

**Electrical Installation and Maintenance Work -
National Technical Certificate (NTC) and Advanced
National Technical Certificate (ANTC)**

Battery Charging and Repairs

PROGRAMME: NATIONAL TECHNICAL CERTIFICATE IN ELECTRICAL INSTALLATION AND MAINTENANCE WORK

MODULE: BATTERY CHARGING AND REPAIRS	Course Code: CEI 15	Contact Hours: 168 Hours
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GOAL: The module is designed to provide the trainee with the knowledge and skill to maintain, repair and charge batteries efficiently.

GENERAL OBJECTIVES:

On completion of this module, the trainee should be able to:

1. Understand the working principles of a cell and the constructional feature of a battery.
2. Maintain, repair and charge batteries.

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Course Specification: Theoretical Content

General Objective 1.0: Understand the working principles of a Cell and the Constructional feature of a battery.

Week	Special Learning Outcome:	Teachers Activities	Resources
1-2 3-5 5-7 8-13	1.1 Identify types of cells - Primary and Secondary cells. 1.2 Explain the working principle of Primary and Secondary cells 1.3 Identify the various parts of the cells 1.4 Construct a simple cell of battery	<ul style="list-style-type: none"> • Ask questions on Cells and Battery. • Explain primary and secondary cells. • Explain working Principle of 1.1 above. • Draw a labelled diagram of a cell. • Construct a small single cell in the Workshop 	<ul style="list-style-type: none"> • Cells • Battery • Charts • Chalkboard • Chemicals

General Objective 2.0: Maintain, Repair And Charge Batteries.

Week	Special Learning Outcome:	Teachers Activities	Resources
1-8	2.1 Identify the materials, equipment and tools used for battery charging.	<ul style="list-style-type: none"> • Show tools, materials and equipment used with battery in a charging room. • List the precaution in a charge room. • Explain the precaution in a room. 	<ul style="list-style-type: none"> • Charging Equipment. • Acid • Potassium

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Week	Special Learning Outcome:	Teachers Activities	Resources
1-8	<p>2.2 Describe the condition suitable for battery charging e.g.</p> <ol style="list-style-type: none"> Observe polarity and terminal the room will be well ventilated remove the vent covers use non-corrosive base. <p>2.3 Prepare electrolyte observing necessary precaution</p> <p>2.4 Describe the various methods of charging battery e.g. Constant voltage, constant current, float charging, trickle charge.</p>	<ul style="list-style-type: none"> Demonstrate how to prepare electrolyte. Observe all precautions. State and describe various methods of charging battery. Explain methods of battery charging. 	<ul style="list-style-type: none"> Sulphuric Acid Chalkboard.
9-10	<p>2.5 Describe the various types of charge. E.g.:</p> <ol style="list-style-type: none"> Stickle charge Floated charge Equalizing charge Ordinary charge Initial charge. 	<ul style="list-style-type: none"> Describe all types of charges as stated. 	<ul style="list-style-type: none"> Battery Charger
11-13	<p>2.6 Determine the specific gravity of electrolyte using the hydrometers</p> <p>2.7 Determine the charge condition. Determine the discharge condition.</p> <p>2.8 Protect terminates from corrosion. Safeguard the battery, cells in a charge condition.</p> <p>2.9 Describe the constructional features of a charger.</p> <p>2.10 Operate the machine to charge a battery.</p>	<ul style="list-style-type: none"> Use hydrometer to demonstrate how to test the specific gravity. Explain charging and discharge state. Show how to determine them. Explain how to maintain terminals from corrosion. Draw a well labelled diagram of a charger. Show parts of a charger. Explain regulations guiding battery installation, charging and maintenance. Observe the regulation guiding battery charging. 	<ul style="list-style-type: none"> Hydrometer Chalkboard Grease Charger Chart Faulty Battery Battery Cells Battery Battery with open top

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Week	Special Learning Outcome:	Teachers Activities	Resources
11-13	2.11 Apply the necessary statutory regulation while charging 2.12 Detect faulty cells in a battery using voltage tester 2.13 Repair and replace fault cells in a battery 2.14 Seal battery top with the appropriate sealing compound.	<ul style="list-style-type: none"> • Show how to detect the condition of cells in a battery • Show how to repair and replace faulty cells. • Demonstrate how to seal battery tops with sealing compound. 	

BATTERY MAINTENANCE AND CHARGING PRACTICALS

PRACTICAL CONTENT FOR BATTERY CHARGING AND REPAIRS CEI 15 FOR MODULE

Week	Experiments	Student Activities	Resources
1-3	Demonstrate connection of Cells - Primary and Secondary	• Demonstrate how to connect cells. E.g. Primary and Secondary.	• Cells
4-6	Construct a simple cell/battery	• Show how to construct simple cell/battery	• Battery
7-9	Install/connect batteries for charging system e.g. Series, parallel connections.	• Connect batteries in both series and parallel connections.	• Batteries
10-12	Preparation of electrolyte for battery use.	• Demonstrate on how to prepare mixed electrolyte for battery	• Electrolyte • Acid • Water
1-3	Connect battery for trickle, float, equalizing charges. Etc.	• Demonstrate how to connect battery for trickle, float, equalizing charges.	• Charger • Battery
4-6	Show how to measure the specific gravity of electrolyte	• Show how to measure the specific gravity of electrolyte	• Electrolyte
7-9	Use hydrometer to determine the specific gravity of electrolyte.	• Demonstrate how to use hydrometer to measure specific gravity of electrolyte	• Hydrometer
10-12	Connect battery to observe the charging conditions	• Demonstrate how to observe charging conditions of battery	• Battery • Battery Charger
1-4	Operate charging machine to charge battery	• Demonstrate how to operate battery charging machine	• Charging Machine

Week	Experiments	Student Activities	Resources
6-12	Prepare and replace damaged battery cells.	• Demonstrate how to prepare and replace damaged battery cells.	• Battery • Cell

EVALUATION GUIDE

BATTERY MAINTENANCE AND CHARGING

Assign periodical examination, Tests Worksheets, Tutorials and Assessment.

- a. Students will be graded on the following criteria:
- b. Quizzes, Mid and Final Exam.
- c. Worksheet (Tutorial)
- d. Drawing
- e. Final projects and workshop Manual
- f. Performance of battery practical experiments.