

**MATHEMATICS 323**  
**“INTRODUCTION TO MATHEMATICAL STATISTICS”**  
**Summer 2005**

**Syllabus and Important Dates.**

NOTE: All quizzes will be written in the lab. No formula sheets permitted for the quizzes.

Midterm will be written in class on July 29<sup>th</sup>.

Final will be written on August 15<sup>th</sup> in class. One-sided formula sheet permitted.

**Schedule for quizzes and midterm**

Quiz 1 July 13<sup>th</sup>

Quiz 2 July 20<sup>th</sup>

Quiz 3 July 27<sup>th</sup>

Midterm July 29<sup>th</sup> (written in class)

Quiz 4 August 3<sup>rd</sup>

Quiz 5 August 10<sup>th</sup>

Final August 15<sup>th</sup> (written in class)

No classes on Monday, July 25<sup>th</sup> and Monday, August 1<sup>st</sup>.

**Topics Covered**

- (1) **Chapter 5:** Bivariate and Multivariate probability distributions, Marginal and Conditional Probability Distributions; Independent Random variables; Covariance and other expectations. The Bivariate Normal Distribution.
- (2) **Chapter 6 (6.1-6.7):** Functions of Random Variables, including the method of transformation (Jacobian method) and the method of moment generating functions for more than one random variable. Order statistics and their applications.
- (3) **Chapter 7 (7.2):** Sampling distributions; the derivation for the chi-square, t, and F distribution; Revisit the central limit theorem and derive the distribution of the sample variance.
- (4) **Chapter 8 (8.1-8.4):** Estimation; unbiasedness, mean square error, evaluation of point estimators. Confidence interval estimation for the difference between two population parameters; confidence interval estimation for the population variance.
- (5) **Chapter 9 (9.2, 9.3, 9.6,9.7):** Some properties of point estimators, including relative efficiency, consistency; some common method of obtaining point estimators, including the method of moments and maximum likelihood estimation.
- (6) **Chapter 10:** Developing formal hypothesis tests using discrete and continuous distribution theory, Type I and Type II errors, power of a test and the Neyman-Pearson Lemma, P-values, uniformly most powerful tests, likelihood ratio test.
- (7) **Chapter 11 (11.1-11.9):** Simple Linear Regression Analysis: Least squares estimation, inference for estimated coefficients, prediction, model assessment, correlation and the coefficient of determination.

