DENTAL EQUIPMENT

UNIT CODE: 0914451 19A

TVET CDACC UNIT CODE: ENG/CU/MDE/CR/02/5/MA
UNIT DURATION: 90 Hours

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Perform Dental Equipment Maintenance.

Unit Description

This unit specifies the competencies required to Perform Dental Equipment Maintenance. It involves maintaining dental unit, amalgamator, light cure machine, dental laser, dental x-ray, dental laboratory equipment, and dental scaler.

Summary of Learning Outcomes

S/No	Learning Outcome	Duration in hours.
1.	To maintain dental unit maintenance	20
2.	To maintain amalgamator maintenance	10
3.	To maintain light cure machine maintenance	10
4.	To maintain dental scaler maintenance	10
5.	To maintain dental x-ray machine maintenance	10
6.	To maintain dental laboratory equipment maintenance	20
7.	To maintain dental laser equipment	10
	TOTAL	**90**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1 Maintain Dental Unit	1.1.Functions of dental unit 1.2. Parts of dental units	• Practical Assessment • Project

	1.2.1. Compressor 1.2.2. Handpieces 1.2.3. Inter-oral camera 1.2.4. Dental Chair 1.2.5. Examination Lamp 1.2.6. Spittoon bowl / cuspidor 1.2.7. Utility box 1.3.Classification of dental chairs 1.2.1. Hydraulic-mechanical 1.2.2. Electro-hydraulic 1.2.3. Electro-mechanical 1.4.Components of various dental chairs 1.3.1. Hydraulic pump 1.3.2. Hydraulic valves 1.3.3. Pump motor 1.3.4. Limit switches 1.3.5. Solenoid valves 1.3.6. Oil reservoirs 1.5.Maintenance procedures of dental chairs. 1.6.Functions of a dental unit 1.5.1. Cutting 1.5.2. Descaling 1.5.3. Suction 1.5.4. Drilling 1.7.Description of the layout of the supplies to the dental unit and drainage	• Third Party Report • Portfolio of Evidence • Written Assessment • Oral Questioning

	1.8.Hand pieces 1.7.1. Micrometer drill 1.7.2. Turbine 1.7.3. Spray unit 1.7.4. Suction device 1.7.5. Descaler 1.7.6. Light cure 1.7.7. Sensitivity tester 1.9.Operating principles of different hand pieces of a dental unit 1.10. Dental unit supplies 1.9.1. Electricity 1.9.2. Water 1.9.3. Compressed air 1.9.4. Vacuum 1.11. Supply diagram of the hand pieces for a dental unit 1.12. Maintenance procedures of a dental unit. 1.13. Safety tests 1.12.1. Safety valves 1.12.2. Water spillage 1.14. Earth leakage	
2 Maintain Amalgamator	2.1.Functions of Amalgamator 2.2.Parts of Amalgamator 2.2.1. Time setting 2.2.2. LCD display 2.2.3. Rubber tray 2.2.4. Clip 2.2.5. Start/stop buttons	• Practical Assessment • Project • Third Party Report • Portfolio of Evidence • Written Assessment • Oral Questioning

	2.3.Maintenance procedures 2.4.Safety procedures	
3 Maintain Light Cure Machine	3.1.Overview of light curing 3.2.Principles of Light-Curing 3.2.1. Polymerization of Composites: 3.2.2. Photo-initiators: 3.2.3. Light Wavelengths and Energy Output 3.3.Types of Light-Curing Units (LCUs) 3.3.1. Halogen Curing Lights 3.3.2. LED (Light-Emitting Diode) Curing Light 3.3.3. Plasma Arc Curing (PAC) Lights 3.3.4. Laser Curing Units 3.4.Curing Techniques 3.5.Safety Measures 3.6.Fault diagnosis 3.7.Maintenance procedures	• Practical Assessment • Project • Third Party Report • Portfolio of Evidence • Written Assessment • Oral Questioning
4 Maintain Dental Scaler	4.1.Definition and purpose of dental scaling 4.2.Types and Components of scalers (manual and ultrasonic) 4.2.1. Curettes 4.2.2. Sickle scalers 4.2.3. Ultrasonic scalers	• Practical Assessment • Project • Third Party Report • Portfolio of Evidence • Written Assessment • Oral Questioning

