SRI Y.N.COLLEGE (AUTONOMOUS)-NARSAPUR
(Affiliated to Adikavi Nannaya University)
Thrice Accredited by NAAC at 'A' Grade
Recognized by UGC as 'College with Potential for Excellence'
For 2022-2023 Batch (w.e.f. 2020-2021)
SEMESTER –II (Group A)
UG- SKILL DEVELOPMENT COURSE
SOLAR ENERGY

No. of Hours per week: 02 **Total Lectures: 30**

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
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 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.

Blue Print
SEMESTER -- II PAPER SD
SOLAR ENERGY

Module	5 marks		10 marks		Marks allotted
UNIT-I – Solar Radiation	**Section A**	**3**	**Section B**	**2**	**35**
UNIT-II – Solar Thermal Systems		**3**		**2**	**35**
UNIT-III – Solar Photovoltaic Systems		**2**		**2**	**30**
Total					**100**

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5)

3/9/22

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SEMESTER –II (Group A)
UG- SKILL DEVELOPMENT COURSE
SOLAR ENERGY

Learning 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 energy
- conversion and different photovoltaic applications.
- Understand the working principles of several solar appliances like Solar cookers, Solar hot water systems, Solar dryers, Solar Distillation, Solar greenhouses

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UG- SKILL DEVELOPMENT COURSE
SEMESTER –II (Group A)
SOLAR ENERGY MODEL QUESTION PAPER

Time: **2 Hrs** **SECTION-A** Max Marks: **50M**

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

1. What is Photovoltaic Effect
   ఫోటో వోల్టాయిక్ ప్రభావం అనగానేమి ?
2. Discuss about Solar greenhouses
   సౌర గ్రీన్ హౌస్ గూర్చి చర్చించుము
3. Define Solar radiation and its uses
   సౌర వికిరణము ను నిర్వచించుము మరియు వాటి అనువర్తనాలను వ్రాయుము
4. Write about domestic lighting
   ఇంటికి ఉపయోగించే లైటింగ్ గూర్చి వ్రాయుము
5. Discuss about Sunshine recorder
   సూర్యరశ్మి రికార్డర్ గూర్చి చర్చించుము
6. Explain about the solar hot water systems
   సోలార్ వేడి జల వ్యవస్థను వివరించుము
7. Explain the Solar dryers
   సౌర డ్రయర్ గూర్చి వివరించుము ?
8. How can we Store the solar energy
   సౌర శక్తీ ని ఏవిధంగా నిల్వ చేస్తారు

SECTION – B

Answer any **THREE** questions. Each question carries 10 marks. **3 x 10M = 30M**

9. Discuss about the Solar radiation at the Earth's surface
   భూమి ఉపరితలం మీద ఉన్న సౌర వికిరణము గూర్చి చర్చించుము
10. What is solar energy? Explain its importance
    సౌర శక్తీ అనగానేమి ? దాని ప్రాముక్యతను వివరించుము
11. Explain the principle of conversion of solar radiation into heat?
    సౌర వికిరణము ఏవిధంగా ఉష్ణంగా మార్పిడి చెందుతుందో తెలిపే సూత్రమును వివరించుము
12. Discuss about the Solar Thermal Power Plant and its importance in daily life.
    సౌర థర్మల్ పవర్ ప్లాంట్ గూర్చి వివరించుము మరియు నిత్య జీవితంలో దాని ప్రాముక్యతను చర్చించుము .
13. Describe solar photovoltaic cell and its working principle
    సౌర ఫోటో వోల్టాయిక్ సెల్ యొక్క సూత్రమును మరియు పనిచేయు విధానమును వివరింపుము
14. Define a solar cell. Explain different types of Solar cells?
    సౌరఘటమును నిర్వచించుము ? వాటిలో రకాలు గూర్చి వివరించుము.

1) 2) 3) 4) 5)

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