FACULTY OF ENGINEERING AND TECHNOLOGY

WORKPLACE BASED LEARNING (WBL)

MECHANICAL ENGINEERING

FINAL REPORT

Procedure to compile and submit the final report:

- After completion of each unit the unit must be assessed by the mentor and signed. (page 9 to 14)
- After completing WBL the mentor must compile the mentor's declaration (page 9) and award a final mark for WBL.
- The final report must be submitted **by post** or in person to N100.

2 MENTOR'S DECLARATION - FINAL REPORT WBL (EPEXWBLA)

STUDENT	**INITIALS AND SURNAME :**	
	VUT - STUDENT NUMBER :	
	ID NUMBER :	
	COMPANY :	
TRAINING PERIOD	**WBL :**	***START DATE:*** ***COMPLETION DATE:***
ASSESSOR	**INITIALS AND SURNAME :**	
	ASSESSOR SIGN:	
	CELL:	
	TELEPHONE NUMBER :	
	E-MAIL:	
MENTOR	**INITIALS AND SURNAME :**	
	CELL:	
	TELEPHONE NUMBER :	
	E-MAIL:	
ASSESSMENT MARK :		**%**

MENTOR DECLARATION

I, the above-mentioned mentor, declare that the above-mentioned student has completed the workplace based learning component (WBL) of the qualification in the mentioned period under my supervision.

The student was found competent in the outcomes as specified in the assessment report.

The mark indicated above may be awarded to the student as the final result for work integrated learning WBL.

Signature *Date*

VUT OFFICIAL	**FINAL MARK:**	**%**

3 **ASSESSMENT REPORT WBL**

SYLLABUS: MECHANICAL ENGINEERING

TRAINING SCHEDULE

F= Fundamental *(Compulsory)*

E= Elective *(Choice)*

					ASSESSOR
	ORIENTATION / INDUCTION	Criteria	DURATION	MARK	SIGNATURE
Unit 1	General introduction to your specific environment.	**F**			
	After completion of this unit the student should be able to do the following: Understand the policy and mission of the company as laid down in the orientation program.				

					ASSESSOR
	SAFETY AND FIRST AID	Criteria	DURATION	MARK	SIGNATURE
Unit 2	Industrial or Mining safety regulations as applicable OHSACT	**F**			
	NOSA course	**E**			
	Basic first aid course	**E**			
	Lockout procedures	**F**			
	After completion of this unit the student should be able to do the following: • Demonstrate knowledge of the safety, health and environment applicable to the specific industry. • Demonstrate and comply with relevant OHSACT. • Demonstrate and comply with NOSA safety standards**, if elected.** • Demonstrate basic first aid**, if elected.** • Know how to apply lockout on machines.				

					ASSESSOR
	BASIC HAND SKILLS	Criteria	DURATION	MARK	SIGNATURE
Unit 3	Tools non electrical	**F**			
	Tools electrical	**F**			
	After completion of this unit the student should be able to do the following as applicable to the discipline: • To be competent in using the basic hand tools like, hammers, chisels, files, hacksaw, measuring instruments, etc. • To be competent in using the basic electrical tools and equipment.				

					ASSESSOR
	LATH/MILL EQUIPMENT	Criteria	DURATION	MARK	SIGNATURE
Unit 4	Observation of lathe operation	**F**			
	Observation of milling operation	**E**			
	Demonstrate understanding of lath settings	**F**			
	Demonstrate understanding of milling settings	**E**			
	After completion of this unit the student should be able to do the following: • Demonstrate the understanding of the basics of lathe and mill operation • Demonstrate the understanding of the speed of operation on lathe and mill when working on various materials. • Know what a parallel cut is, a cross cut, taper cut and how a screw thread is cut. • Know how a hole is bored with the aid of a boring bar.				

