

STATISTICAL METHODS FOR WATER AND ENVIRONMENTAL ENGINEERS
CVEN 5454
Spring 2005

Instructor:

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Lectures: Tuesdays and Thursdays 11:00 – 12:15PM ECCE-1B41
Office hours: (anytime on E-mail)

Textbook(s):

Probability and Statistics for Engineers, Walpole, et al. – Wiley
Statistical Methods in Water Resources by D.R. Helsel, R.M. Hirsch - Elsevier
(<http://water.usgs.gov/pubs/twri/twri4a3/>)

Supplementary Books:

Probability, statistics and decision for civil engineers by Jack Benjamin and C. Allin Cornell – McGraw-Hill
Statistical Methods in the Atmospheric Sciences: An Introduction
by Daniel S. Wilks - Academic Press
(all of the above books are on reserve in the Engineering Library)
In addition, lectures will feature material from several other books and research papers.

Prerequisites:

Undergraduate mathematics (calculus and algebra) and basic computer literacy (e.g. analyze and plot data, spreadsheets, programming)

Course Objectives

Research in almost any field involves making inferences and obtaining insights about the underlying processes from analyzing observations. Therefore, it is critical to have a good understanding of various data analysis techniques. To this end, the objective of this course is to provide a good exposure to a suite of statistical methods that are widely used in analyzing environmental, hydrological and climatological data. One of the powerful tools for data analysis, **R**, will be introduced.

Tentative Topics to be covered

	Weeks
1. Basic Probability / data visualization; distributions (discrete and continuous); random variables and Monte Carlo	3
2. Hypothesis testing Uncertainty estimation, confidence intervals, differences in group means, variance, correlation.	3
3. Regression (Linear Regression – theory, analysis of variance, confidence intervals, forecast) and Logistic Regression	3
5. Design of Experiments (Randomized, factorial) and Control Charts	3
6. Introduction to Time series (Auto Regressive Models)	2
7. Introduction to data driven methods (kernel methods, local polynomials etc.)	1

Grading:

Homework	35%
Mid-term	20%
Project	20%
Final	25%

Please turn off your cell phones in the class and refrain from eating odorous foods! THANK YOU

ENJOY THE CLASS!