MSE-225 Statistical Methods

Credit Hours: 3-0

Pre-requisites: Nil

Course Description

A course dealing with statistical concepts including measures of central tendency and dispersion, probability distributions, Mean & variance of discrete & continuous random variables, Correlation and Regression analysis, Multiple Regression and Statistical Forecasting.

Course Contents

- Introduction & role of statistics in engineering.
- Population & samples, Variables, Methods of displaying data sets, Stem & leaf display, Histogram, Histogram shapes, Boxplot, Bar chart, Pareto diagram, Dot diagram, Frequency distributions & their graphs, Outlier.
- Mean, Median, Quartile, Percentile, Range, Deviation from mean, Sample variance, Sample standard deviation, Coefficient of variation.
- Probability, Concepts & definitions, Basic theorems of probability, Law of total probability, Bayes theorem, Discrete and continuous random variables and their probability distributions, Density and distribution functions; Expectation.
- Mean & variance of discrete & continuous random variables, Binomial distribution, Poisson distribution, Normal distribution, t-distribution, Chisquare distribution, F-distribution.
- Sampling techniques and sampling distribution; Point estimation and interval estimation of parameters, Least square linear & polynomial regression,
- Linearization of nonlinear models, Correlation, Design of experiments,
- Analysis of variance.

Course Outcomes

By the end of this course, students will learn to perform the following:

1) How to calculate and apply measures of location and measures of dispersion -- grouped and ungrouped data cases.
2) How to apply discrete and continuous probability distributions to various engineering problems.

Weekly Plan

Week	Topics
1	Introduction & role of statistics in engineering
2	Population & samples, Variables, Methods of displaying data sets, Stem & leaf display, Histogram, Histogram shapes, Boxplot, Bar chart, Pareto diagram, Dot diagram, Frequency distributions & their graphs, Outlier
3	
4	
5	Mean, Median, Quartile, Percentile, Range, Deviation from mean, Sample variance, Sample standard deviation, Coefficient of variation
6	
7	Probability, Concepts & definitions, Basic theorems of probability, Law of total probability, Bayes theorem
8	
9	**Mid-Semester Exams**
10	Discrete and continuous random variables and their probability distributions, Density and distribution functions; Expectation
11	
12	Mean & variance of discrete & continuous random variables, Binomial distribution, Poisson distribution, Normal distribution, t-distribution, Chisquare distribution, F-distribution
13	
14	Sampling techniques and sampling distribution; Point estimation and interval estimation of parameters, Least square linear & polynomial regression, Linearization of nonlinear models, Correlation, Design of experiments, Analysis of variance.
15	
16	
17-18	**End Semester Exams**

Suggested Books

1. Applied Statistics for Engineers & Scientists by Devore/Farnum. 3rd ed. Thomas.
2. Probability and Statistics for Engineers and Scientists by Ronald E. Walpole. 8th ed. Pearson Educational International, (2007).
3. Probability and Statistics for Engineering and Sciences. 8th ed. CENGAGE Learning.
4. Advanced Engineering Mathematics by Erwin Kreyszig. 11th ed. John and Wiley and Sons.
5. Applied Statistics and Probability for Engineers by Montgomery and Runger. 3rd ed. John and Wiley and Sons.