basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (AUTOMOTIVE): 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)**	**TOOLS (GENERIC)**	**TOOLS (GENERIC)**	**TOOLS & EQUIPMENT (GENERIC)**	**ENGINES (SPECIFIC)**	**ENGINES (SPECIFIC)**	**ENGINES (SPECIFIC))**	**ENGINES (SPECIFIC)**	**PAT CONSOLIDATION**	**REVISION ASSIGNMENT**	**REVISION ASSIGNMENT**
TOPICS/ CONCEPTS, SKILLS AND VALUES	First Aid HIV/Aids awareness **Understand the OHS Act** Safety precautions taken into account during performance-based activities in order to avoid injuries or incidents) Learners must be fully aware of all the safety precautions when using the following tools: • Hand tools • Pedestal drill • Bench grinder	Basic tools and equipment: • Spanners: Ring-, flat- and combination • Sockets and accessories • Pliers • Hammers • Chisels, hacksaws • Screwdrivers • Allen keys • Stocks & dies • Files	Application of measuring and marking-off instruments: • Steel rule • Square • Scriber • Tape measure • Combination set • Punches	Understand the OHS Act Learners must be fully aware of all the safety precautions when using the following tools: • Compressors • Fire extinguisher • Lifts, jacks & trestles	**Identification and function of engine components**: Pistons, piston rings, crankshaft, connecting rod, bearings, gudgeon pin, camshaft, valves, flywheel, cylinder head, engine block, oil pump, manifolds, carburettors, etc.	Operating principles of 4 stroke internal combustion engines. (single cylinder spark ignition engines only): • Stroke • Dead centre • Cycle	Operating principles of 2 stroke internal combustion engines. (single cylinder spark ignition engines only): • Stroke • Dead centre • Cycle Comparison of 4-stroke and 2-stroke cycle	Conventional layouts: • Engine in front with front- and rear-wheel drives • Engine at rear with rear-wheel drive • Advantages and disadvantages of each position	Completion of PAT that was done throughout term 1		
REQUISITE PRE-KNOWLEDGE	HIV/Aids safety in general and basic hand tools										
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		Engines assemblies, YouTube videos, etc.	Engines assemblies, YouTube videos, etc.	Engines with the above-mentioned components, YouTube videos, etc.	Vehicles with different layouts, YouTube videos			
ASSESSMENT **INFORMAL ASSESSMENT:** **REMEDIATION**			Use the marking-off instruments to mark-off a plate (at least 5 mm thick) with 5 holes.	Identify safe and hazardous acts and conditions (e.g. speed of emery wheels, maximum lift on hydraulic equipment,	Use a dismantled engine to identify various components and their functions	Investigate the operation of a 4-stroke engine Identify the stroke, dead centre and cycle	Investigate the operation of a 2-stroke engine Comparison of 4-stroke and 2-stroke cycle				
SBA & PAT (FORMAL)	**PAT phase 1** Assignment										

2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (AUTOMOTIVE): 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	**JOINING METHODS (GENERIC)**	**JOINING METHODS (GENERIC)**	**JOINING METHODS (GENERIC)**	**FORCES (GENERIC)**	**FORCES (GENERIC)**	**MAINTENANCE (GENERIC)**	**MAINTENANCE (GENERIC)**	**MAINTENANCE (GENERIC)**	**PAT CONSOLIDATION**	**REVISION AND ASSESSMENT (CONTROLLED TEST)**	**REVISION AND ASSESSMENT (CONTROLLED TEST)**
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	**Forces:** Different types of forces found in engineering components: • Pulling force (tensile) • Compressive force • Shearing force	**Moments:** Moments found in engineering components (basic calculations) Definition: Moment = force x perpendicular distance (spanner used to tighten a nut or bolt)	Properties of lubricants: • Viscosity • Pour point, etc. Grading of oil according to viscosity (SAE standards): • Transmission oil • Engine oil • Differential oil • Cutting fluid • Grease	Friction: • Definition • Causes • Advantages • Application Define the following types of maintenance: • Preventive • Predictive • Reliability centred maintenance	Lack of maintenance on equipment • Excessive wear • Overheating/seizing and distortion • Failure	Completion of PAT that was done throughout term 2		
REQUISITE PRE-KNOWLEDGE		Grade 9 Forces									
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING	Bolt, nuts, etc. as mentioned above Instructional videos, YouTube videos, etc.		Bolt, nuts, etc. as mentioned above Instructional videos, YouTube videos, etc.	Testing equipment to demonstrate different types of forces Calculators	Testing equipment to demonstrate different types of forces Calculators	Different types of oils Instructional videos, YouTube videos, etc.	Instructional videos, YouTube videos, etc. Old question papers	Instructional videos, YouTube videos, etc. Old question papers			
ASSESSMENT **INFORMAL ASSESSMENT: REMEDIATION**							Inspect and predict the outcome of the lack of maintenance on equipment used in the workshop	Analyse and predict the outcome of the lack of maintenance on equipment used in the workshop			
SBA & PAT (FORMAL)	**PAT Phase 2** Controlled test										

