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 a Research Associate at IIT Khargpur for nearly one year 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 70 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: Cavitation in radial flow pump
Week-4: Radial flow pump operational issues
Week-5: Pump Design: Degrees of reaction
Week-6: Pump characteristics and system design
Week-7: Numerical problems of pumps (Radial and Axial flow)
Week-8: Positive displacement pump
Week-9: Hydraulic Turbine: Impulse Turbine
Week-10: Hydraulic Turbine: Reaction Turbine
Week-11: Cavitation in hydraulic reaction turbines
Week-12: Numerical problems of Turbines (Impulse and Reaction)