



**PARVATHANENI BRAHMAYYA  
SIDDHARTHA COLLEGE OF ARTS & SCIENCE**

*Autonomous*

Siddhartha Nagar, Vijayawada-520010

*Re-accredited at 'A+' by the NAAC*

## **23PHVAP101: SOLAR ENERGY**

**Offered to: ALL UG PROGRAMS**

**Year of Introduction: 2020-21**

**Year of Revision: 2021-22**

**Percentage of Revision: 100%**

**Semester: II**

**30Hrs**

**Credits: 02**

**Max.Time: 2 Hours**

### **Course Description**

This course gives you an introduction to the fundamentals of solar power as it applies to solar panel system installations. This course introduces the technology that converts solar energy to other energy resources such as electricity, heat and solar fuels with a main focus on electricity generation and explain how solar panels, or photovoltaic (PV). You will be able to identify the key components needed in a basic photovoltaic (solar panel) system, such as is found on a house or building, and explain the function of each component in the system. This course explores the advantages, limitations and challenges of different solar cell technologies, such as crystalline silicon solar cell technology, thin film solar cell technologies and the latest novel solar cell concepts as studied on lab-scale. We will discuss the specifications of solar modules and demonstrate how to design a complete solar system for any particular application

### **Course Objectives**

1. Introduction to solar energy collectors
2. Introduction to various photovoltaics
3. Knowledge on Photovoltaics
4. Knowledge on conversion of different energies
5. Able to identify the key components needed in a basic photovoltaic (solar panel) system

**Course Outcomes:** After completion of this course, the students will know about

1. Energy Scenario, overview of solar energy conversion devices and applications, physics of propagation of solar radiation from the sun to earth
2. Sun-Earth Geometry, Extra-Terrestrial and Terrestrial Radiation, Solar energy measuring instruments
3. Fundamentals of solar PV cells
4. Solar thermal power generation (Solar concentrators).

### **List of experiments**

1. Performance testing of solar cooker.
2. study of V-I characteristics of solar cell
3. Study the effect of input light intensity on the performance of solar cell.
4. Measurement of efficiency of solar flat plate collector
5. Study on solar photovoltaic panel in series and parallel combination.
6. Performance of solar module under various conditions (dusting)
7. Measurement of emissivity, reflectivity and transitivity
8. Effect of tilt angle on the efficiency of solar cell

Note :

1. 8 (Eight) experiments are to be done and recorded in the lab. These experiments will be evaluated in CIA.
2. For certification minimum of 7 (Seven) experiments must be done and recorded by student who had put in 90 % of attendance in the lab.
3. **Best 7 experiments are to be considered for CIA.**
4. 15 marks for CIA.
5. 35 marks for practical exam.

**The marks distribution for the Semester End practical examination is as follows:**

Formula/ Principle / Statement with explanation of symbols	05
Diagram/Circuit Diagram / Tabular Columns	05
Setting up of the experiment and taking readings/Observations	10
Calculations (explicitly shown) + Graph + Result with Units	05
Procedure and precautions	05
Viva-voce	05
<b>Total Marks:</b>	<b>35</b>