

# AMAE17 WIND TUNNEL TECHNIQUES

## UNIT-1 WIND TUNNELS

- 1.1 Classification –non-dimensional numbers-types of similarities
- 1.2 Layout of open circuit and closed circuit subsonic wind tunnels
- 1.3 Design parameters-energy ratio - HP calculations. Calibration.

## UNIT-2 HIGH SPEED WIND TUNNELS

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

## UNIT-3 WIND TUNNEL MEASUREMENTS

- 3.1 Pressure, velocity and temperature measurements
- 3.2 Force measurements- types of balances-Three component and six component balances
- 3.3 Calibration of measuring instruments.

## UNIT-4 FLOW VISUALIZATION

- 4.1 Smoke and Tuft grid techniques
- 4.2 Dye injection special techniques
- 4.3 Optical methods of flow visualization.

## UNIT-5 NON-INTRUSIVE FLOW DIAGNOSTICS

- 5.1 Laser- Doppler anemometry.
- 5.2 Particle image velocimetry.
- 5.3 Laser induced fluorescence.

### References Books:

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