

**K.V.R. GOVT. COLLEGE FOR WOMEN(A), KURNOOL.**

**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 waterpumping

**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. Assignments/Model Exam.

**Reference Books:**

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