basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

2023-24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (WELDING AND METALWORK): GRADE 10 (TERM 1)

TERM 1	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10-11
CAPS TOPICS	**SAFETY (GENERIC)** (5%)	**SAFETY (GENERIC)** (8%)	**TERMINOLOGY (WELDING) (SPECIFIC)** (15%)	**TERMINOLOGY (WELDING) (SPECIFIC)** (17%)	**TERMINOLOGY (WELDING) (SPECIFIC)** (20%)	**TERMINOLOGY (WELDING) (SPECIFIC)** (23%)	**TOOLS (GENERIC)** (28%)	**TOOLS (GENERIC)** (32%)	**PAT CONSOLIDATION**	**REVISION AND ASSESSMENT**
TOPICS, CONCEPTS, SKILLS AND VALUES	• Organise and manage activities responsibly and effectively, including self-management and HIV, Aids awareness. • Safety precautions considered during performance-based activities to avoid injuries or incidents. • Explain his, her rights, human rights, contributions and responsibilities. **Understanding of the OHSA** Learners must be fully aware of all the safety precautions to be taken during performance-based activities, to avoid injuries or incidents. Refer specifically to the following tools, machines, equipment: • Different hand tools • Pedestal drill • Bench grinder • Guillotine • Bending machine • Power saws	**Identify safe and hazardous acts and conditions e.g., speed of emery wheels, etc.** Apply personal hygiene measures: • Refer specifically to the following tools, machines, equipment (refer to Topic 2: Tools) • Compressors • Fire extinguishing apparatus **Practical:** • Identify safe and hazardous acts and conditions (e.g., speed of emery wheels, maximum lift on hydraulic equipment etc.) • Apply personal hygiene measures. **Note:** Clean workshop on a weekly basis. First Aid HIV, Aids Awareness	**Explain the following terms with the aid of sketches:** • Arc • Arc length • Leg length • Included angle • Parent metal • Penetration • Reinforcement • Root • Root face • Root run • Run • Tack welding • Toe of weld • Weld bead • Welding voltage • Welding current • Welding heat **Practical:** Explain the welding terms by means of sketches	**Templates:** Materials used for template: • Wood, cardboard • steel and hardboard • Principle of simple setting-out of the right angle and the application of Pythagoras' theory **Practical:** Do calculations on the theorem of Pythagoras and apply the principle by setting a right-angled project.	**Principles and functions of:** • Arc welding machines, such as AC and DC • Arc welding accessories	**Electrical aspects regarding arc welding:** Explain the following: • Volts • Current (Ampere) • Resistance • Polarity • Arc voltage • Direct current • Alternating current • Earthing • Single phase • Three phase • Voltage drop **Practical:** Demonstrate an understanding of arc welding equipment by assembling the equipment in the correct sequence.	**Basic tools and equipment:** • Spanners: ring-, flat- and combination- • Sockets and accessories • Pliers • Hammers • Chisels, hacksaws, • Screwdrivers • Allen keys • Files • Stocks and dies	**Application of measuring and marking-off instruments:** • Steel Rule Square • Scriber • Tape measure • Combination set • Punches **Practical:** Use the marking-off plate from Topic "Tools" and drill and tap two (2) holes.	**Marking off,** **Cutting, drilling and bending:** **Dustpan**	**Assignment**
RESOURCES TO ENHANCE LEARNING	OHS act, safety signs in workshop, first aid manuals and hand tools and equipment		Tools and equipment as mentioned above.				Tools and equipment as mentioned above.			
SBA (FORMAL)	**PAT Phase 1 and Assignment** 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 SANS. 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 always wear a mask. See the document on the workshop safety measures.									

2023-24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (WELDING AND METALWORK): GRADE 10 (TERM 2)

TERM 2	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7-8	WEEK 9	WEEK 10	WEEK 11
CAPS TOPICS	**JOINING METHODS (GENERIC)** (35%)	(40%)	**FORCES (GENERIC)** (48%)	(50%)	(55%)	**TERMINOLOGY (WELDING SYMBOLS AND JOINTS)** (60%)	(65%)	**PAT CONSOLIDATION**	**REVISION AND ASSESSMENT**	
TOPICS, CONCEPTS, SKILLS AND VALUES	**Calculations on the size of drills and key dimensions:** • Drill sizes for screw cutting • Width, thickness and length of keys	**Semi-permanent joining methods:** • Bolts • Studs • Locking devices • Nuts, split pins • Rivets **Keys – Identification, fitting and uses of the following types:** • Parallel • Taper • Gib head • Woodruff keys	**Forces:** Differentiate between the different types of forces found in engineering components: • Pulling force (Tensile) • Compressive force • Shearing force Components of forces: • Parallelogram of forces – resultant of two forces graphically only **Practical:** Calculations to determine: • Forces	**Moments:** Moments found in engineering components (basic calculations): **Definition:** Moment = force x perpendicular distance (Spanner used to tighten a nut or bolt) **Practical:** Calculations to determine: • Moment	**Stress (Basic calculations on):** • Square bar • Round bar **Practical:** Calculations to determine: • Forces, • Moment • Stress **Practical:** Calculations to determine • stress	**Identifying the different Welding Symbols:** Elements of welding symbols	**Theory and application of permanent joints (Arc welding):** • Lap joint • Butt joint • T-joint • Edge • Corner **Practical:** Apply the identified welding symbols by welding different types of joints using arc-welding	**Dustpan** **Semi-permanent joining methods**	**Control test**	
RESOURCES TO ENHANCE LEARNING	Bolt, nuts, etc. as mentioned above. Instructional videos, YouTube videos, etc.		Testing equipment to demonstrate different types of forces. Calculators			Arc-welding equipment. as mentioned above. Instructional videos, YouTube videos, etc.				
SBA (FORMAL)	**PAT Phase 2 and Control Test** 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 SANS. 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 always wear a mask. See the document on the workshop safety measures.									

