

The University of Texas at Tyler  
Department of Electrical Engineering

**EENG 5307: Intro. to Random Processes**

**Syllabus**

**Catalog Description:**

Introduction to random processes, transformation of random variables, correlation function and power spectral density, system response to noise, optimal processing.

**Prerequisites:** EENG 4311

**Credits:** ( 3 hours lecture, 0 hours laboratory per week )

**Text(s):** Intuitive Probability and Random Processes using MATLAB by Steven Kay, ISBN: 9780387241579

**Additional Material:** MATLAB, Class Notes

**Course Coordinator:** Seyed Ghorshi, PhD

**Topics Covered:** (paragraph of topics separated by semicolons)

Random Variables Review; Functions of Random Variables; Expectation and Estimation; Random Vectors and Parameter Estimation; Random Sequences; Random Processes

**Evaluation Methods:** (only items in dark print apply):

- 1. Examinations / Quizzes**
- 2. Homework**
3. Report
- 4. Computer Programming**
- 5. Project**
6. Presentation
7. Course Participation
8. Peer Review

**Course Objectives<sup>1</sup>:** By the end of this course students will be able to:

1. Make use of random variables to solve engineering problems [1,2]
2. Make use of random vectors to solve engineering problems[1,2]
3. Make use of random sequences to solve engineering problems[1,2]
4. Model engineering problems using random process [1,2]
5. Analyze the response of linear systems to random inputs[1,2]
6. Analyze power spectral densities [1,2]
7. Simulate the response of linear systems to random inputs and random process. [1,4,5]

<sup>1</sup>Numbers in brackets refer to method(s) used to evaluate the course objective.

Relationship to Student Outcomes<sup>2</sup>: This course supports the following Electrical Engineering Student Outcomes, which state that our students will possess:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. [1, 2]
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. [5]
3. an ability to communicate effectively with a range of audiences.
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. [3]
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. [4]

<sup>2</sup>Numbers in brackets refer to course objective(s) that address the Program Outcome.

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:		hours
Engineering Sciences and Design:	3	hours
General Education Component:		hours

<u>Prepared By:</u>	Ralph Hippenstiel, Professor	<u>Date:</u>	08-20-2004
<u>Modified By:</u>	Hector A. Ochoa, Assistant Professor		12-13-2008
	Hector A. Ochoa, Assistant Professor		08-19-2010
	Seyed Ghorshi, PhD		08-07-2020