

# Advanced Turbo Machinery

B.E. Sem. VIII [MECH/AUTO]

(Elective – II)

## EVALUATION SYSTEM

	Time	Marks
<b>Theory Exam</b>	3 Hrs.	100
<b>Practical Exam</b>	–	–
<b>Oral Exam</b>	–	25
<b>Term Work</b>	–	25

## SYLLABUS

### 1. Principles of Turbo machinery

- 1.1 Introduction, Overview and Machinery Classification
- 1.2 Review of Conservation Laws
- 1.3 Dimensional Analysis and Scaling Laws
- 1.4 Adiabatic flow through Nozzles and Diffusers
- 1.5 Work and Efficiencies in Compressor Stages
- 1.6 Selection of centrifugal, axial, mixed flow, Axial flow machines based on specific Speed

### 2. Flow Through Cascades

- 2.1 Two-dimensional Flow
- 2.2 Cascade of Blades
- 2.3 Cascade Tunnel
- 2.4 Axial Turbine Cascades
- 2.5 Axial Compressor Cascades

### 3. Analysis of Axial Turbine Stage

- 3.1 Stage Velocity triangles
- 3.2 Single Impulse Stage
- 3.3 Multi-stage velocity and Pressure Compounded Impulse
- 3.4 Reaction Stages
- 3.5 Losses and Efficiencies
- 3.6 Performance Charts

### 4. Analysis of Centrifugal Blower

- 4.1 Theoretical Characteristic Curves
- 4.2 Euler Characteristics and Euler Velocity Triangles
- 4.3 Losses and Efficiencies
- 4.4 Flow through impeller Casing, inlet Nozzle, Volute, Diffusers
- 4.5 Multi-vane Impellers of Impulse Type
- 4.6 Cross flow Fans

### 5. Testing and Control of Fans

Fan Testing, Noise Control, Materials and Components Blower Regulation, Speed Control, Throttling Control at Discharge and Inlet.

### 6. Design and Application of Blowers

Special Design and Applications of Blower, Induced and Forced Draft Fans for Airconditioning Plants, Cooling Towers, Ventilation Systems, Booster Systems.

**References Books :**

1. Stepanoff (*A.J. Turboblonders*) John Wiley & sons, 1970.
2. (*Brunoeck, Fans*) Pergamon Press, 1973.
3. Centrifugal pumps and blowers (*Austin H. Chruch*) John wiley and Sons, 1980.
4. Fluid Mechanics, Thermodynamics of turbomachinery, (*S.L. Dixon*), Elsevier
5. Worked examples in turbomachinery (*S.L. Dixon*), Pergamon Press, 1984.
6. Compressors and Fans (*S M Yahya, Turbines*) Tata McGraw Hill Publishing Company Ltd. 1983
7. <http://www.petroPager.com>
8. <http://www.tami.org>
9. <http://www.erichson.com>
10. <http://www.apgate.com>

