Spring, 2013

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
SYLLABUS

I. MATH 335 - MATHEMATICAL STATISTICS I - 3 Credits

II. Catalog Description

Probability, random variables and probability distributions, mathematical expectation, special probability distributions and probability densities. MATH 335 may be considered as an introductory course in probability theory.

Prerequisite: Math 311

III. Objectives

A. To introduce probability theory as a basis for further study in mathematical statistics.

B. To prepare secondary education mathematics teachers for teaching topics related to probability and statistics.

C. To prepare students for Mathematical Statistics II.

IV. Course Outline

A. Introduction
   1. Historical background
   2. Mathematical preliminary: combinatorial methods
   3. Mathematical preliminary: binomial coefficients

B. Probability
   1. Sample spaces
   2. Events
   3. The probability
   4. Some rules of probability
   5. Conditional probability
   6. Independent events
   7. Bayes' Theorem

C. Probability Distributions

1. Random variables
2. Discrete probability
3. Continuous random variables
4. Probability density functions
5. Multi variate distributions
6. Marginal distributions
7. Conditional distributions

D. Mathematical Expectation
1. The expected value of a random variable
2. Moments
3. Chebyshev's Theorem
4. Moment-generating functions
5. Product moments
6. Moments of linear combinations of random variables
7. Conditional expectations

E. Special Probability Distributions
1. The discrete uniform distribution
2. The Bernoulli distribution
3. The binomial distribution
4. The negative binomial and geometric distributions
5. The hyper geometric distribution
   Binomial approximation to the hyper geometric
6. The Poisson distribution
   Poisson approximation to the binomial
7. The multinomial distribution
8. The Multivariate hyper geometric distribution

F. Special Probability Densities
1. The uniform density
2. The gamma, exponential, and chi-square distributions
3. The beta distribution
4. The normal distribution
5. The normal approximation to the binomial distribution

V. Suggested Text

John E. Freund's Mathematical Statistics, 8th Ed., by Miller & Miller, Pearson, 2014.

VI. General Education Credit

This course cannot be taken for general education credit.

Revised 04/25/13