19CE4602D -OPEN CHANNEL HYDRAULICS

Course Category:	Program Elective	Credits:	3
Course Type:	Theory	Lecture-Tutorial-Practical:	2-1-0
Prerequisites:	19CE3302- Fluid mechanics 19BS1101- Engineering Mathematics-I	Continuous Evaluation:	30
		Semester End Evaluation:	70
		Total Marks:	100

Course Outcomes

Upon successful completion of the course, the student will be able to:

CO1	**Understand** the concept of open channels	K4
CO2	**Design** economic channel sections	K4
CO3	A**pply** gradually varied flow equation and able to solve problems	K4
CO4	**Understand** energy dissipation during hydraulic jump	K4
CO5	**Understand** the concept of flood routing	K3

Contribution of Course Outcomes towards achievement of Program Outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2			2					2		2	
CO2	2	2	2			2					2		1	
CO3	2	2	2			2					2		2	
CO4	2	2	2			2					2		1	
CO5	2	2	2			2					2		1	
Avg.	2	2	2			2					2		1	

1- Low **2-Medium** **3-Hig2h**

Course Content

UNIT-1	**INTRODUCTION** Types of channels, classification of flows, velocity distribution, pressure distribution, specific energy, critical depth – calculation, kinetic energy correction factor, momentum correction factor. Bottom slopes and Surface profiles.	**CO1**
UNIT-2	**UNIFORM FLOW:** Chezy's equation, Manning's formula, velocity distribution, uniform flow computations, hydraulically efficient channel sections, Specific Energy, Specific Force, Critical Flow, Compound channel section, Irrigation canal.	**CO2**
UNIT-3	**GRADUALLY VARIED FLOW (GVF):** Differential equation for GVF, classification and features of flow profiles, control sections, simple numerical solutions of GVF problems.	**CO3**
UNIT-4	**RAPIDLY VARIED FLOW:** Hydraulic jump in horizontal rectangular channel, use of jump as energy dissipator, Applications of hydraulic Jump. Types of hydraulic jump.	**CO4**
UNIT-5	**FLOOD ROUTING** through reservoirs and flood routing through channel, Muskingum method of flood routing.	**CO5**

Learning Resources

Text Books	1. K. Subramanya, Flow in Open Channels, 5/e, Tata McGraw Hill, 2015. 2. VenTe Chow, Open-Channel Hydraulics, McGraw-Hill, 2009.
Reference Books	1. P.N. Modi and S.M. Seth, Hydraulics and Fluid Mechanics and Hydraulic Machines, 20/e, Standard Book House, 2015. **2.** A.K. Jain, Fluid Mechanics, 12/e, Khanna publishers, 2014.
e-Resources& other digital material	1. https://nptel.ac.in/courses/105/103/105103096/ 2. https://nptel.ac.in/content/storage2/courses/105107059/module1/lecture1/lecture1.pdf