

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

Paper Code: PS04EPHY07	Total Credit: 4
Title Of Paper: Bio Mass & Other Systems, Energy Storage	

Unit	Description in detail	Weightage (%)
I	Biomass conversion processes direct combustion of biomass (incineration) thermo chemical conversion of biomass – biochemical conversion, Fermentation- ethanolgaseous fuels from biomass – application of biomass energy conversion processes, introduction to the magnetohydrodynamics energy conversion – basic principle – Hall Effect and segmented electrodes – description of typical open cycle MHD plant.	25%
II	Design aspects-alternate MHD systems-technical particulars of conceptual MHD fundamental equations of MHD generation, introduction to the fuel cells and fuel cell power plants – advantages of fuel cell power sources – theory of electro-chemistry applied to fuel cells. Classification and types of fuel cells fuels for fuel cells electrical circuit and quantities performance characteristics of fuel cells.	25%
III	Introduction to the energy storage systems, energy storage systems for the electrical utility peak saving, pumped hydro energy storage plant, underground pumped hydro-compressed air energy storage. CASE with gas turbine peaking power plants, Huntor compressed air energy storage system with gas turbine power plant, battery energy storage systems, lead acid battery, Nickel-cadmium battery, advanced batteries superconducting magnet storage, advanced flywheel energy storage AFES.	25%
IV	Thermal energy storage, chemical reaction material energy storage, Hydrogen energy storage, Introduction to the hydro energy, Merits and demerits of the hydroenergy, Hydroenergy resources in India, Types of hydro-electric plant and energy conversion schemes. Terms and definitions, Generation description, Typical hydro-electric power plants, Hydro-electric turbines, Specific speeds of hydro-turbines, Impulse turbine, Reaction turbine, Choice of hydro-turbine, speed control and hydrothermal coordination, Merits of hydro-turbines, Types of turbines for small hydro, classifications, Mini, micro, small hydro-electric projects, Run-of river and storage plants, Environments aspects concerned with hydro power.	25%

Basic Text & Reference Books:-

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

