THERMODYNAMICS

PROF. S.R KALE
Department of Mechanical Engineering
IIT Delhi

TYPE OF COURSE : Rerun | Elective | UG
COURSE DURATION : 12 weeks (18 Jan21 - 09 Apr'21)
EXAM DATE : 25 April 2021

INTENDED AUDIENCE : BE - Mech/Aerospace
PRE-REQUISITES : 12 th standard science (PCM or PCB), and basic knowledge of differential calculus.
INDUSTRY SUPPORT : The course encompasses power generation, I.C.engines, process engineering, refrigeration and air-conditioning, and energy conversion in general, amongst others.

COURSE OUTLINE :
This course is on basic engineering thermodynamics. The first part, on single component systems, covers basic concepts and definitions, conservation of mass, 1 st and 2 nd laws of thermodynamics for closed and open systems, thermodynamic properties of a pure substance and practical applications. The second part covers physical behaviour of a mixture of ideal gases, psychrometry, thermodynamics of reacting systems, combustion, phase and chemical equilibrium, and applications. Lecture notes will be provided and supplemented with assignments that emphasize systematic problem solving.

ABOUT INSTRUCTOR :
Sunil R. Kale is Professor in the Department of Mechanical Engineering at IIT Delhi, and currently at Ahmedabad University as Dean, School of Engineering and Applied Science. Besides engineering thermodynamics, he has taught undergraduate heat & mass transfer and power plant technologies, amongst others. His research interests are combustion, fire dynamics, heat and mass transfer, and fluid mechanics.

COURSE PLAN :


Week 02 : Conservation of mass for closed and open systems and Internal energy and Enthalpy

Week 03 : First Law of Thermodynamics


Week 05 : Thermodynamic behavior of a pure substance and properties.

Week 06 : Carnot’s cycle realization – in closed and open systems for ideal gas and vapour states

Week 07 : Thermodynamics of engineered equipment: turbine, compressor, pump, heat exchanger, diffuser, nozzle, throttling, flow through pipes/ducts, etc.


Week 09 : Mixtures of ideal gases
