

About IIT Kharagpur



Kharagpur - a dusty town tucked away in the eastern corner of India, famous until 1950 as home to the longest railway platform in the world - became the nursery where the seed of the IIT system was planted in 1951. IIT Kharagpur started its journey in the old Hijli Detention Camp in Eastern India, where some of the country's great freedom fighters toiled and sacrificed their lives for India's independence. Spurred by the success of IIT Kharagpur, four younger IITs sprouted around the country in the two following decades, and from these five came thousands of IITians, the brand ambassadors of modern India. It was the success of this one institution at Kharagpur that wrote India's technological odyssey.

The Institute takes pride in its relentless effort to provide the best platform for both education as well as research in the areas of science and technology, infrastructure designs, entrepreneurship, law, management, and medical science and technology. IITKGP is not just the place to study technology, it is the place where students are taught to dream about the future of technology and beam across disciplines, making differences enough to change the world.



Program Features/ Structure

Classroom lectures – **80%**

Numerical/ Problem solving, Case study and Lab Activity – **20%**

Program Schedule and Venue

05 Days, 14th – 18th October
2019 (9:30 AM – 4.30 PM)

IIT Kharagpur –
Department of Aerospace
Engineering

Program Fee

**TEQIP-III sponsored
participants - NIL**

For students - INR 5,000/-
(Five Thousand) + **GST @18%**
per participant

For others - INR 10,000/-
(Ten Thousand) + **GST @18%**
per participant

Last day of Registration

05th

October 2019

Who will benefit (Eligibility)

Academicians, students and practicing engineers in the field of mechanical/ aerospace/civil/marine engineering with reasonable background in fluid mechanics

Accommodation

Accommodation will be provided to the TEQIP-III sponsored participants at the campus Guesthouse. For other participants, the same will be provided on chargeable basis as per rule.

How to Apply

Use the link: <https://erp.iitkgp.ac.in/CEP/courses.htm> to apply ONLINE.



Payment if applicable is to be done **ONLINE** after getting short listed for the program.

Contact Us

Dr. Sunil Manohar Dash

Department of Aerospace Engineering
Indian Institute of Technology Kharagpur
Phone: +91-3222-304512
Email: smdash@aero.iitkgp.ac.in



NPIU

TEQIP-KIT

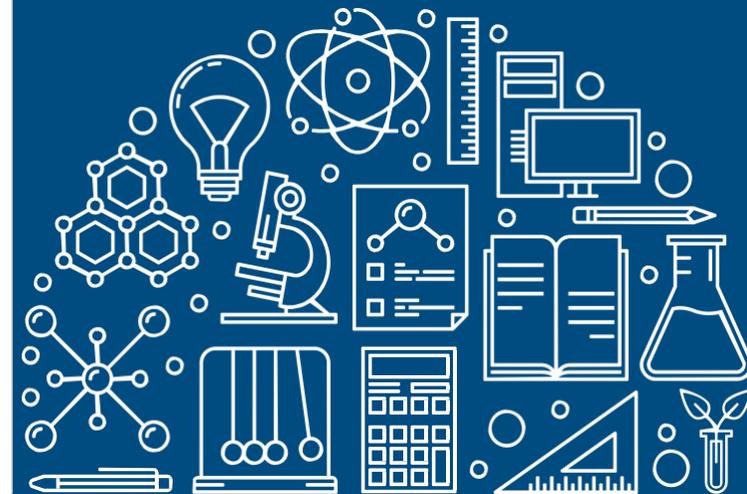
NPIU - A Unit of MHRD, Govt of India for
Implementation of World Bank Assisted Projects in Technical Education

Indian Institute of Technology Kharagpur

**CFD AND EXPERIMENTS ON FLUID-
STRUCTURE INTERACTIONS FOR
BOTH RIGID AND ELASTIC
MATERIALS**

FIVE DAYS SHORT TERM COURSE

14th – 18th OCTOBER 2019



Introduction / Overview

Fluid-Structure Interaction (FSI) is ubiquitous in nature and has significant industrial applications. In general, above a critical Reynolds number (Re) flow, the wake regime downstream of the structure becomes unsteady that contains alternating shedding vortices and exerts fluctuating aerodynamic forces on the structure through periodic pressure fluctuations. The mode of vortex shedding is a function of the rigidity of the structure material and it can be either beneficial or detrimental depending upon the type of wake regime interaction. In order to accurately describe the FSI problems, an accurate numerical solver and experimental technique must be adopted. In this course, we will discuss various FSI problems in the incompressible regime for both rigid and elastic materials. We will demonstrate the Computational Fluid Dynamics (CFD) solver development for accurate simulation of FSI problems. Some of the experimental techniques for flow visualization and measurements for FSI problems will also be discussed.

Program Objectives

- The short term course aims to provide thorough understanding of the fluid dynamics of Fluid-Structure Interaction (FSI) problems.
- Ability to develop a Computational Fluid Dynamics (CFD) solver for detail investigation of the FSI problems.
- An overview on the experimental flow visualization and measurements techniques for FSI problems.

What you will learn

Program Content

- Introduction to Fluid-Structure Interaction (FSI) Problems
- Computational Technique for Fluid-Rigid Structure Interaction (FRSI) Problems
- Computational Technique for Fluid-Elastic Structure Interaction (FESI) Problems
- Experimental Techniques for Flow Visualization and Measurements for FSI Problems

Principal Coordinator

Dr. Sunil Manohar Dash

Dr. Sunil Manohar Dash is an Assistant Professor, in the Department of Aerospace Engineering, at Indian Institute of Technology (IIT) Kharagpur, India. Prior to this position he has worked as, a Research Fellow in the International Design Center, at SUTD-MIT Alliance, Singapore and in the Department of Mechanical Engineering at National University of Singapore, Singapore. He earned his Ph.D. Degree from National University of Singapore, Singapore in 2014, and B.Tech degree in Mechanical Engineering from National Institute of Technology (NIT) Rourkela, India in 2009. He has received a silver medal from the former president of India, Dr. A.P.J. Abdul Kalam and a gold medal from the Institution of Engineers India (IEI) for his excellent academic performance. He has published more than 20 international journal and conference papers. His research interests are in the field of fluid-structure interactions, immersed boundary-lattice Boltzmann method, flapping aerodynamics, active flow separation control using biomimetic design and experimental and computational fluid mechanics.

Co-Coordinator

Prof. Kalyan Prasad Sinhamahapatra

Professor Sinhamahapatra has a long experience of research of over 30 years in the fields of computational aerodynamics and fluid dynamics. During this long period he has been actively engaged in applied as well as fundamental research in several branches of fluid dynamics that include inviscid flows, boundary layers, viscous-inviscid interaction, CFD algorithms for low- and high-speed flows, domain decomposition and grid generation, flow-induced vibration, fluid-structure interaction, reactive flows, bluff body flows, vortex tubes, large eddy simulation (LES) of turbulence, computational aeroacoustics and wind engineering. Large eddy simulation, aeroacoustics and internal flows are his current areas of interest. Professor Sinhamahapatra is actively involved in sponsored research, industrial consultancy and collaborative works. He has completed about 30 sponsored projects funded by several reputed organizations which include BARC, ISRO, DRDO and Indian Railways, amongst others. He took the leading role in setting up an excellent computing facility, a nodal centre of CFD, with the financial support from AR&DB, ADA and other organizations. He is also involved in collaborative research and development with several aerospace industries and research agencies such as HAL, ADA, DRDL, GTRE and others.

