

## WORKSHOP TECHNOLOGY PRINCIPLES

**UNIT CODE: ENG/CU/AUT/CC/ 4/06**

### **Relationship to Occupational Standards:**

*This unit addresses the unit of competency and meets the requirements specified by the Occupational Standards: **Apply workshop technology principles***

**Duration of Unit:** 240 Hours

### **Unit description**

This unit describes the competencies required by an automotive technician in order to apply a wide range of workshop technology skills in their work. It involves use of different methods to produce work pieces using basic tools while observing occupational safety and health legislations, regulations and safe working practices, interpret working drawings, select appropriate techniques for a given task to achieve specified results as well as perform housekeeping.

### **Summary of Learning Outcome**

1. Use technical drawing to plan work operations
2. Choosing of appropriate tools and materials.
3. Measure and mark out dimensions on work pieces
4. Use hand tools to cut and file parts
5. Use drills to make holes
6. Thread using taps and dies
7. Produce components using a lathe machine
8. Assemble metal parts and sub-assemblies
9. Polish finished work
10. Perform housekeeping
11. Inspect finished work for accuracy and quality
12. Maintenance of tools and equipment

### **Learning Outcomes, Content and suggested assessment methods**

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
1. Use technical drawing to plan work operations	<ul style="list-style-type: none"><li>• Reading and extraction of information (dimensions, tolerances, BS/ANSI Drawing Standards, geometric ISO symbols &amp; abbreviations)</li><li>• Development of working procedure/ operational plan</li></ul>	<ul style="list-style-type: none"><li>• Administration of written and oral tests</li><li>• Assessment of worksheet/ operation plans</li></ul>

2. Choosing of appropriate tools and materials	<ul style="list-style-type: none"> <li>• Types of hand tools □ Using hand tools.</li> <li>• Using machine tools</li> <li>• Selection of tools as per the specific operation</li> <li>• Inspection and/or recalibration of tools</li> <li>• Demonstration of correct handling of tools.</li> <li>• Selection of material for the given component</li> </ul>	<ul style="list-style-type: none"> <li>• Observation of correct selection of tools for specific operation</li> <li>• Observation of inspection and/or recalibration of tools</li> <li>• Observation of appropriate handling of tools</li> <li>• Administration of oral and written questions</li> </ul>
3. Measure and mark out dimensions on work pieces	<ul style="list-style-type: none"> <li>• Use of marking out tools</li> <li>• Laying out work piece(s)</li> <li>• Transfer of dimensions onto the work piece(s)</li> </ul>	<ul style="list-style-type: none"> <li>• Observation of laying out of work piece(s)</li> <li>• Assessment of transferred</li> </ul>

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
		dimensions □ Administration of oral and written questions
4. Use hand tools to cut and file parts	<ul style="list-style-type: none"> <li>• Types of hand tools</li> <li>• Uses of hand tools</li> <li>• Selection of tools as per the specific operation</li> <li>• Inspection and/or recalibration of tools</li> <li>• Demonstration of correct handling of tools</li> </ul>	<ul style="list-style-type: none"> <li>• Observation of correct selection of tools for specific operation</li> <li>• Observation of inspection and/or recalibration of tools</li> <li>• Observation of appropriate handling of tools</li> <li>• Administration of oral and written questions</li> </ul>

5. Use drills to make holes	<ul style="list-style-type: none"> <li>• Marking and centre punching the hole</li> <li>• Selecting and mounting drill bits</li> <li>• Mounting and clamping work pieces</li> <li>• Drilling hole to specification</li> <li>• Inspecting the hole</li> </ul>	<ul style="list-style-type: none"> <li>• Observation of degree of surface finish</li> <li>• Assessment of finished surface(s) using inspection tools</li> <li>• Assessment of finished surface(s)</li> </ul>
-----------------------------	---	--

