basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (AUTOMOTIVE): GRADE 11 (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)** (3%)	**SAFETY (GENERIC)** (5%)	**TOOLS (GENERIC)** (10%)	**TOOLS (SPECIFIC)** (15%)	**ENGINES (SPECIFIC)** (20%)	**ENGINES (SPECIFIC) VALVE ASSEMBLIES**: (22%)	(24%)	(25%)	**PAT CONSOLIDATION**	**REVISION AND ASSESSMENT (ASSIGNMENT)**	
TOPICS, CONCEPTS, SKILLS, AND VALUES		First aid HIV/AIDS awareness OHS Act General workshop safety. • Machine-specific safety measures when dealing with: • Grinding machines (angle grinder and bench grinder) • Cutting machines	Machine-specific safety measures when dealing with: • Press machines (drill press, hydraulic press)	The principles and functions and applications of the following: • Stocks and dies (characteristics and drill sizes) • Grinding machines • Cutting machines (drilling machines) • Press machines	The functions and applications of the following: • Dial indicators • Telescopic gauges • Torque wrenches • Outside, inside micrometres and vernier calliper	**C.I. Engines**: Combustion chamber designs for direct and indirect injection **Injector:** Function, construction, operation and types of nozzles	• Identify various overhead valve arrangements • Identify various camshafts arrangements: SOHC and DOHC	• Cam followers – mechanical and hydraulic valve timing diagram • Continuously variable valve timing (CVVT) system	• Purpose and importance of valve clearance • Timing gears, chains, belt drives and tensioners	Completion of PAT that was done throughout term 1		
REQUISITE PRE-KNOWLEDGE		HIV/AIDS Awareness		Hand tools and cutting tools	Hand tools and measuring tools	Operating principles of 2- & 4-stroke internal combustion engines	Operating principles of 2- & 4-stroke internal combustion engines					
RESOURCES (OTHER THAN TEXTBOOK) **TO ENHANCE LEARNING**		OHS Act, safety signs in workshop, first aid manuals & tools & equipment	OHS Act, safety signs in workshop, first aid manuals & tools & equipment	Tools and equipment as mentioned above.	Engine components. Tools and equipment as mentioned above.	Direct and Indirect injection C.I. engines, different types of injectors.	Engines with various OHV assemblies, YouTube videos	Engines with various OHV assemblies, YouTube videos				
ASSESSMENT	**INFORMAL ASSESSMENT:** REMEDIATION	Demonstrate the competent use of the specific tools above with the measuring of various engine components to determine wear etc. (e.g., bore, piston and crankshaft). Tighten bolts to the correct torque in the correct sequence (cylinder head).				Research the CVVT systems used by any 4 various manufacturers of motor vehicles. Use a practical method and determine the valve timing of a four-cylinder four-stroke engine (with or without marks). Record findings.						
	SBA & PAT (FORMAL)	**PAT Phase 1** Assignment										

