

COURSE CODE	COURSE TITLE	L	T	P	C
1151AE322	AERODYNAMICS LABORATORY	0	0	2	1

**Course Category:**

Programme core

**a. Preamble:**

This lab aids the students to learn about the requirement of wind tunnel in the field of Aeronautical Engineering. Students get hands on experience about speed calibration Flow visualization, Force and pressure measurements over slender and bluff bodies.

**b. Pre- Requisites:**

- Fluid Mechanics

**c. Link to Other Courses:**

- Nil

**d. COURSE EDUCATIONAL OBJECTIVES:**

Students undergoing this course are expected:

- To understand the flow pattern over different aerodynamic profiles.
- To have hands on experience on pressure and force measurement over aerodynamic profiles.
- To estimate aerodynamic response of different objects

**e. COURSE OUTCOMES:**

On successful completion of this course students will be able to

CO Nos.	Course Outcomes	Level of learning domain (Based on revised Bloom's)
CO1	Describe the different types of wind tunnel	K2,S3
CO2	Calibrate the test section speed of the wind tunnel	K3,S3
CO3	Illustrate the stream patterns over bluff and slender bodies.	K2,S3
CO4	Investigate the variation of surface pressure over bluff and slender bodies	K4,S3
CO5	Compute the lift and drag co efficient over an airplane model	K3,S3

(S1-Factual, S2-Conceptual, S3-Procedural, S4-Metacognitive)

**f. CORRELATION OF COS WITH PROGRAMME OUTCOMES:**

<b>COs</b>	<b>PO1</b>	<b>PO2</b>	<b>PO3</b>	<b>PO4</b>	<b>PO5</b>	<b>PO6</b>	<b>PO7</b>	<b>PO8</b>	<b>PO9</b>	<b>PO10</b>	<b>PO11</b>	<b>PO12</b>
CO1	H	H		H		H	H	H	L			
CO2	H	H		H		H	H	H	L			
CO3	H	H		H		H	H	H	L			
CO4	H	H		H		H	H	H	L			
CO5	H	H		H		H	H	H	L			

H- High; M-Medium; L-Low

**g. List of Experiments:**

1. Introduction to wind tunnel layout.
2. Flow visualization over different profile in water flow channel.
3. Flow visualization over wing using oil flow/ribbon method.
4. Smoke Flow visualization over streamline and bluff bodies.
5. Subsonic wind tunnel test section speed calibration using Pitot static tube.
6. Pressure distribution over cylinder.
7. Pressure distribution over rough cylinder.
8. Pressure distribution over aerodynamics profiles.
9. Estimation of aerodynamic forces and moments of aerodynamic profiles
10. Calibration of Wind tunnel in vertical/horizontal direction.

**Total Periods: 30**