



## Hydraulics

SWAYAM Prabha Course Code – C21

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<b>INSTITUTE</b>	Indian Institute of Technology, Guwahati
<b>Course Outline</b>	<p><b>Introduction to Open Channel Flow:</b> Difference between Open Channel Flow and Pipe Flow, Types of Channel, Geometric parameters of a channel, Classification of Open Channel Flow, Continuity and Momentum equation.</p> <p><b>Uniform flow:</b> Resistance flow formula, Velocity distribution, Equivalent roughness coefficient, Velocity coefficients, Uniform flow in rigid boundary channel, Uniform flow in mobile boundary channel</p> <p><b>Energy and Momentum Principle:</b> Concept of Specific Energy, Critical Depth, Alternate depth, Specific Force, Sequent depth.</p> <p><b>Non-Uniform Flow:</b> Governing equation of GVF, Classification of Gradually Varied Flow, Computation of GVF profile, Rapidly Varied Flow, hydraulic Jump, Flow over a Hump, Flow in Channel Transition.</p> <p><b>Canal Design:</b> Concept of best hydraulic section, Design of rigid boundary canal, design of channel in alluvial formation- Kennedy's theory, Lacy's theory, Method of Tractive force, Free-board in canal.</p> <p><b>Unsteady Flow:</b> Wave and their classification, Celerity of wave, Surges, Characteristic equation.</p> <p><b>Pipe Flow:</b> Losses in pipes, Pipe in series and parallel, Pipe network analysis, Water hammer, Surge tank.</p> <p><b>Hydraulic Model Study:</b> Important dimensionless flow parameters, Similitude: Geometric, Kinematic and Dynamic Similarity, Model scales</p>

<b>S. No</b>	<b>Module ID/ Lecture ID</b>	
1	L1	Introduction to Hydraulics
2	L2	Open Channel Hydraulic Part - 1
3	L3	Open Channel Hydraulic Part - 2
4	L4	Velocity and Pressure Distribution
5	L5	Practical use of velocity co-efficient in channel flow
6	L6	Conservation Principles & ioioGoverning Equations
7	L7	Uniform Flow
8	L8	Uniform Flow Formula
9	L9	Computation of Uniform Flow Part - 1
10	L10	Computation of Uniform Flow Part - 2
11	L11	Uniform Flow in Mobile Boundary Channel
12	L12	Incipient Motion Condition and Regime of Flow
13	L13	Concept of Specific Energy
14	L14	Computation of Critical Depth
15	L15	Specific Force, Critical Depth & Sequent Depth
16	L16	Non-uniform Flow: Gradually Varied Flow
17	L17	Classification of Gradually Varied Flow
18	L18	Characteristic of Gradually Varied Flow
19	L19	Characteristic of Gradually Varied Flow & its Computation
20	L20	Gradually Varied Flow & its Computation
21	L21	Computation of Gradually Varied Flow

22	L22	Gradually Varied Flow: Numerical Methods and Problem Solving
23	L23	Rapidly Varied Flow: Hydraulic Jump
24	L24	Hydraulic Jump
25	L25	Flow Over Hump and Channel Contraction
26	L26	Canal Design - 1
27	L27	Canal Design - 2
28	L28	Design of Alluvial Channel
29	L29	Design of Alluvial Channel - 2
30	L30	Design of Alluvial Channel - 3
31	L31	Unsteady Flow: Waves and its Classification
32	L32	Unsteady Flow Part - 2
33	L33	Unsteady Flow Part - 3
34	L34	Pipe Flow: Friction Loss
35	L35	Pipe Flow: Losses in Pipes
36	L36	Pipe in Series & Parallel
37	L37	Pipe Network Analysis
38	L38	Water Hammer & Surge Tank
39	L39	Pipe Flow Friction Loss
40	L40	Pipe Flow: Losses in Pipe

**References if Any:**