2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (AUTOMOTIVE): GRADE 11 (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		**SYSTEMS AND CONTROL (SPECIFIC)** (27%)	(31%)	(35%)	(40%)	(44%)	**SYSTEM AND CONTROL (SPECIFIC)** (48%)	(52%)	(58%)	**PAT CONSOLIDATION**	**REVISION AND ASSESSMENT (CONTROLLED TEST)**	
TOPICS, CONCEPTS, SKILLS, AND VALUES		**Basic function, construction, and operation of final drives:** • Spiral bevel type • Hypoid type • Conventional differential • Limited slip differential	**Identify the layout and purpose of different drive systems:** • Four-wheel drive • All-wheel drive Hydraulic brakes: • Master Cylinder (Construction, Function & Operation)	**Hydraulic brakes**: • Vacuum servo unit (purpose and operation) • ABS braking system (Basic layout and operation)	**Define the difference in construction between:** • Front axles • Rear axles: ➢ Semi-floating ➢ Full-floating	**Steering systems, layout & operation:** • Types of steering boxes (rack and pinion gearing and worm gearing) • Power steering • Electric p/steering	Identify the function & purpose of the following steering control components: • Drag links • Tie rod ends • Ball joints	**Suspension layout and operation**: • Define sprung and un-sprung mass • Semi- elliptic leaf • Coil springs • Torsion bars	• Control ➢ Telescopic shock absorbers (gas and hydraulic) ➢ Anti-roll bars ➢ Stabilisers	Completion of PAT that was done throughout term 2		
REQUISITE PRE-KNOWLEDGE			Engine layout from Grade 10 syllabus Hydraulic brake systems	Hydraulic brake systems	Hydraulic brake systems							
RESOURCES (OTHER THAN TEXTBOOK) **TO ENHANCE LEARNING**		Different types of final drives, hand tools, YouTube, educational videos, etc.	Different types of final drives and layouts, hand tools, etc.	Hydraulic brakes components and operational system, hand tools, etc.	Vacuum servo units, hand tools	Steering control components (as above): Educational videos on axles, etc.	Steering control components (as above): Educational videos, etc.					
ASSESSMENT	**INFORMAL ASSESSMENT:** REMEDIATION	Use an actual differential in the workshop and explain the power flow under different simulated conditions and record findings		Inspect master cylinder components and compile condition report								
	SBA & PAT (FORMAL)		**PAT Phase 2** Controlled Test									

2023/24 ANNUAL TEACHING PLANS: MECHANICAL TECHNOLOGY (AUTOMOTIVE): GRADE 11 (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	**SYSTEMS AND CONTROL** (63%)	(65%)	(75%)	**MAINTENANCE (SPECIFIC)** (80%)	(82%)	(85%)	**FORCES (SPECIFIC)** (87%)	(90%)	**CONSOLIDATION OF PAT**	**REVISION AND CONTROLLED TEST**	
TOPICS, CONCEPTS, SKILLS, AND VALUES	ELECTRICITY Identify the functions and describe the operation of the conventional ignition system with reference to: • Ignition coil • Firing order • Ignition timing • Spark plugs	Purpose, construction, and operation of ignition timing regulators • Mechanical and • Vacuum regulators	Starting circuit: Show an understanding of the basic starting circuit supplemental systems (purpose and operation): • Traction control • Airbag control	Engine lubrication oil pumps (purpose and operation): • Gear • Vane • Rotor	Demonstrate an understanding of oil control methods referring to: • Oil filtration systems • Pressure relief valve	Demonstrate an understanding of oil control • Seals • Servicing of vehicles: Importance of regular servicing	Automotive calculations and application: • Work • Power • Torque	Compression ratio: Define the following: Compression ratio	Completion of PAT that was done throughout Term 3		
REQUISITE PRE-KNOWLEDGE	Identification and function of engine components		Identification and function of engine components	Properties of lubricants friction, lack of maintenance	Lubrication systems		Types of forces basic calculations				
RESOURCES (OTHER THAN TEXTBOOK) **TO ENHANCE LEARNING**	Conventional ignition system components (as above) with relative specifications		Batteries, starters, hand tools, YouTube, CDX educational videos, etc.	Different types of oil pumps	Oil filtration systems, vehicle or running engines for servicing		Engines, measuring instruments and specifications Calculators				
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 (AUTOMOTIVE): GRADE 11 (TERM 4)

TERM 4	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9-11
CAPS TOPICS	**TERMINOLOGY (SPECIFIC)** (95%) (100%)		**PRACTICAL: MAINTENANCE**			**REVISION, CONSOLIDATION AND MODERATION OF PAT**			**EXAMINATION**
TOPICS, CONCEPTS, SKILLS, AND VALUES	Workshop administration • Read and interpret job instructions	Read, interpret and adhere to manufacturers' specifications	Changing disc pads and bleeding of breaks or oil change or engine timing or setting of engine valves						
REQUISITE PRE-KNOWLEDGE	Workshop administration and maintenance								
RESOURCES (OTHER THAN TEXTBOOK)	Sample job cards	Workshop manuals YouTube videos							
FORMAL ASSESSMENT	**PAT Phase 4 and final examination**								