ME1100: Thermodynamics
Jul–Nov 2016

Instructor(s)

- Dr. Krithika Narayanaswamy
  # 203, Thermodynamics and Combustion Engineering Lab
  krithika@iitm.ac.in

- Prof. Babu Viswanathan
  # 114, Thermodynamics and Combustion Engineering Lab
  vbabu@iitm.ac.in

- Dr. Raghavan Vasudevan
  # 201, Thermodynamics and Combustion Engineering Lab
  raghan@iitm.ac.in

- Prof. K. Srinivasan
  # Thermodynamics and Combustion Engineering Lab
  ksri@iitm.ac.in

- Dr. Shaligram Tiwari

- Dr. Kameswararao Anupindi
  # 207, Thermal and Turbo Machines Lab
  kanupindi@iitm.ac.in

General information

- 3 credit course
- 3 + 1 lecture+ tutorial hours per week: ‘E2’ slot
  - Monday: 2:55–3:45 PM
  - Tuesday: 1:00–1:50 PM
  - Wednesday: 1:00–1:50 PM
  - Thursday: 3:50–4:40 PM
- Venue: CRC202
- Course materials on moodle courses.iitm.ac.in

Learning Outcomes

- Understand the basic principles of thermodynamics
- Apply these principles to systems of relevance to engineers
Syllabus

1. Fundamentals concepts
   (a) System & Control volume
   (b) Property, State & Process
   (c) Exact & Inexact differentials

2. Work
   (a) Concepts of thermodynamic and displacement work
   (b) Work interactions in specific processes

3. Temperature and heat
   (a) Thermal equilibrium
   (b) Zeroth law of thermodynamics
   (c) Difference between work and heat interactions

4. First law for a system
   (a) Concept of total energy
   (b) Various modes of energy

5. Pure substance
   (a) Two property rule
   (b) Enthalpy and internal energy

6. Ideal gases and mixtures of ideal gases
   (a) Dalton’s Law
   (b) Amagot’s law

7. Properties of water-steam system
   (a) Constant temperature and constant pressure heating
   (b) Saturated states
   (c) Use of steam tables

8. First law for flow processes
   (a) Steady flow process
   (b) Unsteady flow process

9. Second law of thermodynamics
   (a) Kelvin-Planck and Clausius statements
   (b) Internal and external reversibilities
   (c) Carnot cycle
   (d) Absolute temperature scale

10. Entropy
    (a) Clausius inequality
    (b) Definition of Entropy
    (c) TS relationships
    (d) Entropy from steam tables
    (e) Irreversibility, lost work, available and unavailable work

11. Thermodynamic cycles
    (a) Rankine cycle
    (b) Brayton cycle
    (c) Vapor compression refrigeration cycle
Suggested Textbooks


Grading Policy

- Assignments – 20%
- Quiz 1 – 20%
- Quiz 2 – 20%
- Final exam – 40%
- **Institute norm** – Attendance ≥ 85%