

# GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Semester: 1

## Water Resources Management

Subject Name Advance Fluid Mechanics

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Sr.No	Course content
1.	Flow in pipes: Equation of fluid motion, Momentum and Energy equations, Navier-Stokes equation exact and approximate solutions, laminar and turbulent flow in pipes, Boundary layer theory, boundary stress, skin drag, water hammer analysis.
2.	Flow in channels: Steady-non uniform flow, water surface profiles and its computation, Design of channel transitions, unsteady flow - propagation of positive and negative waves, surges in channel resulting from gate operation, application of Method of Characteristics, Finite Difference and Finite element methods to transient flow in open channels, flow in mobile boundary channel, spatially varied flow, Dispersion in open channel.

### List of Experiments:

1. Water surface profile in open channel flow
2. Pipe friction
3. Laminar and turbulent flow in pipes
4. Propagation of positive and negative waves
5. Surges in channel resulting from gate operation

### Reference Books:

- 1 Engineering Hydraulics - Hunter Rouse.
- 2 Engineering Fluid Mechanics - Narasimhan.
- 3 Open channel Hydraulics - V.T.Chow
- 4 Open channel flow - Henderson
- 5 Open channel hydraulics - Richard H. French
- 6 Flow through open channel – K. Subramanya
- 7 Flow through open channel – K. G. Ranga Raju
- 8 Open Channel Flow – M. Hanif Chaudhry
- 9 Fluid Mechanics – Granger
- 10 Fluid Mechanics – Streeter & Wiley