College: Engineering Department: civil Engineering

Course Title:
Probability & Statistics(For Engineering Students)

Course No:

Credit Hours:
3h

Semester: 2021/2020

About The Course

Course Title: Probability & Statistics(For Engineering Students) Class:
Course No:
Credit Hours: 3 h Lecture Room: 408

Obligatory/ Optional:
Text Book: Probability and Statistics for Engineering and the Sciences, J. L. Devore, 8th Edition, Cengage, 2012.

The Instructor

Name: Eng. Dua M. Al-Afeef Title: full time lecturer
Office Tel:
Office No: 201 Office Hours: sun. tues 11-12 am
Mon. wed. 8-11 am

E-mail: de-8888@yahoo.com

Course Description

This course introduces students to various aspects of statistical analysis. The objective is to expose the students to elements of probability and probability distributions, and statistical inference. We try to keep a balance between theory and methodology.

Course Objectives

Calculate and interpret various descriptive statistics using numerical and graphical methods. Understand the basic concepts of probability, random variables (discrete and continuous), probability distributions, and joint probability distributions. Define the binomial, Poisson, geometric, hypergeometric, exponential, Gamma, and normal random variables, know their statistical properties including probability mass (density) function, mean and variance. Understand the concepts of point and interval estimations of population parameters from data sets and use the sampling distributions to construct confidence intervals for population means and proportions. Understand the basic components of hypothesis testing and perform hypothesis tests on population means and proportions. Use Linear Regression to describe the relationship between two variables and perform hypothesis tests and confidence intervals for the slope.

Learning Outcome

1. Calculate and interpret various descriptive statistics using numerical and graphical methods.
2. Understand the basic concepts of probability, random variables (discrete and continuous), probability distributions, and joint probability distributions. Define the binomial, Poisson, geometric, hypergeometric, exponential, Gamma, and normal random variables, know their statistical properties including probability mass (density) function, mean and variance
3. Understand the concepts of point and interval estimations of population parameters from data sets and use the sampling distributions to construct confidence intervals for population means and proportions.

4. Understand the basic components of hypothesis testing and perform hypothesis tests on population means and proportions.
5. Use Linear Regression to describe the relationship between two variables and perform hypothesis tests and confidence intervals for the slope.

Course Outline and Time schedule

Week	Course Outline
First week	Chapter 1 (Descriptive Statistics): types of data, populations, samples, pictorial and tabular methods, measures of location, measures of variability and measures of shape
2nd week	Chapter 2 (Probability): 2.1 Sample Spaces, 2.2 Axioms, rules of probability, 2.3 Counting techniques Probability 2.4 Conditional Probability and Independence
3rd week	Chapter 3 (Discrete random variables and probability distributions): 3.1 Random Variables 3.2 Probability Distributions discrete random variables 3.3 Expected Values
4th week	Chapter 3 (continued): 3.4 Binomial Distribution 3.5 Hypergeometric and Negative Binomial Distribution 3.6 Poisson Distribution
5th week	Chapter 4 (Continuous Random Variables and Probability Distributions): 4.1 Probability density functions, 4.2 Cumulative Distribution function and expected values
6th week	Chapter 4 (continued): 4.3 Normal Distribution 4.4 The Exponential and Gamma Distributions
7th week	Chapter 5 (Joint Probability distributions and Random samples): 5.1 Jointly Distributed Random Variables(discrete and continuous) 5.2 Expected Values, Covariance, and Correlation
8th week	Chapter 5 (continued): 5.3 Statistics and Their Distributions 5.4 The Distribution of the Sample Mean
9th week	Chapter 6 (Point estimation): 6.1 Some general concepts of point estimation 6.2 Methods of Point Estimation
10th week	Chapter 7 (Statistical intervals based on a single sample) 7.2 Large-Sample Confidence Intervals for a Population Mean. 7.3 Intervals Based on a Normal Population
11th week	Chapter 8 (Tests of hypothesis based on a single sample): 8.1 Hypotheses and Test Procedures

12th week	Chapter 8 ((continued) 8.2 Tests About a Population Mean
13th week	Chapter 9 (Inferences based on two samples): 9.2 Two independent samples t-test 9.3 Paired ttest.
14th week	Chapter 12 (Simple Linear Regression and Correlation): 12.1 The Simple Linear Regression Model 12.2 Estimating Model Parameters
15thweek	Chapter 12 (continued): 12.3 Inference about the slope parameter 12.5 Correlation

Presentation methods and techniques

Methods of teaching varied according to the type of text, student and situation. The following techniques are usually used:

1- Problem solving.

2- Discussion.

3- Learning by activities.

Sources of information and Instructional Aids

- Library sources

Assessment Strategy and its tools

The assigned syllabus is assessed and evaluated
Through: feed back and the skills that are acquired by the students

The tools:

1- Digonistic tests to identify the students level and areas of weakness
2- Formal (stage) evaluation
   a) Class Participation
   b) Ist Exam
   c) 2nd Exam
   d) Activity file

Tool & Evaluation

Tests are permanent tools & assessment, in addition to the activity file which contains curricular and the co-cussiculor activities, research, report papers and the active participation of the student in the lecture.

The following table clarifies the organization of the assessment schedule:

Test	Date	Grade
First Exam		20
2nd Exam		20
Attendance	Students should be notified about their marks	20
Final Exam		40

Activities and Instructional Assignment

1- Practical assignments to achieve the syllabus objectives.

Regulations to maintain the teaching-Learning Process in the Lecture:

1- Regular attendance.

2- Respect of commencement and ending of the lecture time.

3- Positive relationship between student and teacher.

4- Commitment to present assignments on time.

5- High commitment during the lecture to avoid any kind of disturbance and distortion.

6- High seuse of trust and sincerity when referring to any piece of information and to mention the source.

7- The student who absents himself should submit an accepted excuse.

8- University relevant regulations should be applied in case the studen,s behavior is not accepted.

9- Allowed Absence percentages is (%).

Internet websites

References:

1. Introduction to Probability and Statistics, Principles and Applications for Engineers and Computing Sciences, J.S. Milton and J.C. Arnold, 4th Edition, 2003.
2. Applied Statistics and Probability for Engineers, D. Montgomery and C. Runger , 4th Edition, 2007.
3. Applied Probability and statistical Methods, G. C. Canavos, 1st Edition. 1984.

Syllabus Classification

Objectives	***Learning outcome***	***Assessment tools***
1-		
2-		
3-		
4-		
5-		