

## Alternative Energy

**Direct Energy Conversion:** Introduction: Fuel Cells-Working principles, descriptions and classification, electrochemistry of H<sub>2</sub>-O<sub>2</sub> cells, Ernst equation and e.m.f., efficiency calculations, application: Solar Photovoltaic (SPV)-Semiconductors & junctions, working principles, descriptions, I-V characteristics, efficiency and fill factor: Thermoelectric devices-Working principles, descriptions: Magneto Hydro Dynamics (MHD) –Working principles, descriptions/classification, e.m.f. calculations (Faraday & Hall configurations), application.

**Non-conventional Energy Conversion:** Solar thermal energy: Air and water heating, power generation, desalination, Solar geometry, collectors, storage (solar pond); Wind Energy Conversion. Principle of conversion, Types of turbines, Geo-thermal energy-Principle of Conversion, classification of plants. Tidal, Wave and Ocean Thermal (OTEC) energy conversion: Basic principles, Description of different types of plants. Pumped storage hydro-Principle of storage and conversion. Alternative Fluids as Energy Carrying Media.

### Text Books:

1. Sukhatme, S.P., 'Solar Energy Principle of Thermal Collection and Storage', TMH, 1990.
2. Kriender, J.M., 'Principles of Solar Engineering', McGraw Hill, 1987.

### Reference Books:

1. Mangal, V.S., 'Solar Engineering', Tata McGraw Hill, 1992.
2. Bansal, N.K., 'Renewable Energy Source and Conversion Technology', TMH, 1989.
3. Peter J. Lunde., 'Solar Thermal Engineering', John Willey & Sons, New York, 1988.
4. Duffie, J.A and Beckman W.A., 'Solar Engineering of Thermal Processes', Willey & Sons, 1990