

Institute/College Name:	Darbhanga College of Engineering.
Program Name:	B.Tech (CE, 5 th semester).
Course Code:	PCC-CE-305
Course Name:	Hydrology and Water Resource Engineering.
Lecture/Tutorial(per week):	4/0
Course Credits:	03
Course Co-coordinator Name:	Mr. Prashant Kumar

1. Scope and Objectives of the Course

The course serves as an introduction to the field of engineering hydrology. It covers fundamentals such as the hydrological cycle, catchment, losses, hydrographs and hyetographs. Design topics covered will be selected from: flood frequency analysis, determination of design rainfall intensity and hyetographs, peak flow estimation, design hydrograph estimation, groundwater process and modelling, and drought risk analysis/yield hydrology.

Course Outcomes

CO1-Outline the physical processes in the context of flood hydrology, including the hydrological cycle in general, and rainfall, loss and groundwater transport mechanisms. Knowledge of the methods that can be used to measure rainfall and flow, as well as their relative advantages and disadvantages

CO2-Define and comprehend key concepts related to flood hydrology, such as relative and cumulative frequency, the use of statistical data distributions, time of concentration, major / minor systems, risk-cost trade-offs, runoff hydrographs, rainfall hyetographs, model calibration, catchment storage, flood routing, actual versus design rainfalls and flows and the value of data.

CO3-Apply a range of common techniques, such as flood frequency analysis, probabilistic rational, regional methods to estimate design peak flows in rural areas; Compare and evaluate (e.g. how they work, what their limitations are) a number of methods for determining peak flows and flood hydrographs for urban and rural areas, including flood frequency analysis, the probabilistic and deterministic rational methods, the regional method and runoff routing methods.

CO4-Solve an engineering design problem in the context of the conceptual design of a small urban drainage system by applying the deterministic rational method to estimate peaks flow in urban areas and comparing various urban drainage design options. Define and comprehend key concepts related to drought risk assessment, including the use of stochastic models, including water storage behaviour analysis.

CO5-Apply and evaluate stochastic modelling techniques and water storage behaviour analysis to estimate the yield of an underground water source and able to depict ground water potentials.

2. Textbooks

TB1: "Engineering Hydrology" by K. Subramaniya, Fourth edition, Mc Graw Hill Publication.

3. Reference Books

RB1: "Applied Hydrology" by Ven Te Chow, International edition, Mc Graw Hill Publication.

Other readings and relevant websites

S.No.	Link of Journals, Magazines, websites and Research Papers
1.	http://nptel.ac.in/courses/105101002/

2. Course Plan

Lecture Number	Date of Lecture	Topics	Web Links for video lectures	Text Book / Reference Book / Other reading material	Page numbers of Text Book(s)
1-6		Introduction		TB1, RB1	1-59
		Hydrologic cycle and processes, Precipitation, Infiltration and Evapotranspiration, Forms of precipitation, measurement, analysis, depth-area-duration and intensity-duration frequency relations.	http://nptel.ac.in/courses/105104029/		
Assignment 1					
7-14		Evaporation		TB1, RB1	73-152
		Process, measurement and estimation, Infiltration process, measurement and estimation, Evapotranspiration measurement and estimation, Stream flow measurements		http://nptel.ac.in/courses/105101002/	
Assignment 1					
15-22		Runoff and Hydrographs		TB1, RB1	164-286
		Factors affecting flow hydrograph, Rainfall Runoff correlations, Flow duration curve, Mass curve, Unit hydrograph, its analysis and S-curve hydrograph. synthetic and instantaneous unit hydrographs	http://nptel.ac.in/courses/105104029/		
Assignment 2					
23-30		Statistical analysis		TB1, RB1	296-330
		Flood frequency studies, Rational method, time Area curves, Design flood, Design Storm, Risk		http://nptel.ac.in/courses/105101002/	
Mid-Semester Exam (Syllabus covered from 1-24 lectures)					
31-36		Channel and flood routing		TB1, RB1	340-358
		Time series analysis of droughts and floods		http://nptel.ac.in/courses/105101002/	
Assignment 3					
37-40		Groundwater hydrology		TB1, RB1	389-431
		Flow equations confined and unconfined flow, Well hydraulics Steady and unsteady flow, Well losses, Specific capacity.	http://nptel.ac.in/courses/105105042/		
Assignment 4					

3. Evaluation Scheme:

Component 1	Mid Semester Exam	20
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Assignments/Quiz Tests/Seminars	10%
End term examination	70%