UNIT I

Syllabus : Present solar energy scenario, world energy futures, governing bodies (self–study), solar radiations and its measurements, solar constant, solar radiation geometry, solar radiation data, estimation of average solar radiation, solar radiation on tilted surface.

UNIT II

Syllabus : Types of solar thermal collector, flat plate collector analysis, evacuated tube collectors (ETC) analysis, its design and application, solar air heaters and its types, solar distillation.

Solar concentrating collectors : Types - line and point concentrator, theory of concentrating collectors, parabolic trough collector, parabolic dish collector, solar tower, concentrated Fresnel linear receiver (CFLR).

UNIT III

Syllabus : Forming the PN junction solar cells and its applications, structure of a solar cell, types of modules, PV array, solar cell equation, Fill factor and maximum power, Grid aspects of solar power, equipment used in solar photovoltaic plants, power conditioning Equipment-inverters, regulators, other Devices; System Analysis Design procedure, Design constraints, other considerations.

UNIT IV

Syllabus :

Case study 1 : Design of solar food drier for domestic purpose referring existing system

Case study 2 : Design of parabolic dish solar cooker for domestic purpose referring existing system

Case study 3 : Design of solar photovoltaic system for domestic purpose referring existing system

UNIT V

Syllabus : Principle of wind energy conversion; Basic components of wind energy conversion systems; various types and their constructional features; design considerations of horizontal and vertical axis wind machines : analysis of aerodynamic forces acting on wind mill blades and estimation of power output; wind data and site selection considerations, wind energy potential and installation in India.

UNIT VI

Syllabus : Case study on designing miniature windmill for domestic purpose referring existing system

❑❑❑