

**DEPARTMENT OF MATHEMATICS  
INDIAN INSTITUTE OF ENGINEERING  
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Date: 24/02/2026

## **NOTICE**

### **Departmental Invited Lecture**

**Speaker: Dr. Sukhendu Ghosh**, Associate Professor, Department of Mathematics, IIT Jodhpur

**Title:** “The mathematical and physical framework of hydrodynamic stability analysis”

**Date:** 12th March 2026

**Time:** 11:50 AM Onwards

**Venue:** L-6, Department of Mathematics

**Abstract:** In a wide variety of physical systems, fluid-flow properties are a function of space and time, and their variation can have a significant impact on the dynamics of flow stability. The knowledge of hydrodynamic instability behaviour of such complicated flows is essential for effective mathematical modelling, design and application of compact tools. Moreover, many intriguing and important fluid dynamic phenomena in nature and engineering tools are associated with complex spatio-temporal patterns. The study of hydrodynamic instability is a mathematical way to understand the overall dynamics of any flow system using perturbation theory. This talk includes detailed discussion on modal linear stability theory, analytical and numerical techniques for checking instability for a class of complex flow problems. I will discuss thoroughly how to derive the generalized stability equations as a dynamical system and the associated energy equation for complex flow problems. Consequently, the analytical and numerical solution procedure will be discussed. I will also explain the variation of instability characteristics in stratified complex flows with different flow configurations.

In this regard, all are kindly requested to make it convenient to attend the above-mentioned Departmental Seminar accordingly.

Note: Attendance of ALL research scholars of the Department of Mathematics is mandatory.

(Dr. Santanu Saha Ray)  
Professor and Head  
Department of Mathematics  
IEST, Shibpur