INTRODUCTION TO PROBABILITYAND STATISTICS

STA 111 : 3 Credit hours (2 lectures, 0 lab, 2 exercises)

Prerequisites:

MATH113

Objectives:

This course is designed to equip the students with a working knowledge of probability and 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 or MINITAB.

Course Description:

This course teaches introduction to probability and statistics.

Contents:

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. Using Technology: Creating, Listing and Describing Data in EXCEL or MINITAB

- Counting: Counting Principles, Factorial Notation, Binomial Coefficients, Permutations, Combinations, Tree Diagrams.
- Introduction to Probability: Sample Space and Events, Axioms of Probability, Finite Probability Spaces, Infinite Sample Spaces, Classical Birthday Problem, Expectation.
- 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, Discrete Random Variables in General, Continuous Random Variables, Cumulative Distribution Function. Using Technology: Generating a Random Sample in EXCEL or MINITAB.
- Some Usual Distributions: Bernoulli Trials, Binomial Distribution, Geometric and Negative Binomial Distributions, Poisson Distribution, Normal Distribution, Evaluating Normal Probabilities, Normal Approximation of the Binomial Distribution. Using Technology: Binomial Probabilities, Normal Probabilities, and Normal Probability Plots in EXCEL or MINITAB.

References:

Probability and Statistics in Engineering, William W. Hines, Douglas C. Montgomery, Connie M. Borror, David M. Goldsman, John Wiley & Sons Inc, 2004.

Introduction to Probability and Statistics, William Mendenhall, Robert J. Beaver, Barbara M. Beaver, Duxbury Press, 2006.

Data Analysis With Microsoft Excel, Kenneth N. Berk, Patrick Carey, Duxbury Press, 2003.

Elementary Statistics, Ron Larson, Elizabeth Farber, Prentice Hall, 2006.