

2022 Annual Teaching Plan Term 1: Mechanical Technology: Fitting & Machining Grade 11

TERM 1 (47 days)	Week 1 (5 days)	Week 2 (5 days)	Week 3 (5 days)	Week 4 (5 days)	Week 5 - 8 (17 days)	Week 9 (5 days)	Week 10 (5 days)	
CAPS Topics	SAFETY (Generic)	SAFETY (Generic)	TOOLS (Generic)	TOOLS (Specific)	TERMINOLOGY Machining (Specific)	PAT Consolidation and Revision	Assignment	
Topics /Concepts, Skills and Values	<p>HIV/Aids Awareness</p> <p>Knowledge of basic First Aid measures</p> <p>Analyse the OHS Act and regulations where applicable</p> <p>Machine specific safety measures when dealing with:</p> <ul style="list-style-type: none"> Grinding machines Cutting machines 	<p>Machine specific safety measures when dealing with:</p> <ul style="list-style-type: none"> Press machines Hydraulically Operated equipment <p>Practical:</p> <p>Perform a first aid exercise to demonstrate action to be taken when a fellow learner hurts him/herself in the workshop.</p>	<p>The principles and functions of the following:</p> <ul style="list-style-type: none"> Stocks and dies (characteristics and drill sizes) Grinding machines Cutting machines (drilling machines) Press machines <p>Practical:</p> <p>Explain the safety precautions to be followed when using the various cutting and grinding machines Press machines</p>	<p>The principles and functions of the following:</p> <ul style="list-style-type: none"> Dial indicators Telescopic gauges Torque wrenches Outside, Inside micrometers and Vernier calliper <p>Practical:</p> <p>Demonstrate competent use of:</p> <ul style="list-style-type: none"> Dial indicators Telescopic gauges Torque wrenches Inside micrometers 	<p>Lathe:</p> <ul style="list-style-type: none"> Safety measures Set up of irregular work pieces – 4 jaw chuck Steadies (purpose and use) Mandrels (purpose and use) Taper turning (compound slide method – inside and outside tapers) <ul style="list-style-type: none"> Calculations for setting over of compound slide Screw cutting <ul style="list-style-type: none"> Description of the pitch and leads for single- and multi-start screw threads Uses of screw thread dial gauge, pitch gauge, centre gauge and graduated collar when screw thread cutting is carried out Methods to determine the locating positions on the dial gauge Calculations of depth of V-threads Square thread (calculations of the helix, leading and following angles for the cutting tools) <p>Practical – Lathe:</p> <ul style="list-style-type: none"> Set-up of an irregular work piece in a 4-jaw chuck Use the lathe to do taper turning Use the lathe to do V-thread screw cutting <p>Milling machine:</p> <ul style="list-style-type: none"> Safety measures Milling machine parts Calculations on: <ul style="list-style-type: none"> Centring of cutter Cutting of key ways – parallel Milling cutters (identification and uses): <ul style="list-style-type: none"> Side and face cutter End mill Flute mill T-slot mill Helical cutter Involute gear tooth cutter <p>Practical – Milling machine:</p> <ul style="list-style-type: none"> Centring of cutter Cutting of parallel key way 			
Requisite pre-knowledge	HIV/Aids Awareness		Hand tools and Measuring tools		Terminology content in grade 10			
Resources (other than textbook) to enhance learning	OHS act, Safety signs in workshop, First aid manuals & Tools & Equipment		Tools and equipment as mentioned above.		Tools and equipment as mentioned above. Calculator			
Assessment	Informal	Classwork/case studies/worksheets/homework/class tests (Theory and practical work)						
	SBA & PAT Formal	<p>Assignment</p> <p>PAT Phase 1 = 50 marks (Practical of: Safety, Tools generic & Specific) Start Phase 4.</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>						

2022 Annual Teaching Plan – Term 2: Mechanical Technology: Fitting & Machining Grade 11

TERM 2 (53 days)	Week 1 - 4 (16 days)	Week 5 (4 days)	Week 6 - 8 (15 days)	Week 9 (5 days)	Week 10 - 12 (13 days)
CAPS Topics	FORCES (Specific)	MAINTENANCE (Specific)	JOINING METHODS (Specific)	Revision, PAT Consolidation	Term Test
Topics /Concepts, Skills and Values	<p>Forces: Effects of forces, moments and torques on engineering components applying design principles</p> <p>Basic calculations on: Forces found in engineering components:</p> <ul style="list-style-type: none"> • System of forces (maximum of three forces) • Resultant and equilibrant <p>Moments: Moments found in engineering components: (By calculation only) Law of moments: ➤ Sum of LHM = Sum of RHM</p> <p>A simply supported beam with two vertical point loads acting on the beam supported by two supports.</p> <p>Basic calculations on stress:</p> <ul style="list-style-type: none"> • Square tubing • Round tubing <p>Practical: Use basic calculations to determine forces, moments and stress</p>	<p>Identify causes of malfunction of lathes and milling machines.</p> <ul style="list-style-type: none"> • Lack of lubrication or incorrect lubrication • Overloading • Friction • Balancing <p>Practical: Analyse and predict the outcome of the lack of maintenance on equipment used in the workshop:</p>	<p>Identify the characteristics of the ISO metric V-thread. Use basic calculations for the ISO metric V-thread:</p> <ul style="list-style-type: none"> • Root diameter • Crest diameter • Effective diameter • Pitch • Lead for multi-start screw threads <p>Practical: Use basic calculations to determine the following for ISO metric V-thread:</p> <ul style="list-style-type: none"> • The drill size to tap a V-thread • Tap hole(s) according to bolt size 		
Requisite pre-knowledge	Grade 10 forces	Grade 10 maintenance	Grade 10 knowledge on threads in Systems & Control.		
Resources (other than textbook) to enhance learning	YouTube videos, force board. Forces training kits. White board/chalkboard. Calculators	Machines and videos.	Various bolts and nuts. Thread gauges, thread charts. Etc.		
Assessment	Informal	Classwork/case studies/worksheets/homework/class tests (Theory and practical work)			
	SBA & PAT Formal	<p style="text-align: center;">Term Test</p> <p style="text-align: center;">PAT Phase 2 = 50 marks (Practical of: Forces, Maintenance and Joining methods) Continue Phase 4</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>			

