SRI A S N M GOVERNMENT COLLEGE (A), PALAKOL, W.G.DT
(Affiliated to Adikavi Nannaya University, Rajamahendravaram)
(Accredited with NAAC "B" Grade with 2.61 CGPA)

UG- SKILL DEVELOPMENT COURSE

SOLAR ENERGY

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

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

Skill development ; Green
Employability ; yellow

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. Desigining and constructing photovoltaic system for a domestic house requiring 5kVA power
8. Assignments/Model Exam.

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 Mc-Graw HillPublishers,1999.
4. Solar Photovoltaics- Fundamentals, technologies and applications, Chetan Singh Solanki, PHILearning Pvt. Ltd.,
5. Science and Technology of Photovoltaics, P. Jayarama Reddy, BS Publications, 2004.

MODEL QUESTION PAPER

SKILL DEVELOPMENT COURSE

Semester II Solar Energy

Time: 2 Hrs Max Marks: 50

Section – A

Answer any **FOUR** questions. Each question carries 5 marks. 4 x 20Marks

1. What is Photovoltaic Effect
2. Discuss about Solar greenhouses
3. Define Solar radiation and its uses
4. Write about domestic lighting
5. Discuss about Sunshine recorder
6. Explain about the solar hot water systems,
7. Explain the Solar dryers
8. How can we Store the solar energy

Section – B

Answer **all** the questions. Each question carries 10 marks 3 x 10M = 30Marks

9. Discuss about the Solar radiation at the Earth's surface

(OR)

10. What is solar energy? Explain its importance
11. What is the principle of conversion of solar radiation into heat?

(OR)

12. Discuss about the Solar Thermal Power Plant and its importance in daily life.

13. Describe solar photovoltaic cell and its working principle

(OR)

14. Define a solar cell. what are the types of Solar cells.