

**A.G. & S.G.SIDDHARTHA DEGREE COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS), VUYYURU – 521 165**

B.A, B.Com & B.Sc. PROGRAMMES

Revised CBCS w.e.f. 2020-21

SKILL DEVELOPMENT COURSES

Science Stream

Syllabus of SOLAR ENERGY

Total 30 hrs (02h/wk),

02 Credits & Max Marks: 50

Learning Outcomes:

After successful completion of the course, students will be able to:

1. Acquire knowledge on solar radiation principles with respect to solar energy estimation.
2. Get familiarized with various collecting techniques of solar energy and its storage
3. Learn the solar photovoltaic technology principles and different types of solar cells for energy conversion and different photovoltaic applications.
4. Understand the working principles of several solar appliances like Solar cookers, Solar hot water systems, Solar dryers, Solar Distillation, Solar greenhouses

SYLLABUS:

UNIT-I – Solar Radiation: (6 hrs) Sun as a source of energy, Solar radiation, Solar radiation at the Earth's surface, Measurement of Solar radiation-Pyroheliometer, Pyranometer, Sunshine recorder, Prediction of available solar radiation, Solar energy-Importance, Storage of solar energy, Solar pond

UNIT-II – Solar Thermal Systems: (10 hrs) Principle of conversion of solar radiation into heat, Collectors used for solar thermal conversion: Flat plate collectors and Concentrating collectors, Solar Thermal Power Plant, Solar cookers, Solar hot water systems, Solar dryers, Solar Distillation, Solar greenhouses.

UNIT-III – Solar Photovoltaic Systems: (10 hrs) Conversion of Solar energy into Electricity - Photovoltaic Effect, Solar photovoltaic cell and its working principle, Different types of Solar cells, Series and parallel connections, Photovoltaic applications: Battery chargers, domestic lighting, street lighting and water pumping

Co-curricular Activities (Hands on Exercises): (04 hrs)

[Any four of the following may be taken up]

1. Plot sun chart and locate the sun at your location for a given time of the day.
2. Analyse shadow effect on incident solar radiation and find out contributors.
3. Connect solar panels in series & parallel and measure voltage and current.
4. Measure intensity of solar radiation using Pyranometer and radiometers.
5. Construct a solar lantern using Solar PV panel (15W)
6. Assemble solar cooker
7. Designing and constructing photovoltaic system for a domestic house requiring 5kVA power
8. Assignment/Model exams.

Reference Books:

1. Solar Energy Utilization, G. D. Rai, Khanna Publishers
2. Solar Energy- Fundamentals, design, modeling & applications, G.N. Tiwari, Narosa Pub., 2005.
3. Solar Energy-Principles of thermal energy collection & storage, S.P. Sukhatme, Tata McGraw Hill Publishers, 1999.
4. Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHI Learning Pvt. Ltd.,
5. Science and Technology of Photovoltaics, P. Jayarama Reddy, BS Publications, 2004.

SOLAR ENERGY

MODEL PAPER

Time: 2 hrs

Max.Marks:50

SECTION-A

Answer any four questions .Each answer carries 5 marks

4x5=20M

1. Write importance of solar energy
2. Write about Sunshine Recorder
3. Write about Solar Pond
4. What are the types of Solar Collectors
5. Write about Solar dryers
6. What is meant by Solar Cooker and how does it work
7. What are four main types of Solar Energy
8. What are Photovoltaic Applications

SECTION-B

Answer any three questions.Each answer carries 10 marks

3x10=30M

9. What is Solar Radiation received at Earth's Surface
10. Write about Pyrheliometer. How to measure the Solar Radiation with Pyrheliometer
11. Write about Flat Plate Collectors and Concentrating Collectors
12. Write about the Solar Cookers
13. Write about Photovoltaic Effect and Working Principle

The Guidelines to be followed by the question paper setters in Physics for the II Semester - end exams

Paper – **Solar energy**

Semester –II Maximum marks: 50 marks Duration: 2 Hours

Weightage for the question paper

Syllabus	Section-A (Short answer questions)	Section-B (Essay questions)
Unit-1 (35 Marks)	3	2
Unit-2 (35 Marks)	3	2
Unit-3 (20 Marks)	2	1