					ASSESSOR
	BEARINGS	Criteria	DURATION	MARK	SIGNATURE
Unit 5	Identification	**F**			
	Characteristics	**F**			
	Installation and removal	**F**			
	Bearing lubrication	**F**			
	Vibration	**E**			
	After completion of this unit the student should be able to do the *following:* *Demonstrate the identification of various bearings, speed limit, loading limit and load direction.* *Demonstrate instillation and removal procedures,* *Have knowledge of lubrication requirements,* *Understand the purpose of vibration analysis* *Know how to capture effective vibration readings,* ***if elected***				

					ASSESSOR
	FAULT FINDING AND REPAIR	**Criteria**	**DURATION**	**MARK**	**SIGNATURE**
Unit 6	Do fault-finding on numerous machines on the plant.	**F**			
	Do repairs on numerous machines on the plant.	**F**			
	Identify machines on which the breakdown maintenance strategy are performed	**F**			
	Identify machines on which the planned maintenance are strategy performed	**F**			

After completion of this unit the student should be able to do the following:

- Be familiar with fault-finding techniques on numerous machines on the plant.
- Be familiar with repairs on numerous machines on the plant.
- Understand why certain machines follow the breakdown maintenance strategy
- Understand why certain machines follow the planned maintenance strategy

					ASSESSOR
	PLANNING DEPARTMENT	**Criteria**	**DURATION**	**MARK**	**SIGNATURE**
Unit 7	Job cards	**F**			
	Maintenance computer software systems	**E**			
	Daily, weekly, monthly maintenance planning schedules.	**F**			
	Execution of job	**F**			

After completion of this unit the student should be able to do the following:

- Understand the job card function.
- Demonstrate the interpretation of maintenance plans.
- Demonstrate knowledge of maintenance planning computer software, **if elected**
- Plan a job in the plant, oversee the execution of the job, and then write a report.

				ASSESSOR'S USE	
	TECHNICAL DRAWINGS AND SCADE SYSTEMS	**Criteria**	**DURATION**	**MARK**	**SIGNATURE**
Unit 8	Exposed to technical drawing in industry application	**E**			
	Exposure to scade system in plant application	**E**			

After completion of this unit the student should have exposure to aspects of technical drawings like:

- Orthographic projection.
- Development and interpenetration.
- Assembly drawings
- Tolerance and machining symbols
- Sectional views of assemblies of machine parts and castings

After completion of this unit the student should have exposure to Scade systems

					ASSESSOR'S USE
Unit 9	**WELDING AND GAS WORK**	Criteria	DURATION	MARK	SIGNATURE
	Welding	**F**			
	Gas work	**F**			
	Gas cutting	**E**			

After completion of this unit the student should be able to do the following:

- Do basic flat and vertical arc welding
- Understand the ratio between current required to weld and material thickness
- Understand the importance of electrode selection.
- Have exposure to and be familiar to the processes of gas welding, metal fillers, brazing
- Have exposure to and be familiar to the processes of gas cutting.

					ASSESSOR
Unit 10	**INSTALLATION AND COMMISSIONING**	Criteria	DURATION	MARK	SIGNATURE
	Installing and commissioning after major repairs of plant equipment	**E**			
	Instillation and commissioning of digital, pneumatics, hydraulic systems	**E**			

After completion of this unit the student should be able to do the following:

- Show the ability to work independently in an industrial environment.
- Show the ability to successfully install and commission equipment or a system.

					ASSESSOR'S USE	
Unit 11	**ALIGNMENT AND DRIVES**	Criteria	DURATION		MARK	SIGNATURE
	Clock gauge alignment method	**F**				
	Laser alignment	**E**				
	Belt drives and alignment	**F**				
	Coupling selection	**F**				
	Shaft key	**F**				

After completion of this unit the student should be able to do the following:

- Align the following mechanical systems:
  1. Motor to pump
  2. Motor to gearbox and any other machine.
  3. Belt drive alignment and tensioning.

- Select coupling for various applications
- Select shaft keys for various applications

	CONDITION MONITORING	Criteria	DURATION		ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 12	Vibration analysis	E				
	Oil analyses	E				
	Thermography	E				
	After completion of this unit the student should be able to do the following: • Identify the vibration monitoring methods used in that company. • Study vibration charts recorded by the company and know how to identify a failure from the chart. • Identify the methods of oil analyses used at the company. • Study oil analyses charts recorded. • Identify symptoms of replenished oils. Acquire knowledge of thermography applications in industry.					

	VALVES AND SAFETY VALVES	Criteria	DURATION		ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 13	Identify Valve types	E				
	Test of valves	E				
	Testing safety release values	E				
	After completion of this unit the student should be able to do the following: Have an insight into the different valves used in the plant. How to test valves and the method of replacing valves.					