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
		visually
6. Thread using taps and dies	<ul style="list-style-type: none"> <li>• Selecting taps and dies based on operation plan</li> <li>• Setting up the taps and dies</li> <li>• Cutting threads to specifications</li> </ul>	<ul style="list-style-type: none"> <li>• Observation of the joined or fitted parts</li> <li>• Assessment of the joined or fitted parts</li> <li>• Assessment of functionality</li> </ul>
7. Produce components using a lathe machine	<ul style="list-style-type: none"> <li>• Cleaning of work environment (waste sorting and disposal)</li> <li>• Cleaning and storing of tools and equipment</li> <li>• Servicing and maintenance of machine (lubrication, inspection, alignment and adjustment)</li> </ul>	<ul style="list-style-type: none"> <li>• Observation of servicing and maintenance of the machine</li> <li>• Observation of clean working environment</li> <li>• Observation clean and stored tools and equipment</li> </ul>
8. Assemble metal parts and subassemblies	<ul style="list-style-type: none"> <li>• fitting parts</li> <li>• Quality control (Dimensions, Tolerances, surface finishing,</li> </ul>	<ul style="list-style-type: none"> <li>• Observation of the joined or fitted parts</li> <li>• Assessment of the</li> </ul>

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
	Alignment)	joined or fitted parts <input type="checkbox"/> Assessment of functionality
9. Polish finished work	<ul style="list-style-type: none"> <li>Polishing</li> <li>Cleaning</li> </ul>	<input type="checkbox"/> Assessing polishing and cleaning of parts
10. Perform housekeeping	<ul style="list-style-type: none"> <li>Cleaning of work environment (waste sorting and disposal)</li> <li>Cleaning and storing of tools and equipment</li> <li>Servicing and maintenance of machine (lubrication, inspection, alignment and</li> </ul>	<ul style="list-style-type: none"> <li>Observation of cleaned working environment</li> <li>Observation of cleaned and stored sheet metal tools and equipment</li> </ul>
11. Inspect finished work for accuracy and quality	<ul style="list-style-type: none"> <li>Measuring</li> <li>Surface finishing</li> <li>Functionality</li> </ul>	<input type="checkbox"/> Assessing measurements, finishing and functionality of machined parts
12. Maintenance of tools and equipment	<ul style="list-style-type: none"> <li>Cleaning tools and equipment after operations</li> <li>Servicing and maintenance of tools and equipment (lubrication, inspection, alignment and adjustment, coolant, safety guard)</li> </ul>	<ul style="list-style-type: none"> <li>Observation of cleaning of lathe machine tool</li> <li>Observation of servicing and maintenance of tools and</li> </ul>
<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
		equipment Administration of oral and written tests

### **Suggested Delivery Methods**

- Demonstration by trainer
- Discussions

- Practical work by trainee(s)
- Exercises
- Industrials visits □ Internet.
- Simulation

### **List of Recommended Resources**

#### **Tools and equipment suggested but not limited to:**

- Welding
- Drilling machines
- Vices
- Burnishing machine
- Cutting tools
- Combination square
- Centre punch
- Centre lathe
- scribes
- calipers
- Dies and taps
- Surface plate
- V-blocks
- Dial gauge □ Die stock
- Engineer's square
- File card
- Assorted Files
- Clamps
- Assorted hand tools
- Hammers
- Measuring tools
- Drill bits
- Assorted inspection tools and equipment
- Inspection and measuring tools, GO and NOT GO gauges
- Jigs and fixture
- Pliers
- Rotary disc abrasive grinder
- Reamers
- Saw
- Screwdrivers
- Spiral lowering
- Tap wrench
- Vacuum cleaners
- V-block
- Workbenches
- Vacuum cleaners
- Mops/ Brooms and buckets
- Firefighting equipment

- First Aid kit

**Materials and supplies suggested but not limited to:**

- Personal safety gear:
  - Goggles
  - Safety shoes
  - Overall
  - Cap
  - Ear Muffs
  - Gloves
- Drawing papers
- Raw materials
  - Mild steel plate
  - Sheet metal
  - Brass sheets
  - Zinc sheets
  - Aluminum sheets
  - Bright Drawn Mild Steel
  - Carbon steel
  - Brass rods
  - Aluminum rods
- Abrasive materials
- Grinding paste
- Cotton wastes
- Cleaning detergents

easytvvet.com