CE215 Jan 3:0

Stoachastic Hydrology

Instructor

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Teaching Assistant

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Department: Civil Engineering

Course Time: Tue., Thu, 11:30 AM - 1.00 PM

Lecture venue: Civil Engineering First Floor

Detailed Course Page:

Announcements

Brief description of the course

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 are dealt with. Case study applications are discussed.

The course is targeted at masters students, typically with Civil Engineering background - but students from other departments (such as Centre for Atmospheric and Oceanic Sciences) with a basic degree in any branch of engineering also benefit from the course.

Prerequisites

None

Syllabus

Introduction to Random Variables (RVs); Probability Distributions - One dimensional RVs; Higher Dimensional RVs - Joint Distribution; Conditional Distribution; Independence; Properties of Random Variables; Parameter Estimation; Commonly used Distributions in Hydrology; Hydrologic Data Generation;

Introduction to Time Series; Purely stochastic Models; Markov Processes; Spectral Density; Analysis in the Frequency Domain; Auto Correlation and Partial Auto Correlation; 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).

Course outcomes

Students would be equipped with methodologies of addressing uncertainties in hydrologic systems and one step ahead forecasting.

Grading policy

15% for Assignments

10% for Short project

25% for Mid term (consists of two tests)

50% for final exam

Assignments

Resources

Hann, C.T., "Statistical Methods in Hydrology", First East-West Press Edition, New Delhi, 1995.

Clarke, R.T., "Statistical Models in Hydrology", John Wiley, Chinchester, 1994.

Bras, R.L. and Rodriguez-Iturbe , "Random Functions and Hydrology", Dover Publications, New York, USA, 1993.

NPTEL Course on Stochastic Hydrology, http://nptel.ac.in/syllabus/105108079/