

## 2021 Annual Teaching Plan: Term 1 Mechanical Technology: Welding and Metalwork Grade 10

TERM 1 (45days)	Week 1 – 2 27January -5 February	Week 3-6 8 February-5 March	Week 7-8 12 -19 March	Week 9-11 23 - 31 March	
<b>CAPS Topics</b>	<b>Safety (Generic)</b>	<b>TERMINOLOGY (Welding) (Specific)</b>		<b>Tools (Generic)</b>	
<b>Topics /Concepts, Skills and Values</b>	<p>Organise and manage activities responsibly and effectively, including self-management and HIV/Aids awareness; Safety precautions taken into account during performance-based activities in order to avoid injuries or incidents. Explain his/her rights, human rights, contributions and responsibilities. <b>Understanding of the OHS Act</b> Learners must be fully aware of all the safety precautions to be taken during performance-based activities, in order to avoid injuries or incidents. Refer specifically to the following tools/machines/equipment:</p> <ul style="list-style-type: none"> <li>• Different hand tools</li> <li>• Pedestal drill</li> <li>• Bench grinder</li> <li>• Guillotine</li> <li>• Bending machine</li> <li>• Power saws</li> </ul> <p><b>Identify safe and hazardous acts and conditions e.g. speed of emery wheels, etc.</b> Apply personal hygiene measures. Refer specifically to the following tools/machines/equipment (refer to Topic 2: Tools):</p> <ul style="list-style-type: none"> <li>• Different hand tools</li> <li>• Pedestal drill</li> <li>• Pedestal grinder</li> <li>• Guillotine</li> <li>• Compressors</li> <li>• Fire extinguishing apparatus</li> </ul> <p><b>Practical:</b> Identify safe and hazardous acts and conditions (e.g. speed of emery wheels, Maximum lift on hydraulic equipment etc.) Apply personal hygiene measures. <b>Note:</b> Clean workshop on a weekly basis. First Aid HIV/Aids Awareness <b>Understand the OHS Act</b> Learners must be fully aware of all the safety precautions when using the following tools:</p> <ul style="list-style-type: none"> <li>• Hand tools</li> <li>• pedestal drill</li> <li>• Bench grinder</li> </ul>	<p>Explain the following terms with the aid of sketches:</p> <ul style="list-style-type: none"> <li>• Arc</li> <li>• Arc length</li> <li>• Leg length</li> <li>• Included angle</li> <li>• Parent metal</li> <li>• Penetration</li> <li>• Reinforcement</li> <li>• Root</li> <li>• Root face</li> <li>• Root run</li> <li>• Run</li> <li>• Tack welding</li> <li>• Toe of weld</li> <li>• Weld bead</li> <li>• Welding voltage</li> <li>• Welding current</li> <li>• Welding heat</li> </ul> <p><b>PRACTICAL:</b> Explain the welding terms by means of sketches</p> <p><b>TEMPLATES</b></p> <ul style="list-style-type: none"> <li>• Materials used for template: wood, cardboard</li> <li>• steel and hardboard</li> <li>• Principle of simple setting-out of the right angle</li> <li>• and the application of Pythagoras' theory</li> </ul> <p><b>Practical:</b> Do calculations on the theorem of Pythagoras and apply the principle by setting a right angled project.</p>	<p><b>PRINCIPLES AND FUNCTIONS OF</b></p> <ul style="list-style-type: none"> <li>• Arc welding machines such as AC and DC</li> <li>• Arc welding accessories</li> </ul> <p><b>ELECTRICAL ASPECTS REGARDING ARC WELDING</b></p> <p>Explain the following:</p> <ul style="list-style-type: none"> <li>• Volts</li> <li>• Current (Ampere)</li> <li>• Resistance</li> <li>• Polarity</li> <li>• Arc voltage</li> <li>• Direct current</li> <li>• Alternating current</li> <li>• Earthing</li> <li>• Single phase</li> <li>• Three phase</li> <li>• Voltage drop</li> </ul> <p><b>Practical:</b> Demonstrate an understanding of arc welding equipment by assembling the equipment in the correct sequence.</p>	<p>Basic tools and equipment:</p> <ul style="list-style-type: none"> <li>• Spanners: ring-, flat- and combination-</li> <li>• Sockets and accessories</li> <li>• Pliers:</li> <li>• Hammers</li> <li>• Chisels, hacksaws,</li> <li>• Screwdrivers</li> <li>• Allen keys</li> <li>• Files</li> <li>• Stocks &amp; dies.</li> </ul> <p>Application of measuring and marking-off instruments:</p> <ul style="list-style-type: none"> <li>• Steel Rule</li> <li>• Square</li> <li>• Scriber</li> <li>• Tape measure</li> <li>• Combination set</li> <li>• Punches</li> </ul> <p><b>Practical:</b> Use the marking-off plate from Topic "Tools" and drill and tap two (2) holes.</p>	<b>Revision and Assessment of Assignment</b>
<b>Requisite pre-knowledge</b>					
<b>Resources (other than textbook) to enhance learning</b>	OHS act, Safety signs in workshop, First aid manuals & Hand tools & Equipment	Tools and equipment as mentioned above.		Tools and equipment as mentioned above.	
<b>Assess</b>	<b>Informal Assessment: Remediation</b>	Classwork/case studies/worksheets/homework/class tests (Theory and practical work)			

