

## Course Policies and Syllabus

Instructor	Herbie Lee
Office	Baskin Engineering 151
Email	herbie@ams.ucsc.edu
Phone	459-1655
Office Hours	Mondays 1:30-2:30pm, Thursdays 4-5pm or by appointment

**Web page:** <http://www.soe.ucsc.edu/classes/engr205/Fall04/>

**Lectures:** Tuesday and Thursday, 10:00-11:45am, Nat. Science Annex 103

**Required Text:** *Introduction to Mathematical Statistics*, Robert V. Hogg and Allen T. Craig, Fifth Edition (1995), or Hogg, McKean, and Craig, Sixth Edition (2005).

**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. Topics will generally be covered from a Frequentist (Classical) perspective. The Bayesian approach will largely be left for future courses (e.g., AMS 206 and 207). The schedule on back gives a detailed list of topics.

**Homework:** Homework will be due every Tuesday in class (starting on Oct 5, and excluding Nov 2). 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 may 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, November 2, and a final exam on Wednesday, December 8 from 12-3pm, 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.

<b>Course Grade</b>	Homework:	62.5%
	Midterm:	12.5%
	Final Exam:	25%

## Tentative Schedule for Math Stat AMS 205 Fall 2004

Date	Sections	Topics
Sep 23	1.1-1.4	Intro to the course Basics of probability
28	1.4 1.5-1.7	Bayes' theorem Random variables, distribution functions
30	1.8-1.10 2.1-2.3	Expectation, Chebyshev's inequality Multivariate distributions, correlation
Oct 5	2.4-2.5 3.1	Independence Bernoulli and binomial distributions
7	3.2-3.5	Poisson, gamma, exponential, chi-square, and normal distributions
12	4.2-4.4	Functions of a random variable, transformations
14	4.1, 4.4-4.6	Beta, $t$ , and $F$ distributions, sampling theory, order statistics
19	4.7 4.8-4.9	Moment generating functions, characteristic functions expectations of functions of RV's
21	4.10 5.1-5.3,5.5	Multivariate normal distribution Limiting distributions, convergence, laws of large numbers
26	5.4 6.1	Central limit theorem, delta method Point estimation, maximum likelihood
28		Review
Nov 2		Midterm Exam
4	6.1 6.2-6.3	Method of moments Sampling distributions, confidence intervals
9	6.4-6.6	Hypothesis testing
11	7.1-7.3	Measures of quality of estimators, sufficient statistics
16	7.4-7.9	Properties of statistics, exponential families
18	8.2-8.3	Fisher information, Cramér-Rao inequality
23	9.1-9.3	UMP tests, likelihood ratio tests
30	8.1	Introduction to the Bayesian approach
Dec 2		Review
8		Final exam (12-3pm)