



ESTD - 1928

SNJB's

KKHA Arts SMGL Comm and SPHJ Science College Chandwad Nashik
Department of Physics

Certificate course on

SOLAR PHOTOVOLTAICS AND SOLAR THERMAL ENERGY

Course Code: SPSTE02

Course Duration: One Week (30 Hours)

Date: 22/03/2019 to 27/03/2019

Course Content Includes:

Module: I

Solar Radiation and Its Measurements

- Importance of Solar Energy : Nature of solar radiation
- Sun as a fusion reactor
- special distribution of extraterrestrial radiation
- Estimation of extraterrestrial solar radiation
- Radiation on horizontal and titled surfaces
- Solar Photovoltaics (SPV) Conversion : Basic principles, Types of solar cell materials, Fabrication of solar photovoltaic cells, solar cell parameters and characteristics, Modules. Block diagram of general SPV conversion system and their characteristics,
- Different configurations, Application (such as street light, water pumps, Radio/TV, Small capacity power generation)
- Solar Photovoltaic (SPV) Systems Designing : Load estimation, selection of inverters, battery sizing, array sizing.

List of Experiments: (Any Three)

1. Determination of Calorific value of Wood/Cow dung.
2. Study of Optical Properties of selective coatings.
3. Study of Photovoltaic a Characteristics of Solar Cell (Variation of Intensity, Distance between Source and Solar Cell, and load)
4. Study of power versus load characteristics of Solar Power Photovoltaic Systems and Study of Series and Parallel Combination of Solar Photovoltaic panels.
5. Study of Solar Collector (Efficiency versus $\Delta T/I$)

Module: II

Photo thermal applications of Solar Energy

- Selective coatings : Ideal characteristics of selective coating for various applications,
- Types of selective coatings, materials and techniques for selective coatings,
- Effect of selective coating on the efficiency of solar collectors.
- Solar Thermal Devices and Systems
- Different types of collectors , Flat plate collector(Basic principle, construction
- Energy balance equation of steady state, Testing, Methods to reduce losses)
- Solar cooker
- Domestic hot water system
- Solar dryers
- solar pond
- Solar still
- Solar furnace
- Solar refrigeration
- Solar concentrators
- systems based on use of solar concentrators

List of Experiments: (Any Three)

1. Study of Hot Water system
2. Determination of heat Loss Coefficient in Flat Plate Collector
3. Study of Solar Dryer (Hot Air Collector)
4. Study of Solar Still
5. Performance Evaluation of Box Type and Concentrating Type Solar Cooker

Important Instructions:

Registration is limited to 30 students. This course is offered in partnership (as a fund raiser) with several not-for-profits. No fee for this one-week and course includes instruction, hands-on labs, study table and lab material, installation tool kit for experiments. Accommodations facility will be provided for the outstation participants.