

Stochastic Hydrology - Video course

COURSE OUTLINE

The objective of this course is to introduce the concepts of probability theory and stochastic processes with applications in hydrologic analysis and design.

Modeling of hydrologic time series with specific techniques for data generation and hydrologic forecasting will be dealt with.

Case study applications will be discussed.

COURSE DETAIL

Topic	No. of Hours
Introduction to Random Variables (RVs).	01
Probability Distributions - One dimensional RVs.	02
Higher Dimensional RVs - Joint Distribution.	02
Conditional Distribution; Independence.	03
Properties of Random Variables.	02
Parameter Estimation.	02
Commonly used Distributions in Hydrology.	05
Hydrologic Data Generation.	04
Introduction to Time Series - stationarity; ergodicity.	02
Purely stochastic Models; Markov Processes.	05
Spectral Density; Analysis in the Frequency Domain.	04



NP-TEL

NPTEL

<http://nptel.iitm.ac.in>

Civil Engineering

Pre-requisites:

1. A preliminary background in probability and statistics is desired, but is not essential.

Additional Reading:

1. Ross, S.M., 'Introduction to Probability Models', Academic Press, Elsevier. 2007.
2. Hipel, K. and McLeod, A. 'Time-series Modelling of Water Resources and Environmental Systems', Elsevier, 1993.
3. Kottegoda, N.T. 'Stochastic Water Resources Technology', Macmillan, London 1980.

Hyperlinks:

1. <http://www.geog.uu.nl/fg/mbierkens/stochhyd.html>
(accessed on 20 August 2009).

Coordinators:

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Auto Correlation and Partial Auto Correlation.	02
Auto Regressive Moving Average Models (Box - Jenkins models - model identification; Parameter estimation ; calibration and validation; Simulation of hydrologic time series ; Applications to Hydrologic Forecasting - case studies).	06
Total	40

References:

1. Hann, C.T., "Statistical Methods in Hydrology", First East-West Press Edition, New Delhi, 1995.
2. Clarke, R.T., "Statistical Models in Hydrology", John Wiley, Chinchester, 1994.
3. Bras, R.L. and Rodriguez-Iturbe , "Random Functions and Hydrology", Dover Publications, New York, USA, 1993.