

## 2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (FITTING AND MACHINING): 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	WEEK 11
CAPS TOPICS		Safety (generic) (5%)	Safety (generic) (8%)	Tools (generic) (10%)	Tools (generic) (12%)	Tools (generic) (16%)	Materials (generic) (20%)	Materials (generic) (25%)	Terminology (30%)	Pat consolidation Revision		Assessment
TOPICS/CONCEPTS, SKILLS AND VALUES		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: • Hand tools • Pedestal drill • Bench grinder Lathe Machine Milling Machine	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: • Compressors • Fire extinguisher	Basic tools and equipment : • Spanners: ring-, flat- and combination- • Sockets and accessories • Pliers: • Hammers • Chisels, hacksaws • Screwdrivers • Allen keys • Stocks & dies • Files	Basic tools and equipment: • Spanners: ring-, flat- and combination- • Sockets and accessories	Application of measuring and marking-off instruments: • Steel Rule • Square • Scriber • Tape measure • Combination set • Punches	Characteristics, composition and use of: • 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)	Characteristics, composition and use of: • Non-ferrous elements: - Copper, tin, lead, zinc, aluminium, nickel • Non-ferrous alloys: - Brass, bronze, phosphor bronze, white metal, duralumin and solder	Measuring instruments Simple readings on: • Vernier callipers • Outside, inside and depth micrometres	COMPLETE PHASE 1 OF PAT REVISION		FORMAL ASSESSMENT
PRACTICAL ACTIVITIES		<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>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>Practical</b> Use the marking-off instruments to mark off a plate (at least 5 mm thick) with 5 holes	<b>Practical</b> Use the marking-off instruments to mark off a plate (at least 5 mm thick) with 5 holes	<b>Practical</b> Use the marking-off instruments to mark off a plate (at least 5 mm thick) with 5 holes	<b>Practical</b> Learner identifies and classify the different types of ferrous metal and alloys	<b>Practical</b> • Collect a sample of 5 non-ferrous elements and 5 non-ferrous alloys	<b>Practical</b> Use and reading of measuring instruments			
REQUISITE PRE-KNOWLEDGE		Awareness of HIV and Aids	Awareness of HIV and Aids and tools and machines	Learners' familiar with a few basic hand tools	Learners' familiar with basic hand tools	Learners' familiar with basic hand tools.	Learners able to identify or differentiate between certain materials	Learners able to identify or differentiate between types of ferrous and non-ferrous metals	Learners' familiar with basic measuring instruments			
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING		OHS Act, safety signs in workshop, first aid manuals & hand tools & equipment	OHS Act, safety signs in workshop, first aid manuals & hand tools & equipment	Tools and equipment as mentioned above	Tools and equipment as mentioned above	Different materials as listed above, magnets etc. Instructional videos, YouTube videos, etc.	Bolts Nuts video Taps and dies Hand tools Drill press, rivets, keys etc	Measuring tools, lathe	Measuring tools, cutting tools, lathe			
ASSESSMENT	INFORMAL ASSESSMENT REMEDIATION	Classwork/case studies/worksheets/homework/class tests (theory and practical work)										
	SBA & PAT (FORMAL)	PAT Phase 1 Assignment										