	<b>SBA (Formal)</b>	<p style="text-align: center;"><b>PAT Phase 1 Assignment</b></p> <p>The legislation governing workplaces in relation to COVID – 19 is the Occupational Health and Safety Act, Act 85 of 1993, as amended, read with the Hazardous Biological Agents Regulations. Section 8 (1) of the Occupational Health and Safety (OHS) Act, Act 85 of 1993,</p> <p>Safe work practices are types of administrative controls that include procedures for safe and proper work used to reduce the duration, frequency, or intensity of exposure to a hazard. Examples of safe work practices for SARS-CoV-2 include. Requiring regular hand washing or using of alcohol-based hand rubs. Learners and teachers should always wash hands when they are visibly soiled and after removing any PPE. Keep safe distances and wear a mask at all times.</p> <p style="text-align: center;">See the document on the workshop safety measures</p>
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## 2021 Annual Teaching Plan: Term 2 Mechanical Technology: Welding and Metalwork Grade 10

TERM 2	Week 1-2 13- 23 April	Week 3-5 28 April- 14 May	Week 6-8 17May -4June	Week 9-11 7 -18June
<b>CAPS Topics</b>	<b>Joining methods (Generic)</b>	<b>Forces (Generic)</b>	<b>Terminology (Welding symbols and joints)</b>	Assessment /consolidation
<b>Topics /Concepts, Skills and Values</b>	<p>Calculations on the size of drills and key dimensions:</p> <ul style="list-style-type: none"> <li>• Drill sizes for screw cutting</li> <li>• Width, thickness and length of keys</li> </ul> <p>Semi-permanent joining methods:</p> <ul style="list-style-type: none"> <li>• Bolts</li> <li>• Studs</li> <li>• Locking devices</li> <li>• Nuts</li> <li>• Split pins</li> <li>• Rivets</li> </ul> <p>Keys – Identification, fitting and uses of the following types:</p> <ul style="list-style-type: none"> <li>• Parallel</li> <li>• Taper</li> <li>• Gib head</li> <li>• Woodruff keys</li> </ul>	<p><b>Forces:</b> Differentiate between the different types of forces found in engineering components:</p> <ul style="list-style-type: none"> <li>• Pulling force (Tensile)</li> <li>• Compressive force</li> <li>• Shearing force</li> </ul> <p>Components of forces:</p> <ul style="list-style-type: none"> <li>• Parallelogram of forces – resultant of two forces graphically only;</li> </ul> <p><b>Moments:</b> Moments found in engineering components (basic calculations): <b>Definition:</b> Moment = force x perpendicular distance (Spanner used to tighten a nut or bolt) <b>Stress (Basic calculations on):</b></p> <ul style="list-style-type: none"> <li>• Square bar</li> <li>• Round bar</li> </ul> <p><b>Practical:</b> Calculations to determine</p> <ul style="list-style-type: none"> <li>• forces,</li> <li>• moment and</li> <li>• stress</li> </ul>	<p><b>Identifying the different WELDING SYMBOLS:</b></p> <ul style="list-style-type: none"> <li>• Elements of welding symbols</li> </ul> <p><b>Theory and Application of PERMANENT JOINTS (Arc welding):</b></p> <ul style="list-style-type: none"> <li>• Lap joint</li> <li>• Butt joint</li> <li>• T-joint</li> <li>• Edge</li> <li>• Corner</li> </ul> <p><b>Practical:</b> Apply the identified welding symbols by welding different types of joints using arc-welding.</p>	
<b>Requisite pre-knowledge</b>	Grade 9 forces			
<b>Resources (other than textbook) to enhance learning</b>	Bolt, nuts, etc. as mentioned above. Instructional videos, You-tube videos, etc.	Testing equipment to demonstrate different types of forces. Calculators	Arc-welding equipment. as mentioned above. Instructional videos, You-tube videos, etc.	
<b>Assessment</b>	<b>Informal Assessment: Remediation</b>	<b>Classwork/case studies/worksheets/homework/class tests (Theory and practical work)</b>		
	<b>SBA (Formal)</b>	<p><b>PAT Phase 2 Term Test</b></p> <p>The legislation governing workplaces in relation to COVID – 19 is the Occupational Health and Safety Act, Act 85 of 1993, as amended, read with the Hazardous Biological Agents Regulations. Section 8 (1) of the Occupational Health and Safety (OHS) Act, Act 85 of 1993,</p> <p>Safe work practices are types of administrative controls that include procedures for safe and proper work used to reduce the duration, frequency, or intensity of exposure to a hazard. Examples of safe work practices for SARS-CoV-2 include. Requiring regular hand washing or using of alcohol-based hand rubs. Learners and teachers should always wash hands when they are visibly soiled and after removing any PPE. Keep safe distances and wear a mask at all times.</p> <p>See the document on the workshop safety measures</p>		

