

**APPLIED ENGINEERING PROBABILITY AND STATISTICS  
STAT 3800**

Page 1 of 2

**1.0 Course Description**

- 1.1 Overview of Content and Purpose:** (3 hours) An introduction to the application of probabilistic and statistical techniques to the solution of engineering and industrial design problems. Credit for both MATH 4740 and STAT 3800 will not be given.
- 1.2 For Whom Intended:** Required for engineering students.
- 1.3 Prerequisites:** MATH 1970
- 1.4 Unusual Circumstances:** NONE

**2.0 Objectives**

- 2.1 Performance Objectives for the Student:** To introduce the engineering student to the applications of probability and statistics in engineering. To accomplish this objective, the textbook chosen will be one written primarily for the engineering discipline.

**3.0 Content and Organization**

- 3.1 Topics:**
1. Introduction to statistics in engineering
  2. Probability
    - a. Sample space
    - b. Probability
    - c. Conditional probability
  3. Discrete random variables and their probability distributions
    - a. Random variables
    - b. Binomial distribution
    - c. Hypergeometric distribution
    - d. Poisson distribution
    - e. The mean and variance of a probability distribution
    - f. Chebyshev's Theorem
  4. Continuous random variables and probability density functions
    - a. The normal distribution
    - b. Probability densities, means, and variances for other continuous random variables
    - c. Joint probability densities
  5. Treatment of data
    - a. Frequency distributions
    - b. Descriptive measures
  6. Sampling distributions
    - a. Populations and samples
    - b. The sampling distribution of  $\bar{x}$  with  $\sigma$  known
    - c. The sampling distribution of  $\bar{x}$  with  $\sigma$  unknown
    - d. The sampling distribution of  $S^2$

**APPLIED ENGINEERING PROBABILITY AND STATISTICS  
STAT 3800**

Page 2 of 2

- 7. Inferences concerning means
  - a. point estimation
  - b. Interval estimation
  - c. Tests of hypothesis
  - d. Tests concerning one mean
  - e. Tests concerning two means
- 8. Inferences concerning variances
  - a. Estimation of variances
  - b. Hypothesis concerning one variance
  - c. Hypothesis concerning two variances
- 9. Inferences concerning proportions
  - a. Estimation of proportions
  - b. Hypothesis concerning one proportion
  - c. Hypothesis concerning several proportions
  - d. Contingency tables
  - e. Goodness of fit
- 10. Selected topics
  - a. Introduction to regression
  - b. Student projects

**4.0 Teaching Methodology**

- 4.1 Methods to be Used:** The class will be presented primarily in lecture form.

**5.0 Evaluation**

- 5.1 Basis for Determining Final Grade:** The grade will be determined primarily from examinations and problem assignments.

**6.0 Resource Material**

- 6.1 Textbook(s) or Other Required Readings:** Scheaffer, *Probability and Statistics for Engineers*, 4<sup>th</sup> edition, Duxbury Press.
- 6.2 Current Bibliography of Resources:** Bowker and Lieberman, *Engineering Statistics*, Prentice Hall  
Brownlee, K.A., *Statistical Theory and Methodology in Science and Engineering*, Wiley and Sons.  
Guttman, Wilks, and Hunter, *Introductory Engineering Statistics*, Wiley and Sons.