



PRINCIPLE OF HYDRAULIC MACHINES AND SYSTEM DESIGN

PROF. PRANAB K. MONDAL

Department of Mechanical Engineering
IIT Guwahati

TYPE OF COURSE : Rerun | Core | UG | PG

COURSE DURATION : 8 weeks (20 Jul' 20 - 11 Sep' 20)

EXAM DATE : 27 Sep 2020

PRE-REQUISITES : Basic UG-level Fluid Mechanics

INTENDED AUDIENCE : Undergraduate students of Mechanical/Electrical/Civil Engg. (5th semester onwards) and postgraduate students specializing in the thermofluids/Fluid Mechanics; industry personnel associated with pump industries; faculty members associated with Mechanical/Electrical/Civil engg.

INDUSTRIES APPLICABLE TO : Kirloskar Brothers Limited (KBL) Tata Steel Limited. (TATA STEEL) KSB Pumps Limited (KSB) Worthington Pump India Limited (WPIL) Power Plant Industries Any company associated with design & fabrication of components/accessories of pumps and pumping system.

COURSE OUTLINE :

Principle of operation of hydraulic machines and their system design is important from the perspective of their huge applications in different industries. Present course introduces the students to the fundamentals of hydraulic machines. Starting from the operational principle, students will be gradually familiarized with different concepts like velocity triangle, net head developed, finally leading to the design of their system. Important topics such as design of pumping system of two dissimilar pumps, which find practical relevance as well, will also be discussed.

ABOUT INSTRUCTOR :

Dr. 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 degree from Jadavpur University, Kolkata, and completed his Ph.D. from Indian Institute of Technology Kharagpur in 2015. He worked as an Research Associate at IIT Khargpur for nearly one years before joining IIT Guwahati. His principal research interest, encompassing the broad area of Microfluidics, has covered various facets of microscale multiphase transport, electrokinetics and microscale transport of heat. He is currently working on stability analysis of flows with free-surfaces, capillary filling of bio-fluids. He has co-authored more than 65 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: Principle of operation of hydraulic machines

Week 2: Radial and axial flow pumps

Week 3: Radial flow pump operational issues

Week 4: Pump Design: Degrees of reaction

Week 5: Pump characteristics and system design

Week 6: Positive displacement pump

Week 7: Hydraulic Turbine: Impulse Turbine

Week 8: Hydraulic Turbine: Reaction Turbine