

UG
Course Code: CH415
Credit: 3
Version: 1
Prerequisite Course: Nil

Department: **Chemical Engineering**
Course Name: **Non-Conventional Energy Sources**
L-T-P: **3-0-0**
Approved on:

Introduction: Energy scene of supply and demand in India and the world, energy consumption in various sectors, potential of non-conventional energy resources. Detailed study of the following sources with particular reference to India.

Solar Energy: Solar radiation and its measurement, limitations in the applications of Solar Energy, Solar collectors – types, and constructional details. Solar water heating, applications of Solar Energy for heating, drying, space cooling, water desalination, solar concentrators, photovoltaic power generation using silicon cells.

Bio-Fuels: Importance, combustion, pyrolysis and other thermo chemical processes for biomass utilization. Alcoholic fermentation, anaerobic digestion for biogas production.

Wind Power: Principle of energy from wind, windmill construction and operational details and electricity generation and mechanical power production.

Tidal Power: Its meaning, causes of tides and their energy potential, enhancement of tides, power generation from tides and problems. Principles of ocean thermal energy conversion (OTEC) analysis and sizing of heat exchangers for OTEC.

Geothermal Energy: Geo technical wells and other resources dry rock and hot aquifer analysis, harnessing geothermal energy resources.

Energy Storage and Distribution: Importance, biochemical, chemical, thermal, electric storage. Fuel cells, distribution of energy.

Books

1. Rai, G.D., “*Non-Conventional Energy Sources,*” Khanna Publishers, New Delhi, 2001.
2. Sorenson, B, “*Renewable Energy*”, 3rd ed., Elsevier Science, 2004.
3. Twiddle, J. Weir, T. “*Renewable Energy Resources,*” Cambridge University Press, 1986.
4. Kreith, F. and Kreider, J. F., “*Principles of Solar Engineering,*” McGraw Hill, 1978.
5. Duffie, J. A., Beckman, W. A., “*Solar Engineering of Thermal Processes,*” John Wiley, 1980.
6. Veziroglu, N., “*Alternative Energy Sources,*” Volume 5 & 6, McGraw-Hill, 1978.
7. Sukhatme, S. P., “*Solar Energy: Principles of Thermal Collection and Storage,*” 2nd ed., Tata McGraw-Hill, 2001.
8. Garg, H.P. and Prakash, J., “*Solar Energy: Fundamentals and Applications,*” Tata McGraw-Hill, 2001.