

PAE7J001 WIND TUNNEL TECHNIQUES 3-0-0

UNIT I WIND TUNNELS

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

UNIT II HIGH SPEED WIND TUNNELS

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, Shocktubes,

UNIT III WIND TUNNEL MEASUREMENTS

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

UNIT IV FLOW VISUALIZATION

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

UNIT V NON-INTRUSIVE FLOW DIAGNOSTICS

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

TEXT BOOK

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

REFERENCE

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