

# FLUID MECHANICS LABORATORY

**FLUID MECHANICS IS THE BRANCH OF PHYSICS CONCERNED WITH THE MECHANICS OF FLUIDS (LIQUIDS, GASES, AND PLASMAS) AND THE FORCES ON THEM. IT HAS APPLICATIONS IN A WIDE RANGE OF DISCIPLINES, INCLUDING MECHANICAL, CIVIL, CHEMICAL AND BIOMEDICAL ENGINEERING, GEOPHYSICS, OCEANOGRAPHY, METEOROLOGY, ASTROPHYSICS, AND BIOLOGY.**

## COURSE OBJECTIVES

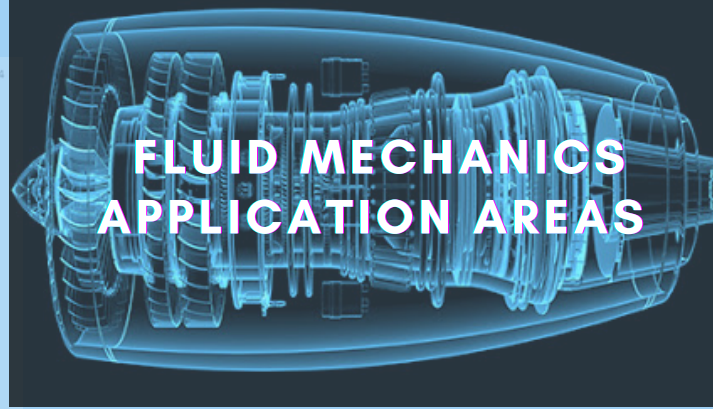
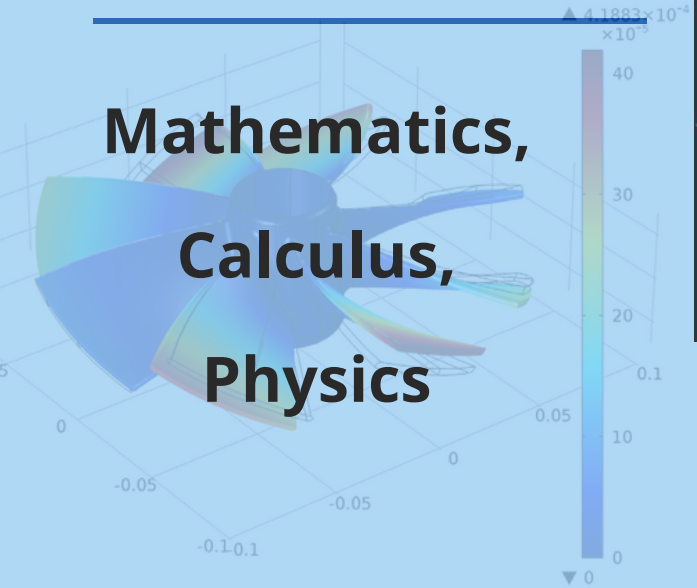
1. TO STUDY VARIOUS PROPERTIES OF FLUIDS AND UNDERSTAND THE LAWS & CONCEPTS OF FLUID STATICS.
2. TO UNDERSTAND THE KINEMATICS OF FLUID MOTION & STUDY VARIOUS CONCEPTS RELEVANT TO FLUID FLOW.
3. TO STUDY VARIOUS FLOW MODELS IN FLUID DYNAMICS & UNDERSTAND THE APPLICATION OF BERNOULLI'S PRINCIPLE TO DIFFERENT FLOW MEASUREMENT PROBLEMS.
4. TO STUDY THE BEHAVIOR OF FLUID FOR INTERNAL FLOWS AND UNDERSTAND THE PHYSICS OF LAMINAR & TURBULENT FLOWS.
5. TO STUDY VARIOUS ENERGY LOSSES OF FLUID FLOW THROUGH PIPES & TO DO THE DIMENSIONAL ANALYSIS.
6. TO UNDERSTAND THE FUNDAMENTALS OF EXTERNAL FLOWS WITH DRAG AND LIFT FORCES, ON IMMERSSED BODIES.

## COURSE OUTCOMES

1. REMEMBER AND APPLY VARIOUS PROPERTIES AND LAWS OF FLUID MECHANICS IN SOLVING THE PROBLEMS.
2. ANALYZE THE TYPE OF FLUID FLOW AND EVALUATE DIFFERENT KINEMATIC PARAMETERS OF THE FLUID MOTION.
3. APPLY BERNOULLI'S EQUATION FOR PROBLEMS IN FLUID FLOW
4. EVALUATE TYPE OF FLOW BASED ON REYNOLD'S NO. & TO DRAW VELOCITY PROFILE FOR THE SAME.
5. ANALYZE & CALCULATE MAJOR AND MINOR LOSSES OF FLOW THROUGH THE PIPE & TO DO DIMENSIONAL ANALYSIS BY USING BUKINGHUM'S  $\Pi$ - THEOREM
6. APPLY AND ANALYZE VELOCITY BOUNDARY LAYER TO FIND PARAMETERS LIKE BOUNDARY LAYER THICKNESS, MOMENTUM THICKNESS, ENERGY THICKNESS & TO CALCULATE DRAG & LIFT FORCES ON IMMERSSED BODIES.

# PREREQUISITES

Mathematics,  
Calculus,  
Physics



# FLUID MECHANICS APPLICATION AREAS

# FLUID MECHANICS ENGINEERING INDUSTRIES



## TURBO MACHINES



## INTERNAL COMBUSTION

## ENGINES



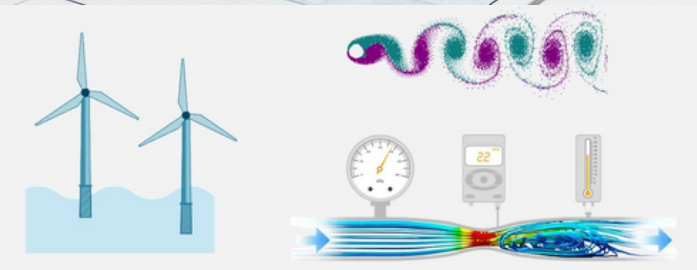
## COMPUTATIONAL ANALYSIS

## OF FLUID



## FLOW PROBLEMS

## AVIATION INDUSTRIES





### Technical Specification

Water Jacket Heater = 500 W

Type – Immersion Heater

Orifice Diameter of Viscometer = 3 mm



### Technical Specification

Diameter of Orifice	: 14 mm
Throat Diameter of Venturimeter	: 14
Inlet Pipe Diameter	: 24
Dimensions of Measuring Tank	: 300 mm x 300 mm x 500 mm



### Technical Specification

Angle of V-Notch	: 60°
Sill Level	: 110 mm
Dimensions of Measuring Tank	: 300 mm x 300 mm x 500 mm
Centrifugal pump	: 0.5 HP



### Technical Specification

<b>Pump Set</b>	<b>0.5 HP</b>
<b>Length of the Section</b>	<b>1 m</b>
<b>Diameter of Pipe1</b>	<b>12 mm</b>
<b>Diameter od Pipe2</b>	<b>18 mm</b>
<b>Diameter of pipe3</b>	<b>24 mm</b>

# FLUID MECHANICS LAB FACILITIES

## Flow Net by Electrical analogy

