Fluid Mechanics
Code:CE401
Contact: 3L
Credits: 3

Module 1
Fluid statics: Forces on plane and curved surfaces, Center of pressure. Stability of floating bodies, Metacentre   [4]

Module 2
Weirs and Notches: Rectangular, triangular, Cippoletti, sharp crested and broad crested weirs, submerged weirs   [3]

Module 3
Turbulent flow in circular pipes: Fluid friction in pipes, head loss due to friction. Darcy-Weisbach equation, Variation of friction factor with wall roughness – Moody's chart. Minor losses in pipes   [5]

Module 4
Water Hammer: Speed of pressure wave, slow and rapid closure, use of surge tank.   [3]

Module 5
Steady uniform flow in open channel: Characteristics, Chezy's, Manning's and Bazin's formulae. Hydraulically efficient cross sections. Flow through channels of circular cross sections –depths for maximum velocity and discharge.   [5]

Module 6
Varied flow through open channel: Gradually varied and rapidly varied flows. Definition, Specific Energy, Critical, Sub-critical and Super-critical flows. Channel transitions - constricted or raised bed. Establishment of critical flow, Venturi flume and Parshall flume. Definition and diagram for Specific force, Hydraulic Jump   [10]

Module 7
Dimensional Analysis and Model studies: Dimensions and dimensional homogeneity, Importance and use of dimensional analysis. Buckingham's Pi theorem with applications. Geometric, Kinematic and Dynamic similarity. Non Dimensional Numbers.   [4]

Module 8
Introduction to Hydraulic Turbines: Working Principles of Pelton, Francis and Kaplan turbines   [3]

Module 9
Pumps: Centrifugal pumps, performance characteristic graph –design flow rate. Working principles of positive displacement pumps, gear, reciprocating and vane pumps. Hydraulic Ram   [5]