

B. Tech. Civil Engineering/ Elective Subject

Course code: Course Title	Course Structure.			Pre-Requisite
CE423: Advanced Open Channel Flow	L	T	P	Nil
	3	0	2	

Course Objective: The objective of this course is to provide students with an in-depth understanding of advanced concepts and analytical techniques in open channel hydraulics. The course aims to equip students with the skills necessary to analyze, design, and manage complex open channel flow systems through a combination of theoretical knowledge and practical application.

S. No	Course Outcomes (CO)
CO1	Understand and distinguish between types of flows in a channel, Specific energy, and critical flow computations.
CO2	Design and Optimization of Open Channel, including channel transitions.
CO3	Understanding and analysis of Uniform and Non-Uniform flow.
CO4	Application of various Hydraulic structures in Open channels.
CO5	Varying and Unsteady flow analysis and problem solving.

S. No.	Contents	Contact Hours
Unit 1	Kinds of open channel flow, channel geometry, types and regimes of flow, Velocity distribution in open channel, wide open channel, specific energy, critical flow, and its computation.	8
Unit 2	Energy in a non-prismatic channel, momentum in open channel flow, and specific force. Qualification of uniform flow, velocity measurement, Manning's and Chezy's formula, determination of roughness coefficients.	9
Unit 3	Determination of normal depth and velocity, most economical sections, and non-erodible channels. Flow in a channel section with composite roughness, and flow in a close conduit with open channel flow.	9

Unit 4	Varied Flow: Dynamic equations of gradually varied flow, assumptions and characteristics of flow profiles, classification of flow profile, draw down and back water curves profile determination, graphical integration, direct step and standard step method, numerical methods, flow through transitions Varied Flow: Dynamic equation of spatially varied flow. Analysis of spatially varied flow profile, computation of spatially varied flow using numerical integration.	8
Unit 5	Unsteady Flows: St. Venant's equations and their solution using the method of characteristics and finite difference schemes; dam break problem, hydraulic flood routing. Channel Transitions: Sub-critical and supercritical.	8
	Total	42

References:

S. No.	Name of Books/Authors/Publishers	Year of Publication / Reprint
1	Chow, V.T., "Open Channel Hydraulics", McGraw-Hill.	1991
2	Choudhary, M.H., "Open-Channel Flows", Prentice-Hall.	2000
3	Ranga Raju, K.G., "Flow Through Open Channels, Tata McGraw Hill.	2003
4	K. Subramaniyam, "Flow in Open Channel," McGraw Hill	2019