



Introduction to Probability & Statistics

Course Code	Course Num.	Course Name	Credit Hours	Lec	Lab	Tut	Prerequisites
STA	111	Introduction to Probability & Statistics	3	2	0	2	MAT 101

Objectives:

This course is designed to equip the students with a working knowledge of probability, statistics. The major objective of the course is to help the students to develop an intuition and an interest for random phenomena, and to introduce both theoretical issues and applications that may be useful in real life. By the completion of the course, students will be familiar with ideas of statistical modeling, data analysis and interpretation. They will have learned to use one of the statistical package EXCEL.

Syllabus:

- **Descriptive Statistics:** Variables and Data, Types of Variables, Graphs for Categorical Data, Graphs for Quantitative Data, Relative Frequency Histograms, Describing a set of Data with Numerical Measures, Measures of Center, Measure of Variability, On the Practical Significance of the Standard Deviation, Bivariate Data, Graph for Qualitative Variables. Introduction to Linear Regression, The Simple Linear Regression Model, Least Squares and the Fitted Model. Using Technology: Creating, Listing and Describing Data in EXCEL.
- **Some Basic Considerations:** Probability Experiment, Sample Space, Event.
- **Counting:** Counting Principles, Factorial Notation, Binomial Coefficients, Permutations, Combinations, Tree Diagrams.
- **Basic Probability:** Axioms of Probability, Finite Probability Spaces, Infinite Sample Spaces.
- **Conditional Probability and Independence:** Conditional Probability, Finite Stochastic Processes and Tree Diagrams, Total Probability and Bayes' Rule, Independent Events, Independent Repeated Trials.
- **Random Variables:** Random Variables, Probability Distributions of Finite Random Variable, Expectation of a Finite Random Variable, Variance and Standard Deviation, Functions of Random Variables, Discrete Random Variables in General, Continuous Random Variables, Cumulative Distribution Function.
- **Discrete and Continuous Univariate Distributions:** Bernoulli Trials, Binomial Distribution, Hypergeometric Distribution, Geometric and Negative Binomial Distributions, Poisson Distribution, Continuous Uniform, Normal Distribution, Evaluating Normal Probabilities, Normal Approximation of the Binomial Distribution, Exponential Distribution.

References:

- *Probability & Statistics for Engineers & Scientists*, Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers and Keying Ye, Pearson Prentice Hall, 9th Edition, 2012.
- *Applied Statistics and Probability for Engineers*, 5th Edition, by Douglas C. Montgomery, George C. Runger, John Wiley & Sons, Inc., 2010.
- *Introduction to Probability and Statistics*, William Mendenhall, Robert J. Beaver, Barbara M. Beaver, Duxbury Press, 2006.