	PNEUMATICS AND HYDRAULICS	Criteria	DURATION		ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 14	Hydraulics	E				
	Pneumatics	E				
	After completion of this unit the student should be able to do the following: Trained to distinguish between and know the applications of the following hydraulic or pneumatic circuit components: Pumps, Motors, Actuators, Accumulators, Filters, Reservoir, Seals, Different types					

	of fluid.

	PROPULSION OF MECHANICAL SYSTEMS	Criteria	DURATION		ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 15	Understand the applications of mechanical systems	F				
	Applied maintenance to mechanical systems	F				
	After completion of this unit the student should be able to do the following: Understand and maintain the following methods of propulsion: • V-belt drives • Chain drives • Fluid couplings • Braking systems.					

	MATERIAL SELECTION	Criteria	DURATION		ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 16	Selecting of materials	E				
	Failure analyses of the materials in applications.	E				
	After completion of this unit the student should be able to do the following: • Understand the physical, mechanical & thermal properties • How to select materials • Analysis of material requirements • Economics of materials • Cost vs. Performance • Failure analysis.					

	RIGGING	Criteria	DURATION		ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 17	Welding	E				
	Gas work	E				
	Gas cutting	E				
	After completion of this unit the student should be able to do the following: •					

	PROJECT	Mechanical Eng.	START DATE		ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
Unit 18	Industrial project	F				
	Documentation	F				
	After completion of this unit the student should be able to do the following: • Successful completion of a small project which includes improvement design on a machine. • Submit project report for assessment.					

Unit 19	MECHANICAL EQUIPMENT	Mechanical Eng.			ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE
	Motors	F				
	Gearboxes	F				
	Pumps	F				
	Boilers	E				
	Crushers	E				
	Conveyor belts	E				
	After completion of this unit the student should have knowledge of the following: • The operation on different types of equipment. • The start-up and shutdown procedures of the equipment.					

Unit 20	OTHER TOPICS	DURATION		ASSESSOR'S USE MARK	ASSESSOR'S USE SIGNATURE	
	Any other topics not mentioned above may be added by the mentor. The mentor must give realistic credit values to the topics.					

Evaluation guideline

This guideline can be used by the assessor to do student evaluation.

Rating	Theoretical knowledge	Application of theory	Use of: advanced tools / measuring equipment	Skills integration / Competencies gained	Working speed	Accuracy	Interpersonal relations	Diligence motivation
1 **0-19%**	Has little knowledge	Cannot apply any theory	Cannot use advanced equipment	Has not integrated any skills	Very slow and do not successfully complete any tasks	Never accurate	Does not get along with any staff	Does nothing unless instructed
2 **20-39%**	Can recall some basic knowledge	Can apply some theory with assistance	Can use advanced equipment with assistance	Has integrated some documented skills	Never complete tasks successfully on time	Has to redo and then sometimes accurate	Can interact positively with most of the staff	Does just enough to keep out of trouble
3 **40-59%**	Knows the basic minimum	Can apply the basic minimum theory	Can use advanced equipment to do the basic minimum	Has integrated the basic minimum documented skills	Just complete tasks successfully on time	Just meets the minimum specifications	Interact positively with all the staff	Does the minimum expected
4 **60-79%**	Good knowledge	Can apply high level theory	Can select and use advanced equipment independently	Effectively integrate skills as needed in practical applications	Normally complete all tasks successfully before/on time	Work is always better than minimum expected	Is accepted by the staff as somebody with good personal skills	Normally looks for over and above work to do
5 **80-100%**	Excellent knowledge	Can analyze and synthesize	Optimally select and use advanced equipment	Innovatively integrate all theoretical and practical skills to solve problems	Always complete all tasks successfully before time	Work is always excellent.	Uses personality to positively influence other staff	Ambitious and eager to prove talents beyond requirements

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WBL Progress report compiled by:

Students signature *Date*

WBL Progress report certified as correct. Assessor Name:

Assessor's signature: *Date*

WBL Progress report certified as correct. Mentor Name:

Mentor's signature *Date*

WBL Progress report compiled by: *Students signature* *Date*
WBL Progress report certified as correct. Assessor Name: *Assessor's signature:* *Date* **WBL Progress report certified as correct. Mentor Name:** *Mentor's signature* *Date*