

Topic 4: Applications, examples and problem solving approach of Thermodynamics

Relevant course: Thermodynamics / Engineering Thermodynamics / Thermal Science

Relevant Department: Mechanical Engg., Aerospace Engg., Production Engg.,

Relevant Semester: This is for a beginning course which is typically offered in the 2nd,3rd or 4th semesters of the B.Tech. program.

Pre-requisite: None. A course in Physics that covers thermodynamics would be helpful.

Topic Description:

Session 1 –

Vapour power cycles

- Rankine cycle.
- Superheat and reheat.

Applications to different power cycles: Fossil fuelled, Nuclear, Geothermal, Solar thermal, Ocean thermal,

etc. Current status. Overview of future developments.

Session 2 –

Gas power cycles

- Otto, Diesel, Brayton cycles.

Application to different types of internal combustion engines. Gas turbines for propulsion (air, land and sea) and power generation.

Combined cycle power plant.

Refrigeration cycles

- Rankine cycle and its modifications.

Applications to refrigeration (domestic, industrial, mobile) implications for food industry. Air-conditioner (domestic, industrial,).

Session 3 –

Rocket propulsion.

Co-generation (textile, petrochemicals, paper, food processing, etc. industries). District heating and cooling.

Fuel cells.Conclusion.

