

HYDRAULICS

18CEPE14	OPEN CHANNEL FLOW			L	T	P	C
				3	0	0	3
Course Objectives:							
1.	To introduce Open Channel Flow to students, explaining the types of open channel and their behaviours, the causes and principles of such behaviours, and applications open channels.						
2.	To impart knowledge about Hydraulic Slope and Hydraulic Curve.						
3.	To impart knowledge about Critical depth and velocity, Hydraulic jumps.						
4.	To apply fundamental concepts and techniques of hydraulics and hydrology in the analysis and operation of water resources systems						
5.	To analyse flow characteristics in open channel and design hydraulic machines.						
Unit I INTRODUCTION							
				9	+		0
Basic concepts of free surface flows, velocity and pressure distribution, Mass, energy and momentum principle for prismatic and non-prismatic channels, Review of Uniform flow: Standard equations, hydraulically efficient channel sections, compound sections. Energy-depth relations: Concept of specific energy, specific force, critical flow, critical depth, hydraulic exponents, and channel transitions.							
Unit II GRADUALLY VARIED FLOW (GVF)							
				9	+		0
Equation of gradually varied flow and its limitations, flow classification and surface profiles, Control sections. Computation methods and analysis: Integration of varied flow equation by analytical, graphical and advanced numerical methods, Transitions of subcritical and supercritical flow, flow in curved channels.							
Unit III Rapidly Varied Flow (RVF)							
				9	+		0
Characteristics of rapidly varied flow, Classical hydraulic jump, Evaluation of the jump elements in rectangular and non-rectangular channels on horizontal and sloping beds, Hydraulic jump in gradually and suddenly expanding channels, submerged hydraulic jump, rolling and sky jump, use of jump as an energy dissipater Rapidly varied unsteady flow: Equation of motion for unsteady flow, "Celerity" of the gravity wave, deep and shallow water waves, open channel positive and negative surge.							
Unit IV Spatially Varied Flow (SVF)							
				9	+		0
Basic principles, Differential SVF equations for increasing and decreasing discharge, Classifications and solutions, Numerical methods for profile computation, Flow over side-weir and Bottom-rack.							
Unit V Flow measurement:							
				9	+		0
Flow measurement by sharp crested and broad crested weirs, critical depth flumes, sluice gate, Free overfall Flumes – Parshall flume, Venturiflume, Cut throat flume							
Total= 45 Periods							
Course Outcomes:							
Upon completion of this course, the students will be able to:							
CO1	:	Demonstrate the causes of soil erosion					
CO2	:	Carry out conservation measures in a watershed					
CO3	:	Know about water harvesting and groundwater recharging structures					
Text Books:							
1.	Chatterjee, S. N., Water Resources Conservation and Management, Atlantic Publishers, 2008.						

2.	Murthy, V.V.N., Land and Water Management, Khalyani Publishers, 2009.
Reference Books:	
1.	Muthy, J. V. S., Watershed Management, New Age International Publishers, 1998.
2.	Suresh Rao, Soil and Water Conservation Practices, Standard Publishers, 1998.

CO-PO-PSO MAPPING

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	2	1	2	1	2	2	1	1	1	1	1	2	1	1
CO2	1	2	2	2	2	2	2	1	1	1	1	1	2	1	2
CO3	1	2	2	1	2	2	2	2	1	1	1	1	2	1	2

1 - Slightly

2 - Moderately

3 - Strongly