?

Select Title of Your Course
How to Book & Find Course content?

Register (Book) onto Course by click onto Green Register button.

Details of Course Content.
What happens after I have booked?

1. Training Provider will contact you and complete Employer Eligibility process (1st booking only - need Manager or above signatures).

2. Training provider will send course Joining Instructions to you.

3. Each employee to be trained will completes an Individual lesson Plan with the training provider.
   Trainee needs to show evidence (usually Passport) of eligibility.
   (This step may is often done on the day of the course).

4. Trainee attends Course.
For further Information please contact :-
www.blackcountryskillsfactory.co.uk

Colin Parker – Skills Factory Director (07944 268709 )
colin_parker@blackcountryskillsfactory.co.uk

Sandra Boyd - Skills Factory Officer (07944 268712 )
sandra_boyd@blackcountryskillsfactory.co.uk

Black Country Consortium Ltd,
The Deckhouse, Waterfront West,
Brierley Hill, DY5 1LW.
Any questions?