

<b>Course Title</b>	<b>SOLAR ENERGY CONVERSION SYSTEMS (ELECTIVE –II)</b>	
<b>Course Code</b>	<b>TH918</b>	
<b>Course Credit</b>	Lecture	: 04
	Practical	: 02
	Tutorial	: 00
	Total	: 05
<b>Course Objective</b>		
<ul style="list-style-type: none"> <li>To familiarize the students with the importance of the solar energy sources and make them motivate towards further research in the same field as far as the crises in the conventional sector are considered.</li> <li>To understand the solar energy aspects in detail as it is one of the prime and most important source of non-conventional energy hereby the study of various solar angles in particular and based on this criteria the design and analysis of solar concentrators and collectors.</li> </ul>		
<b>Detailed Syllabus</b>		
<b>Sr. No.</b>	<b>Name of chapter &amp; Details</b>	<b>Hours Allotted</b>
<b>SECTION-I</b>		
<b>1</b>	<b>Energy scenario and overview of thermal application of solar energy:</b> <ul style="list-style-type: none"> <li>Production and reserves of commercial energy sources- world and indian scenario</li> <li>Energy alternatives for India and importance of Solar Energy, Advantages and Dis-advantages of Solar energy.</li> <li>Devices for thermal collection and storage.</li> <li>Thermal applications of solar energy.</li> </ul>	<b>10</b>
<b>2</b>	<b>Solar radiation:</b> <ul style="list-style-type: none"> <li>Solar radiation outside earths atmosphere and on earth surface.</li> <li>Fundamental terminology, Declination angle and Day length calculations.</li> <li>Instruments for measuring solar radiation and sunshine, solar radiation data and geometry, relations for predicting the availability of solar radiation. Solar radiation on tilted surface.</li> </ul>	<b>10</b>
<b>3</b>	<b>Liquid flat plate collectors:</b> <ul style="list-style-type: none"> <li>Performance analysis of collectors, transmissivity, absorptivity, efficiency, effect of various parameter on performance, transient analysis.</li> <li>Testing procedures.</li> <li>Solar Coatings</li> </ul>	<b>8</b>
	<b>Total</b>	<b>28</b>

**SECTION-II**

<b>4</b>	<b>Concentrating collectors:</b> <ul style="list-style-type: none"> <li>• Flat plate collectors with plane reflectors.</li> <li>• Cylindrical parabolic collectors, compound parabolic collectors, paraboloid dish collectors, central receiver collector.</li> </ul>	<b>14</b>
<b>5</b>	<b>Thermal energy storage:</b> <ul style="list-style-type: none"> <li>• Sensible heat storage, latent heat storage, thermo chemical storage.</li> <li>• Solar pond: performance analysis, experimental studies, operational problems.</li> </ul>	<b>9</b>
<b>5</b>	<b>Methods of solar power generation:</b> <ul style="list-style-type: none"> <li>• Indirect Route: Thermal conversion</li> <li>• Direct route: Photovoltaic conversion, features and applications of same</li> </ul>	<b>5</b>
<b>Total</b>		<b>28</b>

**Instructional Method and Pedagogy:**

- At the beginning of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, blackboard, OHP etc.
- Attendance is compulsory in lectures and laboratory.
- Minimum two internal exams will be conducted and average of two will be considered as a part of overall evaluation.
- Assignments based on course content will be given to the students at the end of each unit/topic and will be evaluated at regularly.
- Surprise tests/Quizzes/Seminar/Tutorials will be conducted.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concepts being taught in lectures.
- Tutorials and assignments are to be submitted as term-work in laboratory related to course contents..

**Students Learning Outcomes:**

At the end of the course the students will be able to understand,

- The importance of solar energy resources for the present energy scenario.
- And pursue further research work behind the development of solar energy sources as a part of their research work.



# SYLLABUS

## Reference Books:

1. Non-conventional energy sources by G.D. Rai, Khanna Publishers.
2. Solar Energy: Fundamentals and Applications by H. P. Garg & Jai Prakash, TMH.
3. Solar Energy: Principles of Thermal Collection and Storage by S. P. Sukhatme, TMH.
4. Alternative Energy Sources by B. L. Singhal, Tech Max Publication.
5. Non Conventional Energy Resources by S.Hasan Saeed and D. K. Sharma.
6. Solar Engineering of Thermal Processes by Duffic and Beckman, John Wiley.