

Module No. 1: Solar Thermal Technologies

No. of weeks / credits 4

Week 1

- **Low Temperature Solar Systems: Flat Plate Collectors**
 - Introduction
 - Solar Collectors
 - Absorption of Solar Radiation by Cover Media
 - Transmittance–Absorptance Product
 - Radiation Absorbed by Collector Plate
 - Selective Surfaces
 - Heat Balance of Fluid
 - Types of Collector Geometries
 - Collector with Phase-changing Fluids
 - Thermo-siphoning in Solar Energy Systems

Week 2

- **Different Types of Solar Water Heaters**
 - Introduction
 - Thermosyphon Type Solar Water Heater
 - Active or Pumped Solar Water Heater
 - Alternative Models of Solar Water Heaters
 - Evacuated Tube Collectors

Week 3

- **Thermal Storage System**
 - Types: Sensible and Latent
 - Thermochemical Storage
 - Solar Box Cooker Analysis
 - Process and Technology Status
 - Performance and Costs
 - Potential and Barriers.

Week 4

- **Concentrating Solar Collector**
 - *Process and Technology Status:*
 - Parabolic Trough (PT)
 - Fresnel Reflectors (FR)
 - Solar Towers (ST)
 - Solar Dishes (SD)
 - CSP Water Requirements
 - CSP for Water Desalination
 - Hybrid CSP Plants
 - Enhanced Oil Recovery (EOR)

- ***Current Costs and Cost Projections:***
 - Investment Costs
 - Breakdown of Investment Costs
 - Technology Advances and Cost Reductions
 - Operation and Maintenance Costs
 - Levelised Cost of Electricity (LCOE)

- ***Potential and Barriers***