



# EXPERIMENTAL METHODS IN FLUID MECHANICS

**PROF. PRANAB K. MONDAL**

Department of Mechanical Engineering  
IIT Guwahati

**TYPE OF COURSE** : Rerun | Elective | UG/PG

**COURSE DURATION** : 12 weeks (24 Jan' 22 - 15 Apr' 22)

**EXAM DATE** : 24 Apr 2022

**PRE-REQUISITES** : Basic UG-level Fluid Mechanics and Thermodynamics

**INTENDED AUDIENCE** : Undergraduate students of Mechanical / Chemical / Aerospace Engg. and postgraduate students specializing in the thermofluids/Fluid Mechanics/Aerospace/Automobiles; industry personnel & faculty members associated with Mechanical/Chemical/Aerospace Engg.

**INDUSTRIES APPLICABLE TO** : Kirloskar Pumps, KSB Pumps, Tata Power and industries manufacturing cooling tower

## **COURSE OUTLINE :**

This course deals with the experimental techniques in Fluid Mechanics. One part of the course focuses on different techniques and challenges associated with the measurement of flow features. Other part of the course has emphasis on the statistical analysis of experimental data. Thus, this course would provide an understanding on several experimental methods in Fluid Mechanics and would unveil hypotheses concerning with the cause-and-effect relationships. It represents the most valid approach to the solution of theoretical advancement in the field.

## **ABOUT INSTRUCTOR :**

Prof. Pranab K. Mondal is an Assistant Professor in the Department of Mechanical Engineering at Indian Institute of Technology Guwahati since May 2015. He received his undergraduate and postgraduate degrees from Jadavpur University, Kolkata, and completed his Ph.D. from Indian Institute of Technology Kharagpur in 2015. He worked as a Research Associate at IIT Kharagpur for nearly one year before joining IIT Guwahati. His principal research interest, encompassing the broad area of Microfluidics, has covered various facets of microscale multiphase transport, electrokinetics microscale transport of heat and experimental microfluidics. He is currently working on stability analysis of flows with free-surfaces, experimental investigations of capillary filling of bio-fluids and droplet dynamics. He has co-authored more than 70 referred journal and conference publications. He is a regular reviewer of many reputed international journals and also associated with several sponsored projects.

## **COURSE PLAN :**

**Week 1:** Introduction to Experimental Methods

**Week 2:** Measurement System

**Week 3:** Displacement and Area Measurement

**Week 4:** Pressure Measurements

**Week 5:** Low Pressure Measurements

**Week 6:** Flow Measurements

**Week 7:** The Measurement of Temperature

**Week 8:** Measurement of Chaotic flows

**Week 9:** Measurement of Flow Angle of Turbo machines

**Week 10:** Micro PIV

**Week 11:** Response Characteristics

**Week 12:** Statistical Analysis