



HYDRAULIC ENGINEERING

PROF. MOHAMMAD SAUD AFZAL

Department of Civil Engineering
IIT Kharagpur

TYPE OF COURSE : Rerun | Core | UG

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

EXAM DATE : 23 Apr 2022

PRE-REQUISITES : Basic Fluid Mechanics

INTENDED AUDIENCE : Civil Engineering, Mechanical Engineering, Ocean Engineering

COURSE OUTLINE :

Hydraulic Engineering, as a sub-discipline of Civil Engineering and is concerned with the flow and conveyance of fluids. This course covers topics like viscous fluid flow, laminar and turbulent flow, boundary layer analysis, dimensional analysis, open channel flows, flow through pipes, and computational fluid dynamics. The objective of this course is to introduce various hydraulic engineering problems like open channel flows and hydraulic machines.

ABOUT INSTRUCTOR :

Prof. Mohammad Saud Afzal is an Assistant Professor in Department of Civil engineering, Indian Institute of Technology, Kharagpur. He is an established researcher in the field of hydraulics and water resources. His research area focuses on Computational Fluid Dynamics, Hydraulics of sediment transport, Coastal Engineering and Machine learning and Artificial Intelligence in Hydraulics. He is an alumnus of IIT Kanpur, Tu- Delft and Norwegian University of Science and Technology (NTNU).

COURSE PLAN :

- Week 1:** Basics of Fluid Mechanics 1
- Week 2:** Basics of Fluid Mechanics 2
- Week 3:** Laminar and Turbulent Fluid Flow
- Week 4:** Boundary Layer Analysis
- Week 5:** Dimensional Analysis and Hydraulic Similitude
- Week 6:** Introduction to Open Channel Flow and Uniform Flow
- Week 7:** Non-Uniform Flow and Hydraulic Jump
- Week 8:** Pipe flow
- Week 9:** Pipe Networks
- Week 10:** Viscous Fluid Flow
- Week 11:** Computational Fluid Dynamics
- Week 12:** Introduction to Wave Mechanics (Inviscid Flow)