## ME 411 Applied Thermodynamics - II (3-0-0-6)

## Pre-requisite: ME 211 or equivalent

I. C. Engines: Classification - SI, CI, two-stroke, four-stroke etc., operating characteristics – mean effective pressure, torque and power, efficiencies, specific fuel consumption etc., air standard cycles – Otto, Diesel and dual, real air-fuel engine cycles, Thermochemistry of fuels – S.I. and C.I. engine fuels, self ignition, octane number, cetane number, alternate fuels etc., combustion – combustion in S.I. and C.I. engines, pressure-crank angle diagram, air-fuel ratio, chemical equation and conservation of mass in a combustion process etc., Air and fuel inje ction – injector and carburetor, MPFI etc., ignition, lubrication, heat transfer and cooling; Gas Power Cycles: Simple gas turbine cycle – single and twin shaft arrangements, intercooling, reheating, regeneration, closed cycles, optimal performance of various cycles, combined gas and steam cycles; Introduction to Axial-Flow Gas Turbine; Introduction to Centrifugal and AxialFlow Compressors; Combustion Chambers; Jet Propulsion: turbojet, turboprop, turbofan, ramjet, thrust and propulsive efficiency; Rocket Propulsion; Direct Energy Conversion: thermionic and thermoelectric converters, photovoltaic generators, MHD generators, fuel cells.

## Texts:

- [1] G. F. C. Rogers and Y. R. Mayhew, Engineering Thermodynamics Work and Heat Transfer, 4 th Ed., Pearson, 2001.
- [2] H. I. H Saravanamuttoo, G. F. C. Rogers and H. Cohen, Gas Turbine Theory, 4 th Ed., Pearson, 2003.

## References:

- [1] T. D. Eastop and A. McConkey, Applied Thermodynamics for Engineering Technologists, 5th Ed., Pearson, 1999.
- [2] W. W. Pulkrabek, Engineering Fundamentals of the Internal Combustion Engine, PHI, 2002.
- [3] C. R. Fergusan and A. T. Kirkpatrick, Internal Combustion Engines, John Wiley & Sons, 2001