ECE 651  STATISTICAL ANALYSIS AND SIMULATION  
Spring 2014  (January 13, 2014 – May 9, 2014)

Instructor:   R. P. Joshi  
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Office Hours:  Monday, Tuesday, Wednesday, Thursday, Friday (2:00 pm - 4:00 pm)  
Other times by appointment  

Class Timings:  Monday  4:20 pm - 7:00 pm ;  GRONT 204  

Course Objectives:  An introduction to probabilistic and statistical techniques for the analysis of:  
Signals and systems; Communication Systems; Reliability Engineering and Production Yield; Noise in Devices & Systems; Basic Queuing. Specific topics will include: Basic concepts of probability, their distributions and computations, Estimation, Random Variables and Processes, Joint Probabilities, Expectation-Autocovariance-Correlation; Response of linear systems to random processes; Spectral Density & Wiener–Khinchin theorem; Confidence intervals & Hypothesis testing; Regression methods, Methods for analyzing data (Fisher’s exact test, McMenar’s test, chi-square tests, Cochran-Mantel-Haenszel methods), Analysis of variance including non-parametric alternatives.  

Pre-requisites:    MATH 307 (or equivalent) and 1 undergraduate course in probability/statistics  

Grading Scheme:  
30 %  --  Homeworks and assignments  
20 %  --  Two in-semester tests ( ~ March 3, 2014 & ~April 21, 2014)  
20 %  --  Two terms papers with presentations  
30 %  --  Finals (Monday, May 5, 3:45 pm -6:45 pm)  
No points given if assignment turned in after solutions are posted  
No “make-up” without valid reasons (e.g., medical etc.)


Withdrawal deadline:  April 1, 2014.  

Honor code:  Everyone taking this course is bound by the ODU honor code.  
(http://orgs.odu.edu/hc/pages/Monarch_creed.shtml)
Possible Term Paper #1 Topics (Methods)

- Design of Experiments;
- Markov Chains;
- Spectral Analyses of Stationary Random Processes;
- Stochastic Differential Equations;
- Analysis of variance (ANOVA);
- Nonparametric Distribution-Free Statistics;
- Queues;
- Diffusion Processes and Their Stochastic Description;
- Martingale Theory and Continuous-Time Martingales;
- Monte Carlo Methods;
- Methods for analyzing data (e.g., Fisher’s/McMenar’s/chi-square tests, Cochran-Mantel-Haenszel);
- Master & Fokker-Planck Equations for Stochastic Processes;
- Filtering for Linear Stochastic Systems;
- Elements of Game Theory.

Term Paper #2 Topics (Applications)