

SU DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE  
 SYLLABUS (*Tentative*)  
 MATH 414/514 *Mathematical Statistics II*

**Objective:** To learn how probability theory is used to design statistical methods. Emphasis will be on the design of methods. MINITAB will be used to implement and demonstrate various methods.

**Intended for:** Students in Mathematics.

**Prerequisite:** Mathematical Statistics I (MATH 413).

**Text:** "Probability and Statistical Inference," by DeGroot and Schervish; Addison Wesley, 3<sup>rd</sup> edition, 2002.

	<i>Weeks</i>
<b><i>Estimation</i></b>	2.5
Statistical Inference Prior, and Posterior distributions, Bayne's Estimators, Maximum Likelihood Estimators, Sufficient Statistics	
<b><i>Sampling Distributions of Estimators</i></b>	3.0
Chi-Square distribution, joint distribution of mean and variance, the t distribution, confidence intervals, unbiased estimators	
<b><i>Testing Hypotheses</i></b>	3.5
Neyman-Pearson Lemma; best critical regions; power; sample size; Bayes test procedures, the F distribution, Likelihood Ratio Tests; applications selected from classical tests	
<b><i>Categorical Data and Nonparametric Methods</i></b>	2.5
Chi-Square Tests, Simpson's Paradox, robust estimation, sign and rank tests	
<b><i>Overview of Linear Statistical Methods</i></b>	1.5
Simple linear regression, Bayesian inference	
<b><i>Tests</i></b>	<u>1.0</u>
	14.0

**EVALUATION**

Boardwork	10%
Homework & Quizzes	15%
Tests	45-50%
Final Exam	25 - 30%

Graduate students will be assigned special homework/test problems or projects.

**NOTE:** Once a student has received credit, including transfer credit, for a course, credit may not be received for any course with material that is equivalent to it or is a prerequisite for it.