



ANDHRA PRADESH STATE COUNCIL OF HIGHER EDUCATION

(A Statutory body of the Government of Andhra Pradesh)

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SYLLABUS OF

SOLAR ENERGY

**AS PART OF SKILL DEVELOPMENT COURSES
UNDER CBCS FRAMEWORK WITH EFFECT FROM 2020-2021**

PROGRAMME: THREE-YEAR UG PROGRAMME

A.P. STATE COUNCIL OF HIGHER EDUCATION
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. 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 McGraw 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.

Recommended MODEL QUESTION PAPER FORMAT

Max. Marks: 50

Time: 1½ hrs (90 Minutes)

SECTION- A

(4x5M=20 Marks)

*Answer any four questions. Each answer carries 5 marks
(At least 1 question should be given from each Unit)*

1.	
2.	
3.	
4.	
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8.	

SECTION B

(3x10M = 30 Marks)

*Answer any three questions. Each answer carries 10 marks
(At least 1 question should be given from each Unit)*

1.	
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4.	
5.	
