

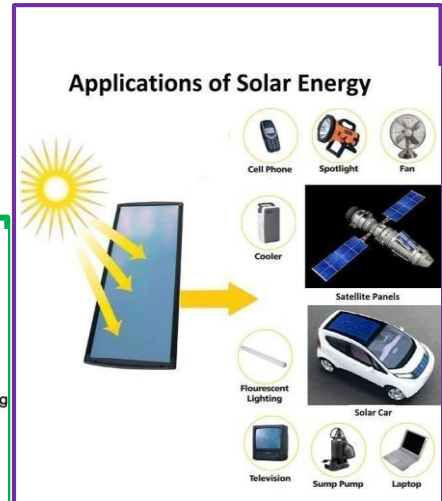
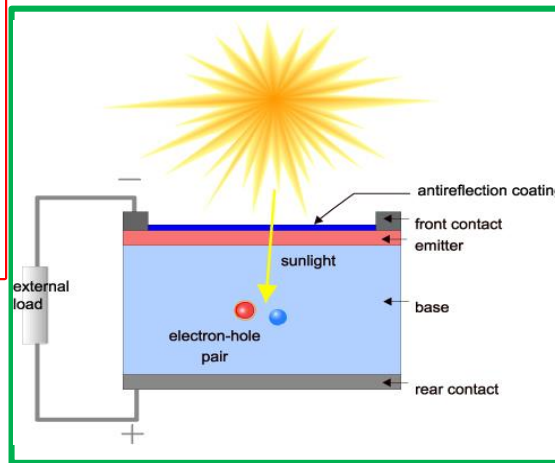
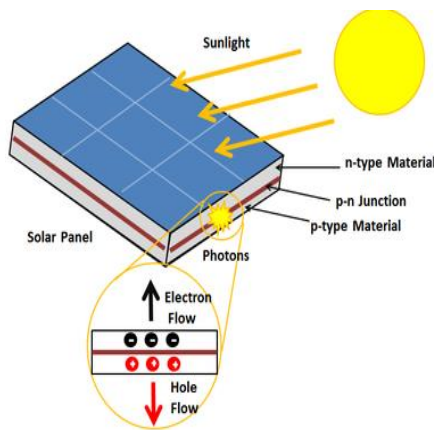
VALUE ADDED COURSE

CHEVA07 - Photovoltaic System

Course Duration : 30 Hours

Session: September to October 2023

Objectives: To know about 1.Introduction to Solar Energy 2.Introduction of fundamental principles, design, and structure of PV modules 3.Overview is on electrochemical cells such as DC-CD/DC-AC converters inverter and Charge controllers 4. generation, distribution, and consumption of energy resources 5.Basic structure of PV system and their applications



Outcomes: The students would be able understand basics of solar energy, describe and understand electrodynamic basics, understanding the I-V equating and power cure of module, know the general applications of solar system



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Course Code: CHEVA07	PHOTOVOLTAIC SYSTEM	Hours: 30
Objectives	The major objectives of this course are to understand the concepts of: <ul style="list-style-type: none"> ➤ To understand the basic knowledge of solar energy systems ➤ To cover the fundamental principles, design, and structure of PV modules. ➤ This unit overview is on electrochemical cells such as DC-CD/DC-AC converters. ➤ To study the generation, distribution, and consumption of energy resources. ➤ To understand the basic structure of PV system and their applications. 	
Unit-I	Introduction of Solar Energy: Definition, status, and prospects of PV technology, the working principle of the solar cell, electrodynamic basics, solar radiation, reflection and transmission of radiation, solar tracking, and types of solar tracking.	
Unit-II	Photovoltaic Modules: History of solar PV cells, Design, and structure of PV module (mismatches in series/parallel connection), The technologies of a PV cell, power output I-V equation of PV module, I-V power curve of module, definition of solar irradiation and temperature	
Unit-III	Components of a solar PV System: Basics of electrochemical cell, Definition: Batteries, batteries for PV system, factor affecting the battery performance, DC-DC/DC-AC energy converter, charge controller and MPPT.	
Unit-IV	Distributed energy resources: Definition, smart appliances, generation and smart consumption, LVDC (low voltage DC), energy distribution in homes and buildings, HEMS (home energy management) Building to grid, solar to grid, microgrid.	
UNIT-V	Solar system design and applications: Design methodology and model of PV system, configuration of standalone PV system, Hybrid PV system, grid connected PV system, working of single stage grid connected PV system configuration, simple payback period.	
Outcomes	The student would be able to: - <ul style="list-style-type: none"> ➤ Define the basics of solar energy, Describe and understand electrodynamic basics ➤ Understanding the I-V equating and power curve of module. ➤ Describe the basics of electrochemical cell and battery performance. ➤ Understanding the use energy resources. ➤ Describe and general applications of solar system. 	

Recommended Books:

1. Antonio Luque and Steven Hegedus, Handbook of Photovoltaic Science and Engineering, John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, West Sussex PO19 8SQ, England, ISBN 0-471-49196-9.
2. Solar Photovoltaic Cells: Photons to Electricity, Alexander P. Kirk.
3. Solar Cell Electricity Market History, Public Policy, Projected Future, and Estimated Costs (Pages: 17-42)