

20CE3405-WATER RESOURCES ENGINEERING

Offering Branches	CE		
Course Category:	Professional Core	Credits:	3
Course Type:	Theory	Lecture-Tutorial- Practical:	3-0-0
Prerequisites:	20BS1101- Calculus and Linear Algebra 20CE3301 - Mechanics of Fluids	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	Determine and analyse various components of hydrological cycle and processing of the rainfall	K4
CO2	Apply hydrograph methods to estimate runoff	K3
CO3	Analyse and evaluate the ground water yield	K5
CO4	Understand and apply the various irrigation methods to the fields and apply the irrigation management practices	K3
CO5	Analyse and Design irrigation canals in alluvial soils and non-Alluvial soils	K6

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	3	3					3	2	
CO2	2	2		2	2	2	2					2	2	
CO3	3	3		3	3	3	3					3	3	
CO4	2	2		2	2	2	2					2	2	
CO5	2	2		2	2	3	3					3	2	
Avg.	2	2		2	2	3	3					3	2	

1- Low

2-Medium

3-High

Course Content

UNIT-1	Hydrology: Hydrologic cycle, precipitation, forms and 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, CO2
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.	CO1, 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	CO1, CO3
UNIT-4	Plant water relationships : Introduction of irrigation, necessity of irrigation advantages and ill effects , 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.	CO3, CO4
UNIT-5	Canal Systems: Classification of irrigation canals, canal lining -advantages, design of unlined canals, Kennedy's and Lacey's theories for designing canals in alluvial soils, balancing depth of cutting.	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., NewDelhi 2. P.N.Modi, Irrigation, Water Resources and Water Power Engineering,
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	Standard BookHouse, Delhi 3. Jayarami Reddy P., Engineering Hydrology, Laxmi Publications Pvt. Ltd., (2013), Delhi.
Reference Books	1. S.K.Garg, Irrigation Engineering, and Hydraulic Structures, Khanna Publishers, Delhi. 2. K.R. Arora, Irrigation, Water Power and Water Resources Engineering, StandardBook 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	1. https://nptel.ac.in/courses/105105110/ 2. http://www.nptelvideos.in/2012/11/water-resources-engineering.html