MATHEMATICS 321
"MATHEMATICAL PROBABILITY"
Spring 2005
SYLLABUS

NOTE: <u>All quizzes</u> will be written in the lab. No formula sheets permitted for the quizzes.
<u>Final</u> will be arranged by the registrar's office. One standard sized formula sheet permitted.

Schedule for quizzes and midterm

Quiz 1 May 25th
Quiz 2 June 1st
Quiz 3 June 8th
Midterm June 10th
Quiz 4 June 15th
Quiz 5 June 22nd

No classes on Monday, May 23rd and Friday, June 3rd.
Classes end on Friday, June 24th.

Topics Covered

(1) **Chapter 1**: populations, parameters, samples, histograms, distributions, mean, variance…
(2) **Chapter 2:** sample spaces, events, counting techniques, probability measure, conditional probability, independence, Bayes' Rule…
(3) **Chapter 3, omit 3.10**: discrete random variables, probability distribution function of the geometric, binomial, negative binomial, hypergeometric, poisson random variables, expected value and variance for discrete random variables; moments and moment generating function; Chebyshev's inequality and its proof. The multinomial distribution.
(4) **Chapter 4, omit 4.7 and 4.11**Continuous random variables, probability distribution functions and cumulative distribution functions of continuous random variables;, uniform, normal distributions, gamma distribution and its special cases, the exponential and chi-square distributions, expected values, variance, and moment generating functions of continuous random variables;, Chebyshev's inequality.
(5) **Chapter 7 (7.1, 7.2, 7.3 and 7.5):** The Central Limit Theorem and its application, including the sampling distribution of the sample mean and the Normal approximation to the Binomial Distribution.
(6) **Chapter 8 (8.5 – 8.7):** Introduction to estimation and statistics inference, point estimation and unbiasedness. Using pivotal quantities to construct confidence interval estimates, confidence interval estimation of the population mean and proportion…
(7) **Chapter 10 (10.1-10.4, 10.6, 10.8):** Hypothesis testing of the population mean and proportion. Type I and Type II error, power of a test, p-values.