

SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Physics)
Semester: III
Syllabus with Effect from: June - 2014

Paper Code: PS03EPHY07	Total Credit: 4
Title Of Paper: Solar Energy & Geothermal Energy	

Unit	Description in detail	Weightage (%)
I	Introduction and application of solar energy, Essential subsystem in a solar energy plants. Solar energy routes and their prospects Terms and definitions, Units of solar power and solar energy, Merits and limitations of solar energy conversion and utilization, Phenomenon of light and energy, Energy from Sun. Solar constant, Power density for various wavelength of sunlight, Clarity index, solar insolation, Tilt angle of the fixed flat plate collector, solar calculations, Local apparent time.	25%
II	Solar thermal collectors, Parabolic through collectors, Paraboloidal dish collectors, Fresnel lens point focus collector and heliostate with central receiver, Heat transfer fluid, Thermal energy storage. Solar distributed collector thermal power plants, Solar boiler/steam generator with large reflector and a central receiver, Solar pond, Solar thermo-electric converter, Introduction to Photovoltaic systems, Merits and limitations of solar PV system, Prospects of solar PV system. Principle of a photovoltaic cell, V-I characteristics of a solar cell, Interconnections of solar cells.	25%
III	Efficiency of a solar cell and spectral response, Configuration of a solar PV panel, Small solar PV system for residence - typical ratings of small PV systems, Large solar PV systems – PV cell technology, Selective surfaces – basic requirements and basic principles – Types of selective surfaces. Applications of selective coatings to the flat plate collector	25%
IV	Introduction to the Geothermal energy Applications, Geothermal energy resources, Origin of geothermal resources, Non-uniform geothermal gradients, hydrogeothermal resources, Geopressure geothermal resources, Hot dry geothermal resources, Geothermal fluids for electrical power plants, Principles of photoelectrochemical solar cell.	25%

Basic Text & Reference Books:-

- Energy Technology (Non conventional, Renewable and conventional) By S. Rao and Dr. P. B. Perulkar
- Solar Energy conversion, An introductory course By A. E. Dikon and J. D. Loslie
- Photoelectrochemical Solar Cells By Suresh Chandra
- Principles of Energy Conversion By Archie W. Cupl Jr.