2023-24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (WELDING AND METALWORK): GRADE 10 (TERM 3)

<table>
<tr><th>TERM 3</th><th>WEEK 1</th><th>WEEK 2</th><th>WEEK 3</th><th>WEEK 4-5</th><th>WEEK 6-7</th><th>WEEK 8</th><th>WEEK 9</th><th>WEEK 10</th><th>WEEK 11</th></tr>
<tr><td>CAPS TOPICS</td><td colspan="2">MAINTENANCE (GENERIC) (70%) (75%)</td><td colspan="4">(77%) (79%) (81%) (83%) (84%) (85%)
TERMINOLOGY DEVELOPMENTS (SPECIFIC)</td><td>PAT CONSOLIDATION</td><td colspan="2">REVISION AND ASSESSMENT</td></tr>
<tr><td>TOPICS, CONCEPTS, SKILLS AND VALUES</td><td colspan="2">Define the following types of maintenance:
• Preventive
• Predictive
• Reliability centred maintenance
Lack of maintenance on equipment
• Excessive wear
• Overheating, seizing, and distortion
• Failure
Practical:
Analyse and predict the outcome of the lack of maintenance on equipment used in the workshop</td><td>Elbows with one joint only</td><td>Right angled and oblique T-pieces of equal diameters</td><td>Unequal diameter pipes, including shapes of holes. All branches to be on centre of the main pipe</td><td>Right cones with top and base parallel to the horizontal plane</td><td rowspan="2">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</td><td colspan="2" rowspan="2">Control test</td></tr>
<tr><td colspan="4">Practical:
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</td></tr>
<tr><td>RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING</td><td colspan="2">Instructional videos, YouTube videos, etc. Past question papers</td><td colspan="4">Instructional videos, YouTube videos, etc. Past question papers</td><td colspan="3"></td></tr>
<tr><td>SBA (FORMAL)</td><td colspan="9">PAT Phase 3 and Control Test
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,
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2023-24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (WELDING AND METALWORK): GRADE 10 (TERM 4)

<table>
<tr><th>TERM 4</th><th>WEEK 1</th><th>WEEK 2</th><th>WEEK 3</th><th>WEEKS 4-5</th><th>WEEKS 6-10</th></tr>
<tr><td>CAPS TOPICS</td><td colspan="3">MATERIALS (GENERICS)
(95%) (98%) (100%</td><td>PAT CONSOLIDATION</td><td>REVISION AND ASSESSMENT</td></tr>
<tr><td rowspan="2">TOPICS, CONCEPTS, SKILLS AND VALUES</td><td colspan="3">CHARACTERISTICS, COMPOSITION AND USE OF:</td><td rowspan="2">Collect a sample of 5 non-ferrous elements and 5 non-ferrous alloys
Give 2 uses for each sample collected.</td><td rowspan="2">Examination</td></tr>
<tr><td>Ferrous metals and alloys:
• Low carbon steel
• Medium carbon steel
• High carbon steel

Cast iron:
Grey cast iron, White cast iron
• Stainless steel (manganese, chrome, vanadium, titanium, tungsten, molybdenum and cobalt)</td><td>Non-ferrous elements:
• Copper
• Tin
• Lead
• Zinc
• Aluminium
• Nickel

Practical:
Collect a sample of 5 non-ferrous elements and 5 non-ferrous alloys
Give 2 uses for each sample collected.</td><td>Non-ferrous alloys:
• Brass
• Bronze
• Phosphor bronze
• White metal, duralumin and solder</td></tr>
<tr><td>RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING</td><td colspan="5">Examples of the different types of materials as used in the welding and metalwork environment.
Instructional videos,
YouTube videos, etc.</td></tr>
<tr><td>SBA (FORMAL)</td><td colspan="5">PAT Phase 4 and Final Examination
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,
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