MATH 474 – Probability and Statistics

Course Description from Bulletin: Elementary probability theory including discrete and continuous distributions, sampling, estimation, confidence intervals, hypothesis testing, and linear regression. (3-0-3)

Enrollment: Not applicable for AM majors. Credit not granted for both MATH 474 and MATH 475

Textbook(s): Walpole, Meyers, Meyers, Ye, *Probability and Statistics for Engineers and Scientists,* 7th ed., Prentice Hall

Other required material: None

Prerequisites: MATH 251

Objectives:

1. Students will learn basic rules of probability, basic counting techniques, and be able to compute and interpret means and variances.
2. Students will learn discrete random variables such as the binomial, the geometric, the negative binomial, the hypergeometric and the Poisson.
3. Students will explore continuous random variables such as the uniform, the gamma (which includes the exponential and the chi-square) and the normal. Applications such as the normal approximation via the central limit theorem to the binomial will be discussed.
4. Students will learn point and interval estimation for various parameters. The parameters will include the population mean and variance and the binomial probability of a success. After exploring the one sample situation the two sample case will also be covered. Also prediction intervals, for future observations, will be explored.
5. Students will explore hypothesis testing of various parameters for both one sample and two. The parameters are those included in our confidence interval estimation.

Lecture schedule: 3 50 minute (or 2 75 minute) lectures per week

Course Outline:	Hours
1. Probability	4
2. Random variables and probability distributions	5
3. Mathematical Expectation	5
4. Some discrete probability distributions	5
5. Some continuous probability distributions	5
6. Functions of random variables, Moments	4
7. Random sampling, Data description, and Fundamental sampling distributions	5
8. One- and two- sample estimation problems	5
9. One- and two- sample tests of hypothesis	4

Assessment:	Homework	20-30%
	Quizzes/Tests	40-50%
	Final Exam	20-30%

Syllabus prepared by: Andre Adler and Art Lubin
Date: 12/17/05