



**King Saud University – Al-Muzahmyiah Branch**  
**College of Engineering**  
**AGE 1150 Engineering Probability & Statistics**  
**Course Syllabus**

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**Course Description: AGE 1150 3 (3, 1, 0)**

AGE 1150 Engineering Probability & Statistics, is a 3-credit hour (3 weekly lectures, and 1 tutorial session) second-year course. The course is designed to introduce students to the concepts of Probability and probability distribution, Mathematical expectations of random variables. Discrete and continuous distributions. Sampling distributions, Estimation, testing of hypothesis, Regression and correlation. Distribution functions. Statistical Analysis. Statistical Design of Experiment. Engineering Applications. During this course, special emphasis is placed on real-life examples in which the above mentioned concepts are relevant. Throughout the semester, students are required to submit homework assignments, and take frequent quizzes. The intent of these activities is to deepen the students' understanding of basic engineering probability and statistics knowledge, raise their awareness of engineering issues related to engineering, and strengthen their ability to work in teams.

**Number of Credits**

3

**Level**

4

**Prerequisites by Course**

None

**Prerequisites by Topic**

None

**Textbook(s)/ Required Material**

Probability and Statistics for Engineers and Scientists, R. E. Walpole, R. H. Myers, S. L. Myers, and K. Ye, Pearson, 9<sup>th</sup> ed. 2012.

**Topics Covered**

1. Introduction and some simple discussion related to sample space, events.
2. Definition of sample space, counting sample points, random events, Probability rules and additive rule.
3. Conditional probability, multiplication rule, independent events.
4. Total probability rule, Baye's rule
5. Random variables, Discrete and continuous distributions.
6. Mean and variance of a random variable. Mean of linear combination of random variables.
7. Some of the common Discrete Distributions: Uniform, Binomial, Hyper geometric, Poisson distributions.

8. Some of the common Continuous Distributions: Uniform, Exponential, Normal distributions.
9. Applications of the normal distribution. Random sampling, Some important sample statistics.
10. Sampling distribution of the mean from normal distribution with known and unknown variance, t-distribution, Statistical inference, Classical estimation, Estimation of a single population mean, Standard error of a point estimate.
11. Estimating a confidence interval for: single population mean, the difference between two independent samples means, a single population proportion.
12. Estimating confidence interval for the difference between two proportions. Introducing the principles of Testing Hypothesis- The first and the second type of errors, Testing hypothesis about: Single population mean, Difference between two independent populations' means.
13. Testing hypothesis about: Single population proportion, Difference between two populations' proportions.
14. Simple Linear correlation, Simple Linear Regression, Least square method for estimating and getting inference about regression coefficients.

### **Course Objectives**

Students who complete this course shall have:

1. Knowledge of probability rules, independent random events.
2. Knowledge of random variables and their probability distribution.
3. Knowledge of the most common discrete probability distributions and their relationships.
4. Knowledge of the most common continuous probability distributions and their applications
5. Knowledge of sampling distribution of some important sample statistics.
6. Knowledge of principals of estimation, estimation of some important population parameters.
7. Knowledge of principals of estimation of the simple linear regression.

### **Course Outcomes**

By the end of this course, students should be able to

1. Determine the Sample space for any trial.
2. Define the Random variables (Discrete and Continuous distributions).
3. Find the mean (mathematical expectation) and the variance of a random variable. Mean and variance of a linear combination of independent random variables.
4. Know the properties of the famous discrete distributions (Uniform, Binomial, Hyper geometric, and Poisson).
5. Know the properties of the famous of Continuous distributions (Uniform, Exponential, and Normal).
6. Find the unknown population parameters by Estimation methods: Point estimation, Confidence interval estimation.
7. Conduct the Hypotheses Testing (single Population parameter (mean, proportion, difference between two means and difference between two proportions of independent populations).

### **Class/Laboratory Schedule**

Three 50-minute lecture sessions, and one 50-minute tutorial session per week.

### **Laboratory:**

None

### **Science/Design Contents**

Engineering Science: 100%  
Engineering Design: 0%

**Assessment Tools**

Mid-term exams:	25%
Homework	10%
Quizzes:	20%
Classroom participating activities:	5%
Final exam:	40%

**Assignment and Quizzes' Policy**

No.	Assessment task	Date due (Academic Week)	Proportion of Final Assessment
1	Homework	Every Thursday	10%
2	Quizzes	3 <sup>rd</sup> , 5 <sup>th</sup> , 9 <sup>th</sup> & 11 <sup>th</sup>	20%

**Prepared by**

Dr. Feras Y. Fraige

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05 February 2016