

SYLLABUS

Testing of Emergency Light and Solar lantern

Level Code: L1

Vertical Name: Photovoltaic Segment (Solar Panel)

Course Code: EL/S/L1/C010
Lantern

Course Name: 2.4.3 Testing of Emergency Light & Solar

(ESSCI)

Objective of the Course:

This Course has been design to provide an introduction to use of Solar Appliances, their assembly, repair and maintenance and installation.

Learning Outcomes:

At the end of the course the learners will be able:

- To assemble the solar lantern and emergency light
- To install solar panels and solar system
- To know the detail operation of solar appliances
- Repair and maintenance of solar lantern, solar panel and emergency light.

Expected Job Roles:

This course will contribute the job potential in the following field:

- Repairing and service centre
- Solar equipments assembling industries
- Different Government Agencies responsible for dissemination/installation of solar equipments as UREDA Uttarakhand
- Different Electronics Industries

Duration of the Course (in hours) 200 Hrs.

Minimum Eligibility Criteria and pre-requisites, if any 8th Pass having Knowledge of Basic Science

Professional Knowledge:

By completing the course the students is supposed to have the following profession knowledge:

- Basics of Electronics
- Working principle and operation of emergency light, solar lantern, battery and solar panels
- Maintenance of Solar appliances

Professional Skill:

- Trouble shooting of Emergency light, Solar lantern
- Preventive and corrective maintenance of solar appliances
- Charging/Discharging and reconditioning of battery

Core Skill:

The following core Skill is to be supposed for the learners

- Basics of Electronics Principles
- Different Electronic and Electrical active and passive components
- Idea of Electronic Circuits
- Application and operation of different Electronic Equipments as multimeter, CRO etc.
- Core efficiencies in soldering practices and use of different related tools
- Knowledge of solar panels and battery
- Preventive and corrective maintenance of related appliances

Detailed Syllabus of Course

S.No.	Topic	Hours	Theory Practical/ Tutorial
1.	Introduction to Basic Electronics	10	20
2.	Trouble shooting Tools and Equipments	10	20
3.	Working principle of Emergency lights	05	20
4.	Working principle of Solar Lantern	05	20
5.	Battery	10	20
6.	Solar Panels	10	20
7.	Repair and maintenance of Emergency Light and Solar Lantern	10	20
	TOTAL	60	140

Detailed Syllabus

1. Introduction to Basic Electronics 10 Hrs.

Introduction to Electronics, Types of Material Intrinsic Semiconductor, Extrinsic Semiconductor Semiconductor, N-Type Semiconductor, P-Type Semiconductor, Conductivity of N-Type and P-Type Semiconductor Charge on N-Type and P-Type Semiconductor, Majority and Minority carrier in Semiconductor PN-Junction, Properties of PN junction Applying voltage across PN-junction, Current Flow in PN junction V-I characteristics of PN- junction Semiconductor diode, Working of diode, specification of diode Active and Passive component, Testing, Identification, Properties Rectifier Circuit, Measurement of Voltage, Current and resistance power supply

2. Trouble shooting Tools and Equipments 10Hrs.

Introduction to Multimeter, Oscilloscope, Soldering/desoldering station, vaccum cleaner, brush, forceps, screw driver set, cutter, pliers, soldering iron, soldering iron, soldering wire, desoldering pump

Soldering Wire Solution, Soldering flux solution, clearing solution, soldering and Desoldering technique

3. Working principle of Emergency lights 05 Hrs.

Introduction to Emergency Light, Charger Circuit Working of Tube Light used in Emergency Light

Inverter circuit used in Emergency Light Change over circuit, change over time, component used in change over circuit

4. Working principle of Solar Lantern 05Hrs.

Introduction to Solar, Solar Devices Introduction Solar Lantern, CFL for Solar Lantern Control Circuit, Sensor Circuit Voltage Controller Circuit, Charge Circuit

5. Battery 10 Hrs.

Introduction to Battery, types of Battery Principle of Cell, Charge on Cell Charging and discharging of Battery Lead-Acid Battery Maintenance free battery Preventive maintenance of Battery

6. Solar Panels 10Hrs.

Element of Solar Light, Working of Solar panel

7. Repair and maintenance of Emergency Light and Solar Lantern 10 Hrs.

Troubleshooting techniques, Fault Finding, Precaution during fault finding, Fault diagnosis of Emergency Light, Fault diagnosis of Solar Lantern, Removing faulty component in Emergency Light

Removing faulty component in Solar Lantern, Safety Precaution, Preventive maintenance of emergency light and Solar Lantern

Recommended Hardware: Particulars

1.Digital Multimeter	-02 No.
2.CRO dual Trace	- 01 No.
3 Electronic Tool Kits	- 03 No.
4.Battery Charger	- 01 No.
5.Emergency Light	- 02 No
6.Solar Lantern with Solar Panel	-02 No.
7.Lead-Acid Battery	- 02 No.
8 Solar Panel	-03 No.

Recommended Software: NIL

Text Books:

- 1- Concentrating Solar Power Technologies by Keith Lovegrove and west Stein
- 2- Crystalline Silicon Solar cells by Armin G. Aberle.

- 3- Third Generation Photovoltaic by Martin A.Green
- 1- Silicon Solar cell by Martin A. Green

Reference Books:

- 2- Solar Electricity Hand Book 2014 Edition by Michael Box Well
- 3- Solar Power Our Home for Dummies by Rik De Gunther