## 2021 Annual Teaching Plan: Term 3 Mechanical Technology: Welding and Metalwork Grade 10

TERM 3		Week 1 13-16 July	Week 2-7 19 July-27 August	Week 8-11 30 August 23 September
CAPS Topics		MAINTENANCE (GENERIC)	TERMINOLOGY DEVELOPMENTS (Specific)	PAT, Remediation & Test
Topics /Concepts, Skills and Values		Define the following types of maintenance: <ul style="list-style-type: none"> <li>• Preventive</li> <li>• Predictive</li> <li>• Reliability centred maintenance</li> </ul> Lack of maintenance on equipment <ul style="list-style-type: none"> <li>• Excessive wear</li> <li>• Overheating/seizing; and distortion</li> <li>• Failure</li> </ul> Disadvantages of an unbalanced work piece or machine part <b>Practical:</b> Analyse and predict the outcome of the lack of maintenance on equipment used in the workshop	<b>Development of:</b> <ul style="list-style-type: none"> <li>• Elbows with one joint only</li> <li>• Right angled and oblique T pieces of equal diameters</li> <li>• Unequal diameter pipes, including shapes of holes. All branches to be on centre of the main pipe</li> <li>• Right cones with top and base parallel to the horizontal plane</li> </ul> <b>Practical:</b> Demonstrate an understanding of developments by developing/ producing models from the drawings of right angled and oblique T-pieces of equal and unequal diameters, and the right cones with the top and base parallel to the horizontal	
Requisite pre-knowledge				
Resources (other than textbook) to enhance learning		Instructional videos, You-tube videos, etc. Past question papers	Instructional videos, You-tube videos, etc. Past question papers	
Assessment	Informal Assessment Remediation	Classwork/case studies/worksheets/homework/class tests (Theory and practical work)		
	SBA (Formal)	<p style="text-align: center;"><b>PAT Phase 3 Term Test</b></p> <p>The legislation governing workplaces in relation to COVID – 19 is the Occupational Health and Safety Act, Act 85 of 1993, as amended, read with the Hazardous Biological Agents Regulations. Section 8 (1) of the Occupational Health and Safety (OHS) Act, Act 85 of 1993, Safe work practices are types of administrative controls that include procedures for safe and proper work used to reduce the duration, frequency, or intensity of exposure to a hazard. Examples of safe work practices for SARS-CoV-2 include. Requiring regular hand washing or using of alcohol-based hand rubs. Learners and teachers should always wash hands when they are visibly soiled and after removing any PPE. Keep safe distances and wear a mask at all times. See the document on the workshop safety measures</p>		

2021 Annual Teaching Plan: Term 4 Mechanical Technology: Welding and Metalwork Grade 10

TERM 4		Week 1 – 2 5 October-15 October	Week 3 – 5 18 October- 30 October	Week 6 – 11 1 November-12 November	
CAPS Topics		MATERIALS (GENERIC)		Finalisation and Consolidation of PAT Revision, remediation	
Topics /Concepts, Skills and Values		<p><b>Characteristics, composition and use of:</b></p> <ul style="list-style-type: none"> <li>• <b>Ferrous metals and alloys:</b> <ul style="list-style-type: none"> <li>➤ Low carbon steel</li> <li>➤ Medium carbon steel</li> <li>➤ High carbon steel</li> <li>➤ Cast iron:                             <ul style="list-style-type: none"> <li>• Grey cast iron</li> <li>• White cast iron</li> </ul> </li> <li>➤ Stainless steel (manganese, chrome, vanadium, titanium, tungsten, molybdenum and cobalt)</li> </ul> </li> <li>• <b>Non-ferrous elements:</b> <ul style="list-style-type: none"> <li>➤ Copper, tin, lead, zinc, aluminium, nickel</li> </ul> </li> <li>• <b>Non-ferrous alloys:</b> <ul style="list-style-type: none"> <li>➤ Brass, bronze, phosphor bronze, white metal, duralumin and solder</li> </ul> </li> </ul> <p><b>Practical:</b></p> <ul style="list-style-type: none"> <li>• Collect a sample of 5 non-ferrous elements and 5 non-ferrous alloys</li> <li>• Give 2 uses for each sample collected.</li> </ul>		<p>Term 1 work Term 2 work Term 3 work Term 4 work</p>	Examination
Requisite pre-knowledge		Materials			
Resources (other than textbook) to enhance learning		Examples of the different types of materials as used in the Welding and Metalwork environment. Instructional videos, You-tube videos, etc.			
Assessment	Informal Assessment: Remediation	Classwork/case studies/worksheets/homework/class tests (Theory only)			
	SBA (Formal)	EXAMINATION			