STATISTICS 610-602 – THEORY OF STATISTICS I
(Practical Theory of Probability)
Section 602, Fall Term, 2004

STAT 610 Course Information

Time and Place:	MWF 10:20am–11:10am, Blocker 163.
Instructor:	Daren Cline.
Office:	Blocker 459D, 845-1443.
E-mail:	dcline@stat.tamu.edu
Office Hours:	MWF 8:30am–10:00am or by appointment.
Grader:	Beverly Gaucher, Blocker 415A, 845-9774. hours: TBA (questions about grading only). email: bgaucher@stat.tamu.edu
Course Web Page:	http://stat.tamu.edu/~dcline/610.html
Text:	G. Casella and R. Berger, *Statistical Inference, 2nd ed.*, Duxbury.
References:	(On reserve in Evans Library) E.J. Dudewicz and S.N. Mishra, *Modern Mathematical Statistics*, Wiley. J.E. Freund, *Mathematical Statistics, 6th ed.*, Prentice-Hall. R.V. Hogg and A.T. Craig, *Introduction to Mathematical Statistics, 4th ed.*, Macmillan. A.M. Mood, F.A. Graybill and D.C. Boes, *Introduction to the Theory of Statistics, 3rd ed.*, McGraw-Hill. V.K. Rohatgi, *An Introduction to Probability and Mathematical Statistics, 2nd ed.*, Wiley.
Prerequisite:	Three semesters of calculus, including • theory of functions • continuity and differentiation • multiple integration • multivariate transformations and Jacobians • power series • Laplace transforms • limits • Taylor's expansion Undergraduate introduction to statistics (e.g., STAT 211 or STAT 414), including • random variables and their probability distributions • normal distribution • expectation and variance • sample mean and its properties • Student's t-test Statistical or mathematical computing experience is not necessary.

STAT 610 Grading

Homework:	Homework will be assigned (on the course web page) and collected regularly. Homework is worth 20% of the total term score. *Please see the homework policy below.*
Exams:	Two midterm exams worth 22.5% each and a final exam worth 35%. *Please see the exam policy below.*
Exam Dates:	Exam I: TBA. Exam II: TBA. Final Exam: Tuesday, 14 December, 8:00am–10:00am.
Grading scale:	A: 85%–100%. B: 70%–84%. C: 60%–69%.

STAT 610 Course Policies

Homework Policy: Your homework solutions must be your own work, not from outside sources, consistent with the university rules on academic dishonesty. I expect you to follow this policy scrupulously. Your performance on the exams is much more likely to be better.

You may use:

- Your textbook and notes from class.
- Your notes, homework, etc., from a related class that you took or are taking.
- References listed on the syllabus.
- Discussion with the instructor or grader.
- Voluntary, mutual and cooperative discussion with other students currently taking the class.

You may not use:

- Solutions manuals (printed or electronic) and copies of pages from solutions manuals.
- Solutions from previous classes.
- Solutions, notes, homework, etc., from classes taught elsewhere or at another time.
- Solutions, notes, homework, etc., from students who took the class previously.
- Copying from students in this class, including expecting them to reveal their solutions in "discussion".

Exam Policy: Each exam will be comprehensive, cumulative and closed book. I will not expect you to quote theorems and results explicitly but I do expect you to demonstrate that you can make use of them. Specifically, you will need to:

- Show all your work. This does not necessarily mean showing every individual algebraic or calculus step - but it must be clear what those steps are.
- Identify (by number, name or description) any theorems, examples or homework problems you use.
- Clearly identify the solution and/or the end of a proof or derivation.

No other resources are acceptable (no calculator).

Please bring your own paper. I ask that separate problems be on separate sheets.

Copies of my old exams will be available on the course web page.

Makeup Policy: This is based on university policy.

- If you must miss an exam due to illness or circumstances beyond your control, notify me or the Statistics Department *before* the exam. See me immediately after you return (within one day) to schedule a make-up exam.
- Incompletes will be given only in the event that circumstances beyond your control cause prolonged absence from class and the work cannot be made up.

STAT 610 Course Outline

Topic	Section
1. The Probability Measure	
1-1. Randomness	
1-2. Sample Spaces and σ-algebras	1.1
1-3. Axioms and Properties	1.2
1-4. Counting Rules	1.2
1-5. Conditional Probability and Bayes' Theorem	1.3
1-6. Independence	1.3
2. Working with Random Variables	
2-1. Random Variables	1.4
2-2. Distributions, pmf's and pdf's	1.5, 1.6
2-3. Transformations	2.1
2-4. Expectation	2.2
2-5. Moments, Mean and Variance	2.2, 2.3
2-6. Generating Functions	2.3
2-7. Quantiles	
3. Special Families of Distributions	
3-1. Occurences and Waiting Times	3.2, 3.3
3-2. Random Sampling	3.2
3-3. Gamma Distributions and Friends	3.3
3-4. Reliability	3.3
3-5. Location and Scale	3.5
3-6. Exponential Families	3.4
4. Handling Multiple Random Variables	
4-1. Discrete Multivariate Distributions	4.1, 4.2, 4.3
4-2. Continuous Multivariate Distributions	4.1, 4.2, 4.3
4-3. Expectations and Conditional Expectations	4.1, 4.2
4-4. Covariance and Correlation	4.5
4-5. Bivariate Normal Distribution	4.5
4-6. Mixtures and Hierarchical Models	4.4
5. Bridging to Statistics	
5-1. Random Samples and Statistics	5.1
5-2. Sums, Means and Moments	5.2
5-3. Statistical Limit Theorems	5.5
5-4. Random Normal Samples	5.3
5-5. Order Statistics and Quantiles	5.4