## 2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (FITTING AND MACHINING): GRADE 10 (TERM 2)

TERM 2		WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11
CAPS TOPICS		Terminology (42%) (machining) (specific)	Terminology (45%) (machining) (specific)	Terminology (48%) (machining) (specific)	Terminology (55%)	Terminology (60%)	Forces (63%)	Forces (65%)	Forces (68%)	Practical task	Revision	Assessment (formal)
TOPICS/CONCEPTS, SKILLS AND VALUES		Lathe: <ul style="list-style-type: none"> <li>• Classification</li> <li>• Types of bed: V and flat and gap</li> <li>• Functions of:               <ul style="list-style-type: none"> <li>- Feed shaft</li> <li>- Head stock</li> <li>- Lead screw</li> <li>- Tail stock</li> <li>- Carriage</li> </ul> </li> <li>- Function and purpose of the 3- and 4-jaw chucks</li> <li>• Coolants (application and advantages and disadvantages)</li> </ul>	<ul style="list-style-type: none"> <li>• Cutting tool (high speed steel):</li> <li>• Clearance angles</li> <li>• Cutting angles</li> <li>• Differentiate between high-speed steel cutting tools and tungsten tip tools</li> </ul>	<ul style="list-style-type: none"> <li>• Cutting tool (high tool holders and boring bars (types and uses)</li> <li>• Apply cutting procedures for diameter turning and facing</li> </ul>	Taper turning (methods, advantages and disadvantages): <ul style="list-style-type: none"> <li>• Compound slide</li> <li>• Tail stock</li> <li>• Taper turning attachment</li> <li>• Cutting tool</li> </ul>	<ul style="list-style-type: none"> <li>• Screw cutting (compound slide – theory only):</li> <li>• Characteristics and elements of metric V-thread</li> <li>• Parallel</li> <li>• Half of the included angle of the thread</li> <li>• Use of the screw thread pitch gauge and screw cutting gauges</li> </ul>	Forces: Differentiate between the different types of forces found in engineering components: <ul style="list-style-type: none"> <li>• Pulling force (Tensile)</li> <li>• Compressive force</li> <li>• Shearing force</li> </ul>	Forces: Differentiate between the different types of forces found in engineering components: Components of forces: <ul style="list-style-type: none"> <li>• Graphic solution of the horizontal and vertical component of a single force acting at an angle</li> </ul>	Forces: Components of forces: <ul style="list-style-type: none"> <li>• Mathematical solution of the horizontal and vertical component of a single force acting at an angle</li> </ul>	Consolidation PAT phase 2		
PRACTICAL ACTIVITIES		<b>Practical</b> <ul style="list-style-type: none"> <li>• Identify the above-mentioned parts of the lathe machine</li> <li>• Mixing of coolant for machines</li> <li>• Replacing and draining of the coolant</li> </ul>	<b>Practical</b> <ul style="list-style-type: none"> <li>• Learners to identify the cutting and clearance angles of a lathe cutting tool</li> </ul>	<b>Practical</b> <ul style="list-style-type: none"> <li>• Facing and diameter/parallel turning on the lathe</li> </ul>	<b>Practical</b> <ul style="list-style-type: none"> <li>• Machining of an outside taper using the compound slide only</li> </ul>	<b>Practical</b> <ul style="list-style-type: none"> <li>• Setting up lathe for screw cutting</li> </ul>	<b>Practical</b> <ul style="list-style-type: none"> <li>• Use basic calculations to determine forces</li> </ul>	<b>Practical</b> <ul style="list-style-type: none"> <li>• Use of drawing instruments to determine forces</li> <li>• Use calculations to test your answer</li> </ul>	<b>Practical</b> <ul style="list-style-type: none"> <li>• Use basic calculations to determine forces</li> </ul>			
REQUISITE PRE-KNOWLEDGE		The use of lubrication when drilling	Knowledge of angles	Knowledge of cutting tools	Knowledge of the lathe machine	Knowledge of cutting threads using taps and dies	Prior knowledge of the different types of forces learned in Grade 9	Knowledge of the different types of forces	The use of the scientific calculator (Trigonometry)			
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING		Lathe machine and accessories, videos, etc.	Cutting tools, bench grinder, grinding wheel dresser, videos, etc.	Lathe machine and accessories, workpiece, videos	Lathe machine and accessories, sample of a taper, videos	Lathe machine and screw cutting tools, bolts and nuts with different types of pitches, videos, etc.	Testing equipment to demonstrate different types of forces. Calculators, YouTube videos, etc.	Testing equipment, instructional videos, You-Tube videos, etc.	Testing equipment, instructional videos, YouTube videos, etc.			
ASSESSMENT	INFORMAL ASSESSMENT: REMEDIATION	Classwork/case studies/worksheets/homework/class tests (Theory and practical work)										
	SBA & PAT (FORMAL)	PAT phase 2 Controlled test										

