

Sh. L.N. Hindu College, Rohtak

Affiliated to M.D.University, Rohtak

A Post Graduate Co-Educational College, Bhiwani Road, Rohtak

Accredited by NAAC with 'B' (2.74) Grade

Certification course in Solar Panel Installation

Beneficiaries: B.Sc. Students

Course Duration: 40 hours

Theory: 30 Hours

Practical: 10 Hours

Objectives:

With the exponential growth in Renewable sector, especially the Solar field, this course aims to give a better understanding and hands-on practice in different streams of solar energy including solar photo-voltaic technology, types of solar cell, working of solar panel system and procedure of its installation. This course also aims to develop solar vocational capability, promote livelihood, put new skills into practice and to give the students a pathway towards becoming a successful professional and an entrepreneur.

Learning Outcomes:

At the end of the course the students will be able to learn/understand the following:

- Different types of solar cells
- Components of solar panel system
- How to demonstrate safe working practices
- How to give energy efficiency and energy management advice to clients
- Understand features, configuration and application of solar panel system
- Understand steps required for solar panel installation
- Able to identify tools required for solar panel installation and their proper usage

Syllabus

External Marks: 60

Internal Marks: 40

Time: 3 hours

Note: Examiner will be required to set 9 questions in all Question number 1 will be compulsory and consist of 6 parts (short answer type questions) covering the entire syllabus and will carry 12 marks. In addition to the compulsory question there will be 3 units I.e. Unit I to unit III. Examiner will set at least two questions from each unit of the syllabus and each question will carry 12 marks. Student will be required to attempt five questions in all.

UNIT-I

- Introduction to solar energy
- Brief history of solar cells
- Semiconductors (doping, band theory)
- Characteristics of P-N junction
- Photo-voltaic effect
- Classification of the solar cells on the basis of generations (Gen I, II and III), Structure and Materials.
- Silicon based solar cells, their conductivity and its measurement.

UNIT -II

- Components of solar panel system (brief description)
- Principle, construction and working of solar cell and solar panel system
- Role of climatic conditions on working of solar cell
- Determination of output of solar panel
- Efficiency of solar panel
- Size requirement of PV system

UNIT-III

- Assessing site conditions and installation requirements
- Procedure for installation of solar panel
- Safety equipments
- Monitoring equipments
- Procedure for cleaning of solar panels
- Manufacturing cost and its advantages over traditional electricity
- Applications of solar panels

Practical Session: 10 Hrs.

- Determination of angle and direction for solar panel installation.
- Assembling of solar panels.
- Electrical wiring.
- Connection between solar panel and solar inverter.
- Connection between solar inverter and solar battery.
- Connection between solar inverter and grid
- Starting of solar inverter through solar panel and grid.
- Earthing for solar panel system

Suggested Readings:

- Dr R. Suresh Kumar , Fundamentals of solar energy , Educreation publishing, 2019
- Sunil Deambi, From sunlight to Electricity , Energy resource Institute TREI, 2015
- A.S Kapoor , A practical guide for total engineering of MW capacity solar PV power project , White Falcon self publishing platform , 2015
- Chetan Singh Solanki , Solar photovoltaics fundamentals Technologies and applications , PHI learning
- Chetan Singh Solanki , Solar photovoltaic technology and system , PHI learning

Note: Latest and additional good books may be suggested and added from time to time.