

With effect from the Academic Year 2024-25  
**VASAVI COLLEGE OF ENGINEERING**  
**(Autonomous)** ACCREDITED BY NAAC WITH 'A++' GRADE  
IBRAHIMBAGH, HYDERABAD – 500 031

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

**SOLAR POWER AND APPLICATIONS (GENERAL POOL)**

**Open Elective-II**

**SYLLABUS FOR B.E. IV SEMESTER**

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: <b>U23OE410EE</b>
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

<b>COURSE OBJECTIVES</b>	<b>COURSE OUTCOMES</b>
The course will enable the students to:	On completion of the course, students will be able to
To impart the basics of solar energy harnessing and solar panel and array.	<ol style="list-style-type: none"><li>1. Compare different energy resources.</li><li>2. Identify and choose proper type of meter for solar radiation measurement.</li><li>3. Use proper solar thermal system according to the load requirements.</li><li>4. Categorize and compare photovoltaic cells.</li><li>5. Apply the knowledge of solar energy.</li></ol>

**Unit – I**

**Fundamentals of Energy Sources:** Oil crisis of 1973, Classifications of Energy Resources, Importance of Non-conventional energy sources, Advantages-disadvantages and salient features of Non-conventional energy sources.

**Unit – II**

**Solar Energy Basics:** Sun as a source of energy, the Earth, Radiation Spectrums, Extraterrestrial and Terrestrial Radiations, Depletion of solar Radiation, Pyranometer, Pyrheliometer, Sunshine Recorder.

**Unit – III**

**Solar Thermal Systems:** Solar Collectors, Solar Water Heater, Solar Passive space – heating and cooling systems, Solar Cookers, Solar furnaces, Solar thermal water pump, Vapour compression refrigeration and Solar pond Electric power plant.

### Unit – IV

**Solar Photovoltaic Systems:** Solar Cell fundamentals, Cell characteristics, Cell classification, Module, Panel and Array, Maximizing the Solar PV output and load matching, MPPT.

### Unit – V

**Solar PV systems & Applications:** Solar PV system classification - Stand- Alone Solar PV system and Grid-Interactive Solar PV system. Applications - Water Pumping, lighting, medical refrigeration, village power and Telecommunication.

### Suggested Reading:

1. B H Khan, Non-Conventional Energy Resources, 2<sup>nd</sup> Edition, Tata McGraw Hill.
2. G. D. Rai, Non-Conventional Energy Sources, 13<sup>th</sup> Reprint 2014, Khanna Publications.

1. No. of Internal Tests	:	<input type="text" value="2"/>	Max. Marks for each Internal Test	:	<input type="text" value="30"/>
2. No. of Assignments	:	<input type="text" value="3"/>	Max. Marks for each Assignment	:	<input type="text" value="5"/>
3. No. of Quizzes	:	<input type="text" value="3"/>	Max. Marks for each Quiz Test	:	<input type="text" value="5"/>
Duration of Internal Tests	:	90 Minutes			