About The Course

The Short-Term Course on Ship Theory and CFD Applications is designed to provide intensive learning on fundamental and advanced aspects of theory and use of Computational Fluid Dynamics (CFD) to make appropriate estimates on Ship Resistance, Propulsion, Seakeeping and Manoeuvring during the conceptual design phase. The course is structured to offer a balanced mix of lectures, case studies, and practical demonstrations, ensuring participants gain both conceptual clarity and real-world insights. It is especially suited for students, early-career researchers, and professionals seeking to strengthen their knowledge in a focused timeframe.

Delivered by experienced faculty members from the Indian Institute of Technology Kharagpur and industry experts from FLOWTECH International AB, Sweden, the course will cover key themes such as resistance and flow around the surface ships, propulsion, Seakeeping, Manoeuvring and computational methods available.

Objectives

The primary objective of this short-term course is to provide participants with a strong foundation in the hydrodynamic principles that govern the performance of marine vehicles. The course aims to bridge theoretical concepts with practical applications by combining lectures, computational tools, and experimental demonstrations

Scope

By the end of this short-term course, participants will be able to:

- Understand the fundamental hydrodynamic principles governing ship and underwater vehicle performance.
- Analyze resistance, propulsion, and manoeuvring characteristics using standard methods and scaling laws.
- Apply computational tools such as CFD to evaluate hydrodynamic behaviour in practical scenarios.
- Interpret experimental results from towing tank .
- Evaluate design trade-offs in marine vehicle performance with respect to speed, stability, and efficiency.
- Collaborate with experts from academia and industry to explore innovative solutions for marine hydrodynamic challenges

Course Content

- Ship resistance, types, methods and general practices in estimating ship resistance
- Introduction to Ship Propulsion, Screw Propeller Geometry, Open water characteristics, Hull-propeller interaction, Demonstration of model tests in the towing tank.
- Hydrodynamic stability of ships in regular and irregular waves, encounter frequency, basic seakeeping criteria, Uncoupled/coupled motions, Concept of RAO and phase
- Introduction; The Control Loop and Basic Equations of Motion; Motion Stability and Linear Equations; Analysis of Course keeping and Controls-Fixed Stability; Stability and Control; Analysis of Turning Ability; Hydrodynamic Modelling, Nonlinear Equations of Motion; Captive and Free-Running Model Tests
- RANS equation solver using commercially available CFD software Shipflow

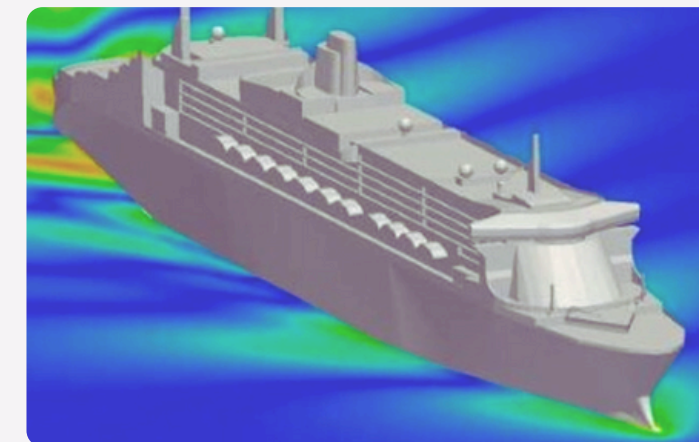# A Short Term Course On Ship Theory & CFD Application

(8th to 11th December, 2025)
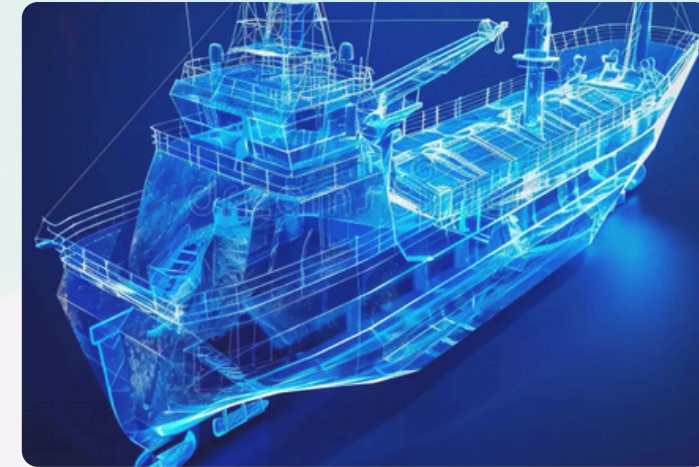
Organized By

Department of Ocean Engineering & Naval Architecture, IIT Kharagpur

&

FLOWTECH International AB, Sweden

Target Group

Who can attend

- Undergraduate and Postgraduate Students
- Research Scholars and Academics
- Industry Professionals from Marine/Offshore Sectors

About IIT KGP

Kharagpur is the fifth largest city of West Bengal. It was chosen as the location for the first campus of the Indian Institute of Technology (IIT). The IITs are the premier technical education institutes in India and are internationally recognized for their academic and technical excellence. IIT Kharagpur started in the old Hijli Detention Camp where some of India's great freedom fighters toiled and sacrificed their lives for Indian independence. The history of IIT Kharagpur is intimately linked with the history of the Hijli Detention Camp. This is possibly one of the very few Institutions anywhere in the world which started life in a prison house. IIT Kharagpur is celebrating its platinum jubilee from 18th august 2025 to 18th august 2027 .

About the Department

The Department of Ocean Engineering & Naval Architecture was established in 1952. During more than 73 years of its existence, the department has made significant contributions to the development of shipbuilding and shipping industries in the country including the Indian Navy, Indian Coast Guard, DRDO and other allied organizations

About FLOWTECH International AB

FLOWTECH International AB develops and markets computational fluid dynamics (CFD) software solutions for naval architects. The company provides SHIPFLOW, a collection of CFD tools for ship hydrodynamics design. Its software suite is used for various applications, including fore body and bulb shape optimization by wave pattern analysis; aft body optimization by wake quality assessment; trim optimization; prediction of resistance components; multi hull configurations; numerical paint tests, such as potential and limiting streamline tracing;

Registration

Category	Fees
Student (IIT Kharagpur)	–
Student (Outside)	INR 2,000+GST*
Industry Professional	INR 10,000+GST*
Academic Professional	INR 6,000+GST*

*Fee includes working lunch for 4 days.

NOTE : Hostel Accomodation may be provided based on availability on payment basis

Organizing Committee

Prof Vishwanath Nagarajan
Prof Ranadev Datta
Prof Anirban Bhattacharyya
Dr KL Vasudev
Dr Michal Orych

For Further Details Please Contact 📞

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Certificate 🏅

Certificate will be awarded to the participants on successful completion of the course.

Evaluation of the Programme

The training programme shall have a dedicated session for feedback. The participants will be provided with an evaluation proforma, which may be completed and handed over to the programme staff.