

## STAT 380: Statistics for Applications

**Course Description:** Descriptive statistics; basic probability rules and distributions; inferences for means, variance and proportions; regression analysis. Prerequisite: MATH 152

**Textbooks:** (1) *Statistical Methods for Engineers* by G. Geoffrey Vining, Brooks/Cole Pub., 3<sup>rd</sup> Ed.  
(2) *Probability and Statistics for Engineers and Scientists 8th Ed*, By Walpole, Myers, Ye, Prentice Hall

### Course Outline and Topics\*

- (1) 2. Data Displays (2 class periods)
  - 2.2 Stem-and-Leaf Displays
  - 2.3 Boxplots
  - 2.4 Using Computer Software
- (2) 2. Probability (2 class periods)
  - 2.1 Sample Space
  - 2.2 Events
  - 2.4 Probability of an Event
  - 2.5 Additive Rules
  - 2.6 Conditional Probability
  - 2.7 Multiplicative Rules
- (2) 3. Random Variables and Probability (2 class periods)
  - 3.1 Concept of a Random Variable
  - 3.2 Discrete Probability Distributions
  - 3.3 Continuous Probability Distributions
- (2) 4. Mathematical Expectation (1 class period)
  - 4.1 Mean of a Random Variable
  - 4.2 Variance and Covariance of Random Variables\* \*
- (2) 5. Some Discrete Probability Distributions (2 class periods)
  - 5.3 Binomial and Multinomial Distributions\* \* \*
  - 5.5 Negative Binomial and Geometric Distributions
  - 5.6 Poisson Distribution and the Poisson Process
- (2) 6. Some Continuous Probability Distributions (5 class periods)
  - 6.1 Continuous Uniform Distribution
  - 6.2 Normal Distribution
  - 6.3 Areas under the Normal Curve
  - 6.4 Applications of the Normal Distributions
  - 6.5 Normal Approximation to the Binomial
  - 6.6 Gamma and Exponential Distributions
  - 6.7 Applications of the Exponential and Gamma Distributions
  - 6.8 Chi-Squared Distribution
- (2) 8. Fundamental Sampling and Data Descriptions (3 class periods)
  - 8.2 Some Important Statistics
  - 8.4 Sampling Distributions
  - 8.5 Sampling Distribution of Means
  - 8.6 Sampling Distribution of S<sup>2</sup>
  - 8.7 t-Distribution
- (1) 4. Estimation and Testing (8 class periods)
  - 4.1 Estimation
  - 4.2 Hypothesis Testing

- 4.3 Inference for a Single Mean
- 4.4 Inference for Proportions
- 4.5 Inference for Two Independent Samples
- 4.6 Paired t-Test
- 4.7 Inference for a Single Variance
- 4.8 p-Values

**(1) 6. Linear Regression Analysis (3 class periods)**

- 6.1 Relationship Among Data
- 6.2 Simple Linear Regression
- 6.3 Multiple Linear Regression
- 6.4 Residual Analysis

\*The suggested class period per chapter assumes two 75-minute class periods per week (total of 30 class periods per semester) with two exams per semester.

\*\*Only expected to discuss variance and standard deviation of a random variable.

\*\*\*Expected to do just the binomial distribution