

<b>Course Title</b>	<b>Course Code</b>	<b>Credit Hours</b>
Renewable Energy Technologies	AE-484	3-0

**Textbook:**

- John Twidell and Anthony D. Weir, “Renewable Energy Resources”, Taylor & Francis

**Reference Books/Materials:**

- Godfrey Boyle, “Renewable Energy – Power for a Sustainable Future”, Oxford University Press
- John A. Duffie, William A. Beckman, “Solar Engineering of Thermal Processes”, Wiley

**Course Objectives:**

This course aims to introduce the students to the most important Renewable Energy Resources, and the technologies for harnessing these within the framework of a broad range of simple to state-of-the-art Advanced Energy Systems.

**Course Outline:**

- Course Overview, Introduction, World Energy Scenario and Trends
- Solar Radiation Characteristics and Impacts, Measurement Principles, Active and Passive Systems
- Solar Water Heating, Solar Concentrators, Parabolic Troughs, Vacuum Tubes
- Solar Thermal Applications, Solar Space Heating, Solar Drying
- Photovoltaic (PV) Power Technology, Mono-Crystalline and Poly-Crystalline Cells, Thin Film Cells, Performance Parameters
- Wind Energy, Wind Resource, Wind Power Technology, Vertical Axis Turbines, Horizontal Axis Turbines
- Hydro Power Plants, Classification of Hydro Power Plants, Components, Impulse and Reaction Turbines
- Design Parameters of Hydro Power Plant, Pros and Cons of Hydro Power, Pumped Storage
- Wave Power, Tidal Current and Tidal Range Power

- Biomass Sources, Potential, Constituents, Municipal Solid Waste, Moisture Requirements
- Biofuels, Bio Ethanol, Bio Diesel, Aviation Fuels, Biomass Conversion
- Geothermal Energy, Hydrogen Energy
- Thermoelectric Systems, thermal Energy Storage, Phase-Change Materials
- Energy Conservation and Efficiency
- Revision & Problems Discussion