2022 Annual Teaching Plan – Term 3: Mechanical Technology: Fitting & Machining Grade 11

TERM 3 (52 days)	Week 1 (4 days)	Week 2 - 6 (23 days)	Week 7 (5 days)	Week 8 - 9 (10 days)	Week 10 - 11 (10 days)
CAPS Topics	MATERIALS (Generic)	SYSTEMS AND CONTROL: Drive systems (Specific)	PUMPS (Specific)	Revision and consolidation	Control Test
Topics /Concepts, Skills and Values	<p>Distinguish between the following properties of engineering materials:</p> <ul style="list-style-type: none"> • Hardness • Plasticity • Elasticity • Ductility • Malleability • Brittleness • Toughness 	<p>MECHANICAL COMPONENTS: Uses, functions, advantages and disadvantages of the following compound drives:</p> <ul style="list-style-type: none"> • Gear train • Pulley systems (i.e. block and tackle) • V-Belt drives • Chain drives <p>Basic velocity calculations on:</p> <ul style="list-style-type: none"> • Gears (compound) Including idler gears • Pulley systems and • Belts (v-belts) <p>Transfer of movement:</p> <ul style="list-style-type: none"> • Spur gears • Gear Ratio • Power transmission <p>HYDRAULICS / PNEUMATICS Basic calculations on: Pistons and reservoirs (only a single cylinder): volume, pressure, force, area Description, identification and application of: Valves, pipes, pressure gauges</p> <p>Practical: Practically determine the transfer of movement of mechanical and hydraulic operating systems mentioned above including drive systems through a simple designed project</p>	<p>Identify the following pumps by referring to purpose, construction and operating principles:</p> <ul style="list-style-type: none"> • Mono pumps • Centrifugal pumps • Reciprocating pumps • Gear pumps <p>Practical: Identify the above pumps by referring to purpose, construction and operating principles:</p>		
Requisite pre-knowledge	Materials grade 10	Grade 10 Systems and Control			
Resources (other than textbook) to enhance learning	Materials listed above	Gear and pulley trainer. Hydraulics trainer. Videos and YouTube videos.	Pumps, pump trainers, videos etc.		
Assessment	Informal	Classwork/case studies/worksheets/homework/class tests (Theory and practical work)			
	SBA & PAT Formal	<p style="text-align: center;">Term Test</p> <p style="text-align: center;">PAT Phase 3 = 50 marks (Practical of: Systems & Control and Pumps) Continue and finalise phase 4</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>			

2022 Annual Teaching Plan Term 4: Mechanical Technology: Fitting & Machining Grade 11

TERM 4 (47 days)	Week 1 - 4 (19 days)	Week 5 - 6 (10 days)	Week 7 - 10 (18 days)
CAPS Topics	TERMINOLOGY Machining (Specific)	Revision, consolidation, moderation of PAT	Examination
Topics /Concepts, Skills and Values	<p>Lathe:</p> <ul style="list-style-type: none"> • Safety measures • Set up of irregular work pieces – 4 jaw chuck • Steadies (purpose and use) • Mandrels (purpose and use) • Taper turning (compound slide method – inside and outside tapers) <ul style="list-style-type: none"> ➢ Calculations for setting over of compound slide • Screw cutting <ul style="list-style-type: none"> ➢ Description of the pitch and leads for single- and multi-start screw threads ➢ Uses of screw thread dial gauge, pitch gauge, centre gauge and graduated collar when screw thread cutting is carried out ➢ Methods to determine the locating positions on the dial gauge ➢ Calculations of depth of V-threads ➢ Square thread (calculations of the helix, leading and following angles for the cutting tools) <p>Practical – Lathe:</p> <ul style="list-style-type: none"> • Set-up of an irregular work piece in a 4-jaw chuck • Use the lathe to do taper turning • Use the lathe to do V-thread screw cutting <p>Milling machine:</p> <ul style="list-style-type: none"> • Safety measures • Milling machine parts • Calculations on: <ul style="list-style-type: none"> ➢ Centring of cutter ➢ Cutting of key ways – parallel • Milling cutters (identification and uses): <ul style="list-style-type: none"> ➢ Side and face cutter ➢ End mill ➢ Flute mill ➢ T-slot mill ➢ Helical cutter ➢ Involute gear tooth cutter <p>Practical – Milling machine:</p> <ul style="list-style-type: none"> • Centring of cutter • Cutting of parallel key way 		
Requisite pre-knowledge	Terminology content in grade 10		
Resources (other than textbook) to enhance learning	Tools and equipment as mentioned above. Calculator		
Assessment	Informal Classwork/case studies/worksheets/homework/class tests(Theory and practical work)		
Assessment	<p style="text-align: center;">Examination</p> <p style="text-align: center;">PAT = Phase 4: Learners that did not complete phase 4 continue and finalise phase 4 – Artefact</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>		