SUBJECT NO-ME60236, SUBJECT NAME- TURBULENT FLOWS

LTP- 3-1-0,CRD- 4

SYLLABUS :-

Turbulent FlowsIntroduction to stability of laminar flows. Linearized stability analysis using Orr Sommerfeld equations for inviscid and viscous flows. Stability with flexible compliant boundaries, for free convection flows and under centrifugal forces. Transition to turbulence. General properties of turbulence: instability and non linearity, statistical nature, vortex stretching, turbulence scales and cascade, mixing and enhanced diffusivity, energy spectrum. Introduction to mathematical analysis of turbulent flows. The closure problem. Reynolds averaged Navier Stokes equations. Equations for Reynolds stresses, turbulence kinetic energy and energy of mean flow convection, production and dissipation of turbulence, re-distribution, turbulent diffusion. Turbulence modeling. Eddy viscosity/mixing-length models, application to free shear flows and wall-bounded flows. Two-equation models of turbulence: standard k and k model. Turbulent free shear flows. Turbulent wallbounded flows, Law of the wall, velocity defect law, law of the wake.