2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (AUTOMOTIVE): 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	**TERMINOLOGY (SPECIFIC) DRIVE TRAINS**			**MAINTENANCE (SPECIFIC)**			**SYSTEMS & CONTROL (SPECIFIC)**		**CONSOLIDATION OF PAT**	**REVISION AND ASSESSMENT (CONTROLLED TEST)**	
TOPICS/CONCEPTS, SKILLS AND VALUES	**Function, construction and operation of the single-plate clutch assembly:** • Flywheel • Diaphragm pressure plate • Clutch plate • Clutch couplings, etc. • Hydraulic: Master & slave cylinders, pipes • Fault finding	Identify the various components of the constant mesh manual gearbox and define the function, operation and power flow of: • Gears • Shafts • Synchronising unit • Selector mechanism	**Function, construction and operation of drive shafts:** • The slip joint • Universal joint • Constant velocity joint • Flexible coupling	**Lubrication systems** • Splash feed, pressure feed and full pressure feed **Oil** • Oil purity, oil dilution, crankcase ventilation	Oil filtration systems: Full-flow and by-pass systems **Temperature control:** • Factors generating heat	**Cooling systems** • Direct air • Indirect air cooling **Components** Radiators, radiator pressure cap, water pumps, thermostat, by-pass system, etc.	**Basic carburetion** • Function of a carburettor • Basic principle of operation, etc. **Air filters** Purpose and types	Hydraulic brake system • Master cylinder (function) • Wheel cylinders Hydraulic brake system: • Disc brake assembly • Brake shoe assembly • Hand brake assembly	Completion of PAT that was done throughout term 3 and phase 4 PAT		
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING	Clutch components (as above) YouTube, CDX educational videos, etc.	Manual gearboxes and components (as above) YouTube, CDX educational videos, etc.	Drive shafts and components (as above) with relative specifications	Engines with different lubrication systems Hand tools YouTube, CDX educational videos, etc.	Vehicle or running engines YouTube, CDX educational videos	Vehicle or running engines to do pressure testing and for servicing	Carburettors, air filters, hand tools & educational videos	Braking systems components, hand tools & educational videos			
ASSESSMENT **INFORMAL ASSESSMENT:** **REMEDIATION**	**Check and maintain fluid levels:** • Brake fluid	Demonstrate knowledge of the working principle of a multi-speed manual gearbox including condition report		**Practical** • Do a visual inspection on a cooling system • Do a pressure test **Check and maintain all fluid levels** • Water • Oil				**Group Practical:** Replace front brake pads and bleed the system			
SBA & PAT (FORMAL)	**PAT Phase 3** Controlled test										

2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (AUTOMOTIVE): GRADE 10 (TERM 4)

TERM 4	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6-10
CAPS TOPICS	**SYSTEMS & CONTROL (SPECIFIC)**			**REVISION OF TERM 1 AND 2 TOPICS**	**REVISION OF TERM 3 AND 4 TOPICS**	**EXAMINATION**
TOPICS /CONCEPTS, SKILLS AND VALUES	Electricity: • Electron theory – basic electrical principles: - Electron movement - Electrons and conductors - Pulse with modulation - Digital & analogue signal - Effects of electricity	• Characteristics of magnetism • Electromagnets • Ohm's law • Electrical units and measurements: - Volts - Amps - Ohms	• Use of the multi-meter • Basics series and parallel circuits • Battery – lead acid type	• Safety • Tools • Engines • Joining methods • Forces • Maintenance generic	• Terminology drive trains • Maintenance specific • Systems & control (carburation and hydraulic brake system) • Systems & control (electricity)	
RESOURCES (OTHER THAN TEXTBOOK) TO ENHANCE LEARNING	Instructional videos, YouTube videos, etc.	Multi-meters, batteries, instructional videos, YouTube videos, etc.				
ASSESSMENT **INFORMAL ASSESSMENT: REMEDIATION**	• Competence in the use of the multi-meter • Taking of basic measurements					
SBA & PAT (FORMAL)	**PAT Phase 4** Final examination					