Advanced Hydrology - Web course

COURSE OUTLINE

The course will be prepared mainly to address the computational emphasis of advanced hydrology at a post-graduate level, and to provide a balanced approach to important applications in hydrologic engineering and science.

Fundamental mechanisms of hydrologic cycle with the probabilistic approaches will be discussed in a logical progression. A number of selected numerical problems will be solved to illustrate the concepts lucidly.

Contents:

Hydrologic Principles - hydrologic cycles and weather, hydrologic losses; Philosophy of Mathematical Models of Watershed Hydrology; Hydrologic Analysis - watershed concepts, rainfall-runoff, hydrograph analysis, unit hydrograph theory, linear and kinematic wave model, and overland flow models; Routing - lumped flow, distributed flow, dynamic wave routing and Muskingum method; Saint - Venant Equations - Reynold's transport theorem, continuity equation, momentum equation, and energy equation; Hydrologic Statistics - statistical parameter estimation, probability distribution, goodness of fit, concepts of probability weighted moments & L-moments, frequency analysis, Markov process, Markov chain and reliability analysis; Hydrologic Simulation Models - steps in watershed modeling, major hydrologic models.

COURSE DETAIL

Sl. No	Topic	No. of Hours
1	Hydrologic Principles - hydrologic cycles and weather, hydrologic losses.	02
2	Philosophy of Mathematical Models of Watershed Hydrology.	01
3	Hydrologic Analysis - watershed concepts, rainfall-runoff, hydrograph analysis, unit hydrograph theory.	05
4	Hydrologic Analysis (contd.) - linear and kinematic wave model, overland flow models.	05
5	Routing - lumped flow, distributed flow, dynamic wave routing, Muskingum method.	04
6	Saint-Venant Equations - Reynold's transport theorem, continuity equation, momentum equation, energy equation.	04

NP-TEL

NPTEL

http://nptel.iitm.ac.in

Civil Engineering

Pre-requisites:

A preliminary background in

1. Undergraduate Hydrology and
2. Probability & Statistics is desired, but is not essential.

Coordinators:

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7	Hydrologic Statistics - statistical parameter estimation, probability distribution, goodness of fit, concepts of probability weighted moments & L -moments.	07
8	Hydrologic Statistics (contd.) - frequency analysis, Markov process, Markov chain, reliability analysis.	07
9	Hydrologic Simulation Models - steps in watershed modeling, major hydrologic models.	05
	Total	**40**

References:

1. Bras, R. L., and Rodriguez-Iturbe, 1994, "Random Functions and Hydrology", Dover Publications, New York.
2. Chow, V. T., D. R. Maidment, and L. W. Mays; "Applied Hydrology", McGraw Hill International Editions.
3. Haan, C. T., 2002, "Statistical Methods in Hydrology", 2nd ed., Blackwell Publishing, Ames, IA.
4. Hoskings, J. R. M. and J. R. Wallis, 1997, "Regional Frequency Analysis, An Approach Based on L-Moments", Cambridge University Press, New York.
5. Viessman Jr., W., and G. L. Lewis, "Introduction to Hydrology", 4th ed., Harper-Collins, New York, 1996.