Department of Electrical Engineering

College of Engineering & Technology
University of Sargodha

OUTCOME BASED EDUCATION (OBE)

Course File

Probability Methods in Engineering

Session-2017

6th Semester

B.Sc Electrical Engineering

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BSc. Electrical Engineering (Session – 2017)

<u>6th Semester</u>

1	Course Time table				
Course: **Probability Methods in Engineering** **GS-323**	Name of Instructor: **Engr. Erum Rehman**	Class 2017	Semester 6th	Duration Feb-Jun, 2020	
Credit hours:	(Theory) 3	**Class Timings:** <u>Wednesday 02:00pm – 03:30 pm</u> <u>Friday 9:30 am – 11:00 am</u>			

2	Course Outlines

Course Outline:

- Set theory,
- Basic concepts of probability
- Conditional probability,
- Independent events,
- Baye's Theorem,
- Discrete and continuous random variables,
- Distributions and density functions,
- Probability distributions (binomial, Poisson,
- Hyper geometric, normal, uniform and exponential),
- Mean, variance, standard deviations, moments and moment generating functions,
- Linear regression and curve fitting,
- Limit theorems and applications.

Recommended Books:

 Alberto Leon-Garcia: Probability and Random Processes for Electrical Engineering. Prentice Hall, Inc. New Jersey, 3rd ed. 2008.

 Peyton Z. Peeble Jr.: Probability and Random Variables and Random Signal Principles. McGraw Hill, 4th ed. 2001.

 Richard L. Scheaffer and James T. McClave: Probability and Statistics for Engineers. Brooks/Cole, 5th ed. 2011.

3	Course Learning Outcomes				
Sr. No	**CLO**	**Domain**	**Taxonomy Level**	**PLO**	**Assessment**
1	EXPLAIN basic probability concepts and their use in different problems	Cognitive	2	2	Quiz 1 + Mid Term + Assignment 1
2	COMPARE different types of random variables and their usage in science and engineering.	Cognitive	4	2	Quiz 2 + Final Term
3	APPLY basic statistical techniques such as regression, curve fitting to engineering data.	Cognitive	3	4	Final Term+ Assignment 2

4	Detailed Lecture Plan			
Week No.	**Lecture**	**Course Content to be Covered**		
		Description	**Objectives**	**CLO's Mapping**
1	1-2	Set theory, Sample Space, Experiment Outcomes, and Sampling	The students will be able to understand the basic concepts of Probability and recognize various Experiments outcomes.	**1**

		with and without replacement.		
2	3-4	Introduction to theory of Probability, Theorems of Probability.	The students will be able to have a working knowledge of the basic properties of probability and will understand the conditional probability.	**1**
3	5-6	Conditional probability Baye's Theorem,	The students will be able to have a working knowledge to make predictions based on data collected and identify all possible outcomes of an event.	**1**
4	7-8	Permutations and Combinations.	The students will learn to systematically find all possible outcomes of an event using tree diagrams and organized lists.	**1**
5	9-10	Random Variables and Probability Distributions. Mean and Variance of a Distribution,	Students will learn to take samples and use them to make predictions, compare theoretical and experimental probabilities.	**1**
6	11-12	Expectation, Moments **(Quiz 1)**	Students will be able to use relative frequency to predict events.	**1**
7	13-14	Binomial distributions.	Students will be able to make and justify the probability of events in common situations.	**2**
8	15-16	Poisson & Hyper geometric distributions.	Students will be able to theoretically and experimentally examine the probabilities of games of chance.	**2**
9		**Mid Term Examination**	**27-03-2020** **10:30am-11:30am (LR-3)**	
10	17-18	Continuous Random Variables.	To learn the formal definition of a probability density function of a continuous random variable.	**2**
11	19-20	Normal distribution.	To learn how to transform a normal random variable X into the standard normal random variable Z.	**2 & 4**
12	21-22	Probability density functions	To learn and be able to apply the empirical rule to a set of data.	**3**

13	23-24	Cumulative Distribution Functions.	To determine probabilities of a class that is just a little too complicated for probability trees.	3
14	25-26	Moments and moment generating functions.	To Use long-run frequencies to estimate probabilities.	3
15	27-28	Linear regression and curve fitting **(Quiz 2)**		4
16	29-30	limits theorems and applications.	To determine probabilities of a class that is just a little too complicated for probability trees.	4
17	31-32	The central limit theorem.		4
18		**End Term Examination**	**24-06-2020**	

6	**Semester Calendar**	
Fall 2017		
	Commencement of Classes:	13-01-2020
	Mid Term exam:	25-03-2020 to 01-04-2020
	Classes End:	22-05-2020
	End Term exam:	10-06-2020 to 14-06-2020
	Result Declaration:	24-06-2020

5	Evaluation Criteria		
Component of Assessment		**Method**	**Marks**