6th Semester		**Wind Tunnel Techniques**	**L-T-P 3-0-0**	**3 Credits**

Module I WIND TUNNELS 8 Hours

Classification –non-dimensional numbers-types of similarities - Layout of open circuit and closed- c i r c u i t subsonic wind tunnels – design parameters-energy ratio – HP calculations. Calibration.

Module II HIGH SPEED WIND TUNNELS 8 Hours

Blow down, in draft and induction tunnel layouts and their design features, Transonic, supersonic and hypersonic tunnels, their peculiarities and calibration. Helium and gun tunnels, Shock tubes,

Module III WIND TUNNEL MEASUREMENTS 8 Hours

Pressure,velocity and temperature measurements – Force measurements – types of balances-Three component and six component balances – calibration of measuring instruments.

Module IV FLOW VISUALIZATION 6 Hours

Smoke and Tuft grid techniques – Dye injection special techniques – Optical methods of flow visualization.

Module V NON-INTRUSIVE FLOW DIAGNOSTICS 6 Hours

Laser – Doppler anemometry. Particle image velocimetry. Laser induced fluorescence.

Books

1. Rae, W.H. and Pope, A. “Low Speed Wind Tunnel Testing”, John Wiley Publication, 1984.

2. Pope, A., and Goin, L., “High Speed wind Tunnel Testing”, John Wiley, 1985.