

Fall 9-1-2000

MATH 441.01: Mathematical Statistics

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MATH 441 Mathematical Statistics Fall, 2000

<u>Instructor:</u>	Jon Graham Math 202 243-2561, jgraham@lolo.math.umt.edu
<u>Time:</u>	Mon, Wed, Fri, 10:10-11:00am
<u>Room:</u>	Math 305
<u>Textbook:</u>	Probability and Statistics, 2nd ed. / DeGroot
<u>Office Hours:</u>	To be announced, By appointment
<u>Course Webpage:</u>	http://lennes.math.umt.edu/~jgraham/math441/math441.html
<u>Grading:</u>	Homework: 30% Exams 1,2: 40% Final: 30%
<u>Prerequisites:</u>	MATH 251 (Calculus III), Math 341 (Intro to Prob/Stat)

Homework will be assigned at the beginning of class every Friday, to be handed in at the beginning of class the following Friday. NO LATE HOMEWORK WILL BE ACCEPTED FOR ANY REASON, and the lowest homework grade will be dropped. Homework is not only a fairly substantial portion of your grade, but is vital to your success in this class. Working with other students on homework is allowed and even encouraged, so long as you hand in your own work, and do not simply copy someone else's work. Solutions to all problems will be provided.

Exams 1 & 2 will be cumulative and closed book. More about the exams, including the exact dates of the exams will be given later. If you cannot make it to an exam, you must let me know **BEFORE** the exam is given. No make-up exams will be given without a documentable reason for missing the exam.

The **Final exam** is scheduled for 8:00am-10:00am on Friday, December 22. More will be said about the final at a later date.

Course Material and Objectives: This course reviews and builds upon introductory material in probability and statistics. It will cover topics such as probability theory, random variables and their probability distributions, expectation, and the Central Limit Theorem. Some goals of this course are to provide a foundation for more advanced studies in probability, to understand how to approach and think about a problem, and to demonstrate the numerous applications of probability and statistics. Throughout the course, the Splus computer package will be used both in class and in homeworks to illustrate probabilistic concepts.

Additional Course Information:

The last day to add or drop this course by phone is Monday, September 25.

The last day to add or drop this course or change the grading option is Monday, October 16.

Questions are strongly encouraged, both during class and at office hours. If you are lost or confused, please let me know.

Summary of Topics

1. Probability Theory (Chapters 1,2)
 - (a) Background, Interpretations
 - (b) Set Theory
 - (c) Kolmogorov's Axioms, Probability Results
 - (d) Combinatorics
 - (e) Multinomial Coefficients
 - (f) Independence
 - (g) Conditional Probability
 - (h) Bayes' Theorem
 - (i) Markov Chains
 - (j) Gambler's Ruin
2. Random Variables and Probability Distributions (Chapter 3)
 - (a) Discrete and Continuous Distributions
 - (b) The (Cumulative) Distribution Function
 - (c) Bivariate Distributions
 - (d) Marginal and Conditional Distributions
 - (e) Univariate and Bivariate Transformations of Variables
3. Expectation (Chapter 4)
 - (a) Expectation and Properties
 - (b) Variance
 - (c) Moments, Moment Generating Functions
 - (d) Mean, Median, Mean Squared & Absolute Error
 - (e) Covariance, Correlation
 - (f) Conditional Expectation
 - (g) Sample Mean and Convergence Properties
4. Special Distributions (Chapter 5)
 - (a) Discrete Distributions
 - i. Bernoulli, Binomial, Hypergeometric, Poisson, Negative Binomial
 - (b) Continuous Distributions
 - i. Normal, Gamma, Beta, Bivariate Normal
 - ii. Central Limit Theorem