# BSCS-306: Statistical Methods (2+1)

Pre-requisite: Introduction to Statistics

**Course Teacher: *Dr. Tahseen A. Jilani***

**Aim and Description**

This course in intended for sampling, decision analysis and data modeling using sample information. This course provides basic methods for research and practice in social and physical sciences, and business administration. The aim is to acquaint students with the advance methods of data handling which are required for different kinds of analysis (e.g. in AI and Data Sciences), as well as to provide them with the requisite knowledge for taking up courses of advanced statistics and computer science research in their academic term.

**Probability Distributions for Discrete and continuous Random Variables:** Random Variable, Discrete and Continuous Random Variables, Binomial Distribution with Properties, Poisson Distribution, Normal Probability Distribution, Normal Approximation of Binomial Probabilities and Poisson Probabilities. Uniform, exponential and Gamma Probability Distributions. **(04 sessions).**

**Sampling Distributions and Confidence Interval Estimation:** Basic Definitions of Sampling, Sampling Distribution for Mean and Variance, Central Limit Theorem, Point and Interval Estimation, Confidence Interval for One and Two Mean, proportion and variance, sample size determination. **(04 sessions)**

**Testing Hypotheses:** Introduction, Basic Steps in Hypothesis Testing, Type-I and Type-II Errors, P-value, Hypothesis Testing for One and Two Mean, Proportion and Variance, Chi-square test for goodness-of- fit and test for independence. **(03 sessions)**

**Analysis of Variance:** Basic concepts, One-Way ANOVA, Two-Way ANOVA. **(02 sessions)**

**Regression and Correlation Analysis:** Objectives and Assumptions, The Method of Least Squares, Inferences Concerning the Slope, The Coefficient of Correlation and determination. Multiple Regression Analysis, The Use of Indicator (Dummy) Variables, Analysis of Variance in Linear Regression Analysis, Multiple and partial Correlation Analysis. **(02 sessions)**

**Reference books:**

1. Walpole, Myers, Myers and Ye, Probability & statistics, for engineers & scientists, Eighth edition, Pearson, Prentice-Hall Publication.
2. Ronald M. Weiers, John Heinz, Introduction to Business Statistics, Seventh Edition, South Western Cengage Learning Publication, USA.
3. Jayavel Sounderpandian, Business Statistics, Seventh Edition, McGraw-Hill Publication, 2008.

**SPSS**/ Minitab and some examples in **RStudio** with R programming

| Title | Points |
|---|---|
| Assignments/ Quizzes | 30 |
| Class participation/ class discipline | 10 |
| Final Exam | 40 |
| Practical exam | 20 |
| **Total Points** | **100** |