ENG 205 **Mathematical Statistics** **Fall 2002**

Course Policies and Syllabus

Instructor	Herbie Lee
Office	Baskin Engineering 151
Email	herbie@ams.ucsc.edu
Phone	
Office Hours	Monday/Thursday 2-3pm or by appointment

Web page: http://www.soe.ucsc.edu/classes/engr205/Fall02/

Lectures: Tuesday, Thursday 10:00-11:45am, Soc Sci 1 room 149

Required Text: *Introduction to Mathematical Statistics*, Robert V. Hogg and Allen T. Craig, Fifth Edition (1995)

Prerequisites: Knowledge of vector calculus and linear algebra is required. The key skills are the ability to set up and evaluate a double integral (including choosing appropriate limits of integration) and the ability to evaluate a determinant.

Course Objectives: To introduce the basic ideas of probability and statistics with a rigorous mathematical approach. All topics will be covered from a Frequentist (Classical) perspective. The Bayesian approach will largely be left for future courses (e.g., ENG 206). Topics are detailed in the schedule on back.

Homework: Homework will be due every Tuesday in class (starting on Oct 1). You may discuss homework freely with other students, but you must write up assignments on your own. You must show your work for full credit. The material in this course will build upon itself, so it is important for you to keep current. Please note that if enrollment is high, not all problems on each assignment will be graded.

Reading: There is a lot of material in this course and it will go quickly. I may not have time to cover everything in class, so you will be expected to read the relevant sections of the text (listed in the schedule and course notes).

Exams: There will be an in-class midterm on Tuesday, October 29, and a final exam on Wednesday, December 4 from 8-11am, as designated by the registrar. Both exams are open book/notes, and be sure to bring a calculator. The midterm will cover material from chapters 1-5 of the text (assuming we follow the schedule on page 2), and the final will be comprehensive.

Course Grade	Homework:	55%
	Midterm:	15%
	Final Exam:	30%

Tentative Schedule for Math Stat ENG 205 Fall 2002

Date	Sections	Topics
Sep 19		Intro to the course
	1.1-1.4	Basics of probability
24	1.4	Bayes' theorem
	1.5-1.7	Random variables, distribution functions
26	1.8-1.10	Expectation, Chebyshev's inequality
	2.1-2.3	Multivariate distributions, correlation
Oct 1	2.4-2.5	Independence
	3.1	Bernoulli and binomial distributions
3	3.2-3.5	Poisson, gamma, exponential, chi-square, and normal distributions
8	4.1-4.3	Functions of a random variable, transformations
10	4.4-4.6	Beta, t, and F distributions, order statistics
15	4.7	Moment generating functions, characteristic functions
	4.8-4.9	expectations of functions of RV's
17	4.10	Multivariate normal distribution
	5.1-5.3,5.5	Limiting distributions, convergence, laws of large numbers
22	5.4	Central limit theorem, delta method
	6.1	Point estimation, maximum likelihood
24	6.1	Method of moments
		Review
29		Midterm Exam
31	6.2-6.3	Sampling distributions, confidence intervals
Nov 5	6.4-6.6	Hypothesis testing
7	7.1-7.3	Measures of quality of estimators, sufficient statistics
12	7.4-7.9	Properties of statistics, exponential families
14	8.2-8.3	Fisher information, Cramér-Rao inequality
19	9.1-9.3	UMP tests, likelihood ratio tests
21	8.1	Introduction to the Bayesian approach
26		Review