	4.3.Safety Measures 4.4.Fault diagnosis 4.5.Maintenance procedures	
5 Maintain Dental X-Ray Machine	5.1.Brief Physics of Dental X-rays and production. 5.2. Parts of Dental X-Ray Machine 5.2.1. X-ray tube 5.2.2. Collimator 5.2.3. Arms 5.2.4. Control panel 5.2.5. Position indicating device 5.3.Main parts of an X-ray tube 5.3.1. Cathode 5.3.2. Focusing cup 5.3.3. Filament 5.3.4. Anode 5.3.5. Vacuum glass envelope 5.3.6. High tension cables 5.3.7. Control cables 5.4.Block diagram of X-ray machine 5.5.Electric circuits and controls 5.6.Operation of control 5.7.Fault diagnosis 5.8.Maintenance procedures 5.9.Safety procedures 5.10. Calibration of the dental X-ray machines	• Practical Assessment • Project • Third Party Report • Portfolio of Evidence • Written Assessment • Oral Questioning

6 Maintain Dental Laboratory Equipment	6.1.Functions of dental laboratory equipment 6.2.Parts of dental laboratory equipment 6.2.1. Dental Microscope 6.2.2. Dental Scanner 6.2.3. Porcelain Machine 6.2.4. Model trimmer 6.2.5. Suspension motor 6.3.Maintenance procedures of dental laboratory equipment 6.4.Safety procedures	• Practical Assessment • Project • Third Party Report • Portfolio of Evidence • Written Assessment • Oral Questioning
7 Maintain Dental laser Equipment	7.1.Basic Principles of Laser Technology 7.2.Types of Lasers Used in Dentistry 7.3.Parts of Dental laser Equipment 7.3.1. Laser Unit 7.3.2. Handpiece 7.3.3. Fiber Optic Cable 7.3.4. Safety Interlocks 7.3.5. Beam Delivery System 7.3.6. Calibration Tools 7.4.Laser Safety and Maintenance 7.5.Fault diagnosis 7.6.Maintenance procedures	• Practical Assessment • Project • Third Party Report • Portfolio of Evidence • Written Assessment • Oral Questioning

Suggested Methods of Instruction

- Practical

- Projects
- Demonstrations
- Group Discussions
- Role Play
- Interactive lectures
- Individual Assignments
- Industial Attachments
- Viewing of Related Videos
- Clinical and Hospital Trips

Recommended Resources for 25 trainees

S No.	Category Item	Description Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	**Learning Materials**			
1.	Reference books	Dental Instruments: A Pocket Guide by Linda R. Bartolomucci-Boyd: Modern Dental Assisting by Doni L. Bird and Debbie Robinson:	5 pcs for each	1:5
2.	Maintenance manuals	Assorted Systems component Maintenance reports, manufacture's manuals and data sheets Instrumentation Handbooks	5 pcs for each	1:5
3.	Charts	Assorted ICU and Theatre equipment diagrams Equipment block diagram charts	1 pc for each	1:25

4.	Software	Assorted installation software for the equipment	25	1:1
5.	Audio visual presentations	Projector	1	1:25
B	**Learning Facilities & Infrastructure**			
6.	Lecture theory room	$60m^2$	1	1:25
7.	Workshop	$150m^2$	1	1:25
8.	Simulation Lab	$100m^2$	1	1:25
9.	Clinical Rotations	Operating room, ICU	1	1:25
C	**Consumable Materials**			
10.	Installation materials	Insulation tape, cables,	25 pcs for each	1:1
11.	Maintenance materials	Wipes, spare batteries, sanitizer, service kits	25 pcs for each	1:1
12.	Assorted electrical components	Contactors, transformer, overload relays, timers	25 pcs for each	1:1
13.	Assorted instrumentation components	Sensors, transducers, actuators, cuvettes	25 pcs for each	1:5
D	**Tools & Equipment**			
14.	Assorted tools and equipment	Side cutters, Allen keys set, Side cutters, Pliers, Screw driver, Crimping tools, Multi-meter, Oscilloscope, Solder guns	25 pcs for each	1:1
15.	PPEs	Safety boots, overall, masks, gloves, antistatic shoes	25 pcs for each	1:1
16.	Hot air gun		5 pcs	1:5

17.	Blower		5 pcs	1:5
18.	Drilling machines		5 pcs	1:5
19.	Air Compressor with tubings		2 pcs	1:12
20.	Dental unit		2 pcs	1:12
21.	Amalgamator		2 pcs	1:12
22.	Light Cure		3 pcs	1:8
23.	Dental Scaler		2 pcs	1:12
24.	Dental X-Ray		1 pc	1:25
25.	Dental Laboratory Equipment	Assorted	2 pcs	1:12
26.	Dental laser		2 pcs	1:12