

Syllabus for B.Tech – Energy Engineering

Course Number & Title: EN308 Solar Energy Technology	
L-T-P-C: 3-0-0-6	
Offered in (Odd/ Even / Any): Semester VI	
Pre-Requisite: Nil	
Preamble / Objectives (Optional): To provide basic principles of Solar Energy conversion and recent developments in solar PV, solar thermal, and solar fuels.	
Course Content/ Syllabus: Introduction to solar energy: overview of global and Indian energy scenario, need of solar energy, propagation of solar radiation from the sun to earth; solar radiation geometry: sun-earth geometry, extra-terrestrial and terrestrial radiation, solar energy measuring instruments; solar radiation estimation; fundamentals of PV: Principles and performance analysis, modules, array, MPPT etc.; standalone PV system: Components and design of standalone system , fundamentals of battery system; grid connected PV system: components and design of grid connected PV systems; fundamentals of thermal collectors; flat plate collectors: analysis of LFPC, solar air heaters, collector testing; concentrating collectors (parabolic and paraboloid); thermal energy storage systems; solar thermal and PV applications: power production (stand alone and grid), water pumping, water heating, water purification etc.; solar fuels; advances in solar thermal collectors and PV technologies	
Books (In case UG compulsory courses, please give it as “Text books” and “Reference books”. Otherwise give it as “References”.	
Text Books: (Format: Authors, <i>Book Title in Italics font</i> , Volume/Series, Edition Number, Publisher, Year.)	
1.	S P Sukhatme and J K Nayak, <i>Solar Energy: Principles of Thermal Collection and Storage</i> , Tata McGraw Hill, 2006.
2.	C S Solanki, <i>Solar Photovoltaics: Fundamentals, Technologies and Applications</i> , Prentice Hall India, 2 nd Edition, 2011.
Reference Books: (Format: Authors, <i>Book Title in Italics font</i> , Volume/Series, Edition Number, Publisher, Year.)	
1.	G N Tiwari, <i>Solar Energy, Fundamentals, Design, Modeling and Applications</i> , Narosa, 2002.
2.	J A Duffie and W A Beckman, <i>Solar Engineering of Thermal Processes</i> , John Wiley, 2006.
3.	D Y Goswami, F Kreith and J F Kreider, <i>Principles of Solar Engineering</i> , Taylor and Francis, 1999.
4.	H P Garg and J Prakash, <i>Solar Energy: Fundamentals and Applications</i> , Tata McGraw Hill, 1997.
5.	M A Green, <i>Third Generation Photovoltaics: Advanced Solar Energy Conversion</i> , Springer, 2003.
6.	Goetzberger and V U Hoffmann, <i>Photovoltaic Solar Energy Generation</i> , Springer- -verlag, 2010.