

4 <sup>th</sup> Semester	RMN4G002	Renewable Energy	L-T-P 3-0-0	3 CREDITS
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**Module - I (09 Hrs)**

Introduction to Energy Science and Energy Technology Energy Science and Energy Technology, world energy future, Energy sources and their availability. Renewable energy sources. Prospects of Renewable energy sources Solar energy fundamentals and application.

**Module - II (10 Hrs)**

Geothermal energy: Introduction, Utilization of Geothermal energy, Geothermal energy resources, geothermal gradient Different types of Geothermal Electric power plant and their operations for Geothermal Energy systems in India Wind energy: Fundamentals and application, Basic principles of Wind Energy Conversion, Wind Energy conversion system, Performance of wind machines.

**Module -III (10 Hrs)**

Electric generation for wind Biomass Energy Resources: Introduction, Biomass Conversion Process. Biogas from plant wastes, communities bio-gas plants. Biochemical conversion, Fermentation, liquid fuels for biomass.

Urban Waste: A source of Energy. Urban solid waste, waste incineration process. Environmental consideration, Fluidized bed combustion boilers for burning solid waste and fossil fuels.

**Module - IV (09 Hrs)**

Energy from the oceans: Introduction Ocean Energy conversion Technologies. Types of Ocean Thermal Electric Power Generation system and their operation. Tidal power plant Hydro Energy: Introduction, types hydro-electric plants and energy conversion scheme, Impulse turbine and Reaction turbine.

Classification of Hydro-Energy plants Energy Conservation: Principle of energy conservation and Energy Audit. Energy conservation Technologies.

**Module -V (07 Hrs)**

Co-generation, waste heat utilization, Heat recuperates, Heat regenerators, Heat pipes, Heat pumps, Energy storage.

**Books:**

- D.S. Chauhan and S.K. Srivastava, Non- Conventional Energy Resources, New Age International Pvt Ltd
- G.N. Tiwari, Fundamentals of Renewable Energy Sources, Narosa Publishing House
- Renewable Energy, Godfrey Boyle, Oxford University Press
- Non Conventional Energy Sources: B.H. Khan, TMH Publications
- Renewable Energy Sources and Emerging Technology: D.P.Kothari and etal., PHI