

19CE4801D -ADVANCED WATER RESOURCES ENGINEERING

Course Category:	Program Elective	Credits:	3
Course Type:	Theory	Lecture-Tutorial- Practical:	3-0-0
Prerequisites:	19CE3602-Water Resources Engineering	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	Assess the reservoir storage requirements and sedimentation	K3
CO2	Design a Gravity and its profile	K6
CO3	Apply the design principles of earth dams and spillways.	K3
CO4	Apply the design principles of diversion structures.	K3
CO5	Arrive at appropriate canal regulation works and outlets and apply the design principles of various cross drainage works.	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	1			2	2				2		1	2
CO2	1	2	2			2	2				2		2	2
CO3	2	2	1			2	2				2		2	1
CO4	2	2	2			2	2				2		1	2
CO5	2	2	2			2	2				2		2	2
Avg.	2	2	2			2	2				2		2	2

1- Low

2-Medium

3-High

Course Content

UNIT-1	Reservoir Planning: Investigations for reservoir planning, selection of site for a reservoir, zones of storage in a reservoir, reservoir yield, mass curve and demand curve, determination of reservoir capacity, yield from a reservoir, reservoir sedimentation, control of reservoir sedimentation, useful life of a reservoir.	CO1
UNIT-2	Gravity Dams: Classification of dams, gravity dams: forces acting, elementary profile, safety criteria, stability analysis of gravity dam, construction joints, openings in dams-galleries, foundation treatment of gravity dam.	CO2
UNIT-3	Earth Dams: Types, causes for failure of earth dams, phreatic line, seepage analysis for homogeneous dams, seepage control in earth dams. Spillways: Essential requirements, spillway capacity, components, types of spillways and their working, profile of ogee spillway, spillway crest gates.	CO3
UNIT-4	Diversion Head Works: Location and components, weirs and barrages, causes of failure of weirs, design of impervious floor of weirs on permeable foundation, Bligh's, Lane's and Khosla's theories, hydraulic design of vertical drop weir	CO4
UNIT-5	Canal Regulatory Works: Head and cross regulators-design principles. Canal outlets, types of canal modules, proportionality, sensitivity and flexibility. Cross Drainage Works: Types, selection, design principles of aqueduct, siphon aqueduct.	CO5

Learning Resources

Text Books	<ol style="list-style-type: none"> 1. B.C.Punmia and Pande B.B.Lal, Irrigation and Water Power Engineering, Laxmi Publications Pvt. Ltd., New Delhi 2. P.N. Modi, Irrigation Water Resources and Water Power Engineering, Standard Book House, Delhi
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Reference Books	<ol style="list-style-type: none">1. S.K.Garg, Irrigation Engineering, and Hydraulic Structures, Khanna Publishers, Delhi2. Ch.Satyanarayana Murty, Water Resources Engineering, New Age International, Delhi3. K.R. Arora, Irrigation, Water Power and Water Resources Engineering, Standard Book Publishing, Delhi
e-Resources & other digital material	<ol style="list-style-type: none">1. https://nptel.ac.in/courses/105/105/105105110/2. https://nptel.ac.in/content/storage2/courses/105105110/pdf/m4106.pdf