

EE 315 - Probabilistic Methods in Electrical Engineering**COURSE OUTLINE****(052)**

Instructor: Dr. M. Adnan Andalusi **Office:** 14/217-2 **Phone:** 1498 **E-mail:** andalusi@kfupm.edu.sa
O.H.: Sun./Tues. 11:15-12:00 am, Wed. 12:00-1:00pm

PREREQUISITE: EE 207**TEXT BOOK:**

Peebles, P. Z. "Probability, Random Variables, and Random Signal Principles", McGraw-Hill, 4th Edition, 2001.

REFERENCES:

Leon-Garcia, A. "Probability and Random Processes for EE", Addison Wesley, 2nd Edition, 1994.

Ross, S. "A First Course in Probability", Prentice Hall, Fifth Edition, 1998.

Helstrom, C.W. "Probability and Stochastic Processes for Engineers", Addison-Wesley, 2nd Edition, 1992.

Wk	Topics	Sections	Homework
1	Probability Set definitions and set operations, Axioms of probability	1.1 1.2-1.3	1.2-3, 1.2-4, 1.2-8, 1.2-15, 1.3.2, 1.3-3, 1.3-4, 1.3-6, 1.3-12
2	Joint and conditional probability Independent events, Combined experiments	1.4 1.5, 1.6	1.4-10, 1.4-13, 1.5-1,1.5-5, 1.6-1, 1.6-3,1.7-2,1.7-5,1.7-6
3	Bernoulli trials, Random Variables The Random Variable (R.V.) concept, CDF and PDF	1.7 2.1-2.3	1.7.12,2.1.6,2.1.11,2.1.14,2.2.2, 2.2.7,2.2.9,2.3.2,2.3.7,2.6.8
4	Some Important R.V.'s	2.4-2.5	2.4.2,2.4.5,2.4.6,2.4.10,2.5.6, 2.5.9, 2.5.13
5	Conditional distribution and density functions, Expectation	2.6, 3.1	3.1.1,3.1.8,3.1.10,3.1.15
6	Moments, Characteristic Function	3.2, 3.3	3.2.2,3.2.3,3.2.4,3.2.14,3.2.22, 3.2.26, 3.3.5, 3.3.6
7	Transformations of a r.v., Multiple random variables Pairs of r.v.'s, Properties of joint distribution and joint density	3.4, 4.1 4.2, 4.3	3.4.1,3.4.3,3.4.5, 3.4.10,3.4.12 4.1.6,4.2.4,4.2.5,4.2.10,4.3.1, 4.3.6,4.3.10
8	Conditional distribution and density Statistical Independence	4.4 4.5	4.4.1,4.4.3,4.5.1,4.5.2,4.5.5
9	Distribution and density of a sum of r.v.'s Central Limit Theorem Expected value of a function of r.v.'s	4.6, 4.7 5.1	4.6.3,4.6.4,4.6.5,4.6.7,4.6.9, 4.7.4, 5.1.3,5.1.8,5.1.9,5.1.15
10	Joint characteristic functions Jointly Gaussian r.v.'s Transformations of multiple r.v.'s	5.2 5.3 (two r.v.'s) 5.4	5.2.1,5.2.6,5.2.9,5.3.2,5.3.5,5.3.9
11	Sampling and some limit theorems Random Processes –Temporal Characteristics Concept of a random process	5.7 6.1	5.7.1,5.7.2, 6.1.4,6.1.7
12	Stationarity and independence Correlation functions and their properties Gaussian random process	6.2 6.3-6.4 6.5	6.2.1,6.2.4,6.2.6,6.2.14,6.3.1, 6.3.8, 6.3.17,6.3.22, 6.5.3
13	Poisson random process Random Processes – Spectral Characteristic Power Spectral Density and its properties Relationship between PSD and autocorrelation function	6.6 7.1 7.2	6.6.1,6.6.2,6.6.3, 7.1.1,7.1.11,7.1.12, 7.2.2,7.2.19
14	Linear systems with random inputs Random signal response of linear systems Spectral characteristics of system response	8.2 8.4	8.2.8,8.2.16,8.2.17,8.2.26 8.4.8,8.4.10,8.4.13
15	REVIEW		

GRADING POLICY:

- (HW, Attendance + Quizzes) 20%
 - Term Project 5%
 - Major Exam I 20%
 - Major Exam II 20%
 - Final Exam (Comprehensive) 35%
- **Official Excuses:** Only excuses obtained from Students Affairs Dept. are accepted. No personal excuses.
 - **Homework:** will be assigned weekly. Each student has to submit an independent solution.