GUJARAT TECHNOLOGICAL UNIVERSITY
Master of Engineering (Energy Engineering)
Semester: IV

Subject Code : 743901
Subject Name : Solar and Photovoltaics

Sr. No.	Course Content
1	**Heat Transfer for Solar Energy Utilization** Introduction, Conduction, Radiation, Reflectivity, Transmissivity, Transmittance-Absorptance Product, convection.
2	**Solar Radiation** Solar constant, Nature of Solar Radiation, Global, Beam and Diffuse Radiation, Hourly, Daily and Seasonal variation of solar Radiation, Estimation of Solar Radiation, Measurement of Solar Radiation, Some term and Basic Earth Sun Angles, Determination of solar time, Determination of Solar Angles.
3	**Photo thermal Systems** Flat Plate Collector, Hot Air Collector, Evacuated Tube Collector, Parabolic , Compound Parabolic and Fresnel Solar Concentrators, Central Receiver System, Thermal Analysis of Solar Collectors Performance of Solar Collectors, Solar Water Heating Systems(Active & Passive), Solar Space Heating & Cooling Systems, Solar Industrial Process Heating Systems, Solar Dryers & Desalination Systems, Solar Thermal Power Systems. Solar Ponds.
4	**Photovoltaic systems** Semiconductor Principles, Photo Voltaic Principle, Solar cells & panels, performance of solar cell, estimation of power obtain from solar power, solar panels PV systems, components of PV systems, performance of PV systems, design of PV systems, applications of PV systems, concentrating PV systems, PV power plants, power plant with fuel cells.
5	**Economic analysis of Solar energy Systems** Life cycle analysis of Solar Energy Systems, Time Value of Money, Evaluation of Carbon Credit of Solar Energy Systems.

Reference Books

1. Duffie J. A and Beckman, W .A., “Solar Engineering of Thermal Process”, John Wiley,1991.
2. G. N. Tiwari and M. K. Ghosal, “Fundamentals of Renewable energy Sources”, Narosa Publishing House, New Delhi, 2007.
3. Nonconventional Energy Resources by G D Rai,Khanna Publishers.
4. Solar Energy Utilisation by G.D Rai, Khanna Publications.