

STAT - 503

Probability and Mathematical Statistics

Instructor: Prof. Dr. Abdullah Al-Shiha

Office: 2 B 43 Building # 4

E-mail: aalshiha@ksu.edu.sa

Course Syllabus:

1. Introduction and some simple concepts of statistics.
2. Sample space, events, and counting sample points (combinations only)
3. Probability of an event, additive rules.
4. Conditional Probability, Multiplication Rule.
5. Independent random events.
6. Random Variables (R.V.), Discrete Probability distributions.
7. Continuous Probability distributions.
8. Mean of a Random Variable, Variance of a Random Variable.
9. Moments of a Random Variable, Mean of a linear combinations of Random Variables.
10. Chebychev's Inequality.
11. Discrete Uniform distribution. Binomial distribution.
12. Hypergeometric distribution. Poisson distribution.
13. Normal distribution. Areas under the standard normal curve.
14. Applications of the normal distribution.
15. Random Sampling, Some important statistics, Sampling distributions.
16. Sampling distribution of the mean from normal populations, t-distribution.
17. Statistical Inference, Classical estimation methods, Estimation of the mean.
18. Standard error of a point estimate, estimating the difference between two means.
19. Estimating of a proportion.
20. Estimating of the difference between two proportions.
21. Testing a statistical hypothesis, One- and Two-tail tests, Types of errors.
22. Testing of means with known population variance, Relation to confidence intervals.
23. Testing of means with unknown population variance, two sample testing, paired comparison.
24. Testing of a single proportion and two proportions.
25. Simple linear regression and Multiple regression, correlation and its applications
26. ANOVA; one and two ways and its applications.
27. Principal component analysis.
28. Clustering technique.

Textbook:

Title: *Probability and Statistics for Engineers and Scientists*, 7th Edition (or Latest Edition), Prentice Hall, 1998.

Authors: Walpole, R. E.; Myers, R. H. and Myers, S. L.

Grading:

First Midterm Exam = 30%

Second Midterm Exam = 30%

Final Exam = 40%

Statistical Packages:

Throughout the course students will be expected to use some statistical package for analyzing data, such as SAS, SPSS, Minitab, Excel Statistical Tools, or any other statistical package.

References:

1. *Applied Statistics and Probability for Engineers* (6th Ed.). By: Montgomery D. C. and Runger G. C.
2. *Introduction to Mathematical Statistics* (6th Ed.). By: Hogg R. V., McKean J. W., and Craig A. T.
3. *Probability and Statistics* (4th Ed.). By: DeGroot M. H. and Schervish M. J.