

ME 650 Gas Turbine Theory (3-0-0-6)

General Considerations of Turbomachinery: Classification; Euler's Equation for Turbomachinery; Velocity triangle; Cascade analysis & nomenclature. Shaft Power & Aircraft Propulsion Cycles. Centrifugal Compressors: Workdone and pressure rise; Slip; Compressibility effects; Compressor characteristics. Axial Flow Compressors: Stage pressure rise; Blockage in compressor annulus; Degree of reaction; 3-D flow; Stage performance; h-s diagram & efficiency; Off design performance; Performance characteristics; Design process. Combustion System. Axial Flow Turbines: Stage performance; Degree of reaction; h-s diagram & efficiency; Vortex theory; Overall turbine performance; Performance characteristics; Blade cooling; Design process. Prediction of performance of simple gas turbines; Off Design performance; Gas turbine blade materials; Matching procedure.

Textsbooks:

- [1] H. Cohen, *Gas Turbine Theory*, 4th Edition, Longman, 1998.
- [2] S.L.Dixon, *Fluid Mechanics, Thermodynamics of Turbomachinery*, Pergamon Press, 1998.
- [3] Jack D. Mattingly, *Elements of Gas Turbine Propulsion*, McGraw-Hill, Inc., 1996.
- [4] B. Lakshminarayana, *Fluid Dynamics & Heat Transfer of Turbomachinery*, John Wiley & Sons, 1996.