

19CE3602 -WATER RESOURCES ENGINEERING

Course Category:	Program Core	Credits:	3
Course Type:	Theory	Lecture-Tutorial-Practical:	3-0-0
Prerequisites:	19BS1204 - Applied physics 19CE3302 - Fluid mechanics	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	Ability to determine and analyze various components of hydrological cycle and measurement of the rainfall	K3
CO2	Capability to apply hydrograph methods to estimate runoff	K3
CO3	Ability to evaluate the ground water yield	K4
CO4	Skill to apply the various irrigation methods to the fields and apply the irrigation management practices	K3
CO5	Capability to design irrigation canals to alluvial soils	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	3		3		1						2	1	1
CO2	3	3		3		1						2	2	1
CO3	3	3		3		2	2					2	1	2
CO4	2	1		2		2	2					2	2	2
CO5	3	3		2		2	2					2	2	2

1- Low

2-Medium

3-High

Course Content

UNIT-1	HYDROLOGY: Hydrologic cycle, precipitation, types of rainfall and its measurement, computation of mean depth of rainfall over an area, double mass curve; evaporation and evapo-transpiration, infiltration, infiltration indices W-index, ϕ - index.	CO1
UNIT-2	Hydrograph Analysis: Runoff, methods of determination of runoff, Total runoff hydrograph, base flow separation, Unit hydrograph theory, derivation, applications of unit hydrograph, hydrograph of different durations, S- curve hydrograph.	CO2
UNIT-3	Ground Water Hydrology: Types of aquifers, Aquifer parameters, Darcy's law, well hydraulics, steady radial flow to wells in un-confined and confined aquifers, Types of wells.	CO3
UNIT-4	PLANT WATER RELATIONSHIPS: Introduction of irrigation, types of irrigation systems, methods of irrigation; soil moisture constants, depth and frequency of irrigation, water requirements of crops, duty, delta, base period and their relationship, crop seasons, factors affecting duty, consumptive use of water, irrigation efficiencies.	CO4
UNIT-5	CANAL SYSTEMS: Classification of irrigation canals, canal lining, regime silt theories, design of unlined canals, Kennedy's and Lacey's theories, balancing depth of canal.	CO5

Learning Resources

Text Books	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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	3. Jayarami Reddy P., Engineering Hydrology, Laxmi Publications Pvt. Ltd., (2013), Delhi
Reference Books	<ol style="list-style-type: none"> 1. S.K.Garg, Irrigation Engineering, and Hydraulic Structures, Khanna Publishers, Delhi. 2. K.R. Arora, Irrigation, Water Power and Water Resources Engineering, Standard Book Publishing, Delhi 3. Subramanya K., Engineering Hydrology, Tata McGraw-Hill Education Pvt Ltd, (2013), Delhi 4. Chow V.T., D.R Maidment and L.W. Mays, Applied hydrology, Tata McGraw Hill Education Pvt Ltd, (2011), Delhi. 5. Mays L.W, Water Resources Engineering, Wiley India Pvt. Ltd, (2013)
e-Resources & other digital material	<ol style="list-style-type: none"> 1. https://nptel.ac.in/courses/105105110/ 2. http://www.nptelvideos.in/2012/11/water-resources-engineering.html