## 2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (FITTING AND MACHINING): GRADE 10 (TERM 3)

TERM 3		WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11
CAPS TOPICS		Joining methods (73%)	Joining methods (78%)	Joining methods (82%)	Systems and control (drive systems) (specific) (83%)	Systems and control (drive systems) (specific) (85%)	Systems and control (drive systems) (specific) (86%)	Systems and control (drive systems) (specific) (88%)	Systems and control (drive systems) (specific) (90%)	Practical task and consolidation	Revision	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	Semi-permanent joining methods: • Keys – Identification, fitting and uses of the following types: - Parallel key - Taper key, - Gib-head key - Woodruff key	<b>Mechanical</b> Identify different drive systems referring to application • Spur gears	<b>Mechanical</b> Identify different drive systems referring to application • Pulleys • Belt drives • Chain drives	Identification and application on the following screw threads (properties, uses, profiles and angles): • ISO Metric V-thread (fine and coarse)	Identification and application on the following screw threads (properties, uses, profiles and angles): • Square thread	Identification and application on the following screw threads (properties, uses, profiles and angles): • Acme thread	Completion of final PATs		Formal assessment
PRACTICAL ACTIVITIES		<b>Practical</b> Use of calculations to determine drill sizes, width, thickness and length of keys	<b>Practical</b> Use different types of rivets to join materials	<b>Practical</b> Identify where semi-permanent joints is used in the workshop	<b>Practical</b> Identify different gears sizes of spur gears used on machines drives	<b>Practical</b> Identify the most suitable mechanical drive system for various applications	<b>Practical</b> Identify fine and coarse ISO metric V- thread in the workshop	<b>Practical</b> Identify square threads in the workshop	<b>Practical</b> Identify Acme threads in the workshop			
REQUISITE PRE-KNOWLEDGE		Knowledge of mathematical calculations in Gr 9	Knowledge of bolts and nut on equipment	Knowledge of rivets and bolts and nuts	Knowledge of comparison between big and small	Knowledge of spur gears done in previous week	Knowledge of semi-permanent joints	Knowledge of semi-permanent joints	Knowledge of semi-permanent joints			
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING		Calculators	• Bolts • Studs • Locking devices • Nuts • Split pins • Rivets • Videos	• Parallel key • Taper key, • Gib-head key • Woodruff key	• Spur gears • Lathe • Milling machine • Power saw	• Pulleys • Belt drives • Chain drives drilling machine • Lathe	• Lathe • Milling machines • Machine vices bolts and nuts	• Lathe • Milling machines • Machine vices bolts and nuts	• Lathe • Milling machines • Machine vices			
ASSESSMENT	INFORMAL ASSESSMENT: REMEDIATION	Classwork/case studies/worksheets/homework/class tests (theory and practical work)										
	SBA & PAT (FORMAL)	PAT phase 3 Controlled test										

2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (FITTING AND MACHINING): GRADE 10 (TERM 4)

TERM 4		WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6-10
CAPS TOPICS		Maintenance (generic) (95%)	Maintenance (generic) (100%)	PAT consolidation	PAT consolidation	Revision	Examination
TOPICS/CONCEPTS, SKILLS AND VALUES		Properties of lubricants: <ul style="list-style-type: none"><li>• Viscosity</li><li>• Pour point</li><li>• Flash point</li></ul> Grading of oil according to viscosity: (SAE standards) <ul style="list-style-type: none"><li>• Transmission oil</li><li>• Grease</li></ul> Friction: <ul style="list-style-type: none"><li>• Characteristics</li><li>• Application</li></ul>	Define the following types of maintenance: <ul style="list-style-type: none"><li>• Preventive</li><li>• Predictive</li><li>• Reliability centred maintenance</li></ul> Identify the outcome of the lack of maintenance on equipment used in the workshop: <ul style="list-style-type: none"><li>• Excessive wear</li><li>• Overheating/seizing; and distortion (lack of cooling and lubrication)</li><li>• Failure e.g., hydraulics/pneumatics, controls and cables</li></ul> Disadvantages of an unbalanced work piece or machine part	Completion of PATs Phase 3 and 4	Completion of PATs Phase 3 and 4		Administration of final examinations
PRACTICAL ACTIVITIES		<b>Practical</b> Analyse and predict the outcome of the lack of maintenance on equipment used in the workshop	<b>Practical</b> <ul style="list-style-type: none"><li>• Analyse and predict the outcome of the lack of maintenance on equipment used in the workshop</li></ul>				
REQUISITE PRE-KNOWLEDGE		Knowledge of coolants for the lathe and milling machine	Knowledge of coolants for the lathe and milling machine	Apply of theoretical knowledge to complete the PAT			
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING		<ul style="list-style-type: none"><li>• Different types of coolants, oil and grease</li><li>• Lathe instructional videos</li></ul>	<ul style="list-style-type: none"><li>• Different types of coolants, oil and grease</li><li>• Lathe Instructional videos</li></ul>	Machines equipment material to complete the PAT			
ASSESSMENT	INFORMAL ASSESSMENT: REMEDIATION	Classwork/case studies/worksheets/homework/class tests (theory and practical work)					
	(FORMAL) ASSESSMENT	PAT phase 4 Final examination					