King Saud University
College of Computer and Information Sciences
Department of Computer Engineering

CEN 343 – INTORDUCTION TO RANDOM PROCESSES (3-0-1)
Semester I, Academic Year 2014-2015
Mandatory Course: Time (STT 13:00-13:50, Tutorial 15-15:50)

Course Description (catalog)

Covers probability theory, random variables, descriptive statistics, random sampling, statistical intervals and hypothesis testing for a single sample, stochastic processes, spectral characteristics and applications to systems

Co-requisites: - **Courses** CEN 340
Topics Fourier transform and continuous time system analysis

Textbook(s) and/or Other Required Materials:

Primary: - Peebles, P., *Probability, Random Variables and Random Signal Processing*, 4th Ed., 2001, McGraw Hill.
- Sullivan III, M., Statistics: Informed Decisions Using Data, 3rd Edition, 2010, Pearson.
Supplementary: Yates, R. D. and Goodman, D. J., *Probability and Stochastic Processes: A Friendly Introduction for Electrical and Computer Engineers*, 2nd Ed., 2005 John Wiley and Sons

Course Learning Outcomes:

This course requires from the student to demonstrate the following:

1. Explain basic concepts probability, joint probability, conditional probability, independence, total probability, and Bayes' rule.
2. Define single random variables in terms of their PDF and CDF, and calculate moments such as the mean and variance.
3. Define multiple random variables in terms of their PDF and CDF and calculate joint moments such as the correlation and covariance.
4. Explain random sampling and data description.
5. Define important properties of point estimators and construct point estimators using maximum likelihood.
6. Estimate the value of a parameter using confidence intervals.
7. Explain basic concepts of a random process, calculate the mean, variance, autocorrelation, and power spectral density of a stationary random process.

Major Topics covered and schedule in weeks:

Set theory and probability basics	2
One dimensional random variables	2
Two dimensional random variables	2
Statistics	4
Stochastic processes and spectral characteristics	4
Review and evaluation	2

Assessment Plan for the Course

Students' performance in homework, quizzes, exams.

Contribution of Course to Meeting Curriculum Disciplines:

Curriculum Discipline	Percentage
Mathematics and Basic Science	100
Engineering Science	
Engineering Design	
General Education	

Relationship of Course to Program Outcomes

Outcome	Student Outcome Description	Contribution
(a)	an ability to apply knowledge of mathematics, science, and engineering	✔
(b)	an ability to design and conduct experiments, as well as to analyze and interpret data	✔
(c)	an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	
(d)	an ability to function on multidisciplinary teams	
(e)	an ability to identify, formulate, and solve engineering problems	✔
(f)	an understanding of professional and ethical responsibility	
(g)	an ability to communicate effectively	
(h)	the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	
(i)	a recognition of the need for, and an ability to engage in life-long learning	
(j)	a knowledge of contemporary issues	
(k)	an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	

Current Instructor, Department, Office Hours and Date:

Dr. Nassim Ammour.
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