Marshall University

College of Science

# MTH 345: Applied Probability and Statistics

**Course catalog description**

Statistical methods in scientific/engineering research, with emphasis on applications. Probability modeling, experimental design/survey sampling, estimation/hypothesis testing procedures, regression, ANOVA/factor analysis. Implementation using statistical software such as Excel/SAS.

**Credit hours**

3 hours

**Prerequisites**

A grade of C or higher in MTH230 or IST230.

**List of topics**

- Descriptive Statistics
- Measures of Location and Variability
- Interpretations and Properties of Probability
- Counting Techniques
- Conditional Probability and Independence
- Probability Distributions for Discrete Random Variables
- The Binomial and Poisson Probability Distributions
- Probability Density Functions
- The Normal, Exponential and Gamma Distributions
- Other Continuous Distributions
- Joint Probability Distributions and Random Samples
- The Distribution of the Sample Mean and a Linear Combination
- General Concepts and Methods of Point Estimation
- Tests of Hypotheses Based on a Single
- Z Tests and Two-Sample t tests and Confidence Interval
- Analysis of Paired Data
- The Analysis of Variance
- Factor Analysis
- Simple Linear Regression and Correlation

- Multiple Linear Regression Goodness of Fit and Categorical Data Analysis

**Learning Outcomes**

- Students will be able to interpret and apply the results of published statistical studies
- Students will be able to plan and implement a statistical study
- Students will able to summarize the results of a study using graphs and numerical measures
- Students will be able to choose appropriate probability models to describe real-world situations
- Students will be able to identify the appropriate statistical procedure for analyzing data
- Students will be able to implement appropriate statistical procedure, with and without computer software
- Students will be able to interpret statistical computer output and to report statistical results in a clear and coherent form

**Suggested textbooks**

- Probability and Statistics for Engineering and the Sciences by J.L. Devore, 8th Edition

**Last updated**
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