Mathematical Sciences 301
Introduction to Statistical Methods

Course Syllabus (Sections 1 and 2, Summer I 2000)

Instructor: Matthew J. Saltzman
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Office Hours: Daily, 2:30–3:30pm or by appointment.

Teaching Assistant: Jonathan Edds, Office Hours TBA, `jedds@clemson.edu`

Class Time/Room: Daily 9:45–11:15am (Section 1) or 11:30am–1:00pm (Section 2), Martin M-201.

Description: An introduction to the basic concepts of statistical reasoning and data analysis. Applications of statistical reasoning in commonly encountered practical problems are presented, with an emphasis on interpretation and communication of results. A laboratory component introduces the use of software packages for calculations and graphical analysis. Topics include data description, exploratory analysis, sampling, experimental design, elements of probability, the normal distribution, confidence intervals, hypothesis tests, and linear regression. (Prerequisite: MthSc 106, 207 or 210).

Textbook and materials:

- **Required:** Moore and McCabe, *Introduction to the Practice of Statistics 3/e*, W. H. Freeman and Co., 1999 (ISBN 0-7167-3502-4).

- **On reserve:** Gonick and Smith, *A Cartoon Guide to Statistics*, Harper Perennial, 1993. This is a surprisingly well-written "once over lightly" for many of the basic ideas that we will cover. Gonick draws the cartoon features that appear regularly in *Discover* magazine.

- Other material as announced and available through my Web page.

Grading:

Quizzes, homeworks, etc.	15%
Midterm exams	$3 \times 17\%$
Final exam (cumulative)	34%
Total	100%

Ground Rules:

Attendance: You are strongly encouraged to attend class. The class time is your primary opportunity to clarify points of difficulty, learn about the instructor's expectations on tests, and get help with problems. It is also the best time for the instructor to get to know you, which in most cases is to your benefit. Finally, you get assignments, turn them in, and take pop quizzes in class, so class attendance can have a direct effect on your grade.

In case of unplanned instructor absence, class will be canceled after 20 minutes.

Assignments and quizzes: Homework will be assigned each class, which you are expected to complete before the next class meeting. Although they may not be collected every day, you are responsible for the material covered in the problems. Your work on these assignments constitutes your primary involvement in the course. It is *essential* that you not fall behind in this work. You should keep a systematic homework notebook with your solutions to all homework problems.

If you would like comments on your solutions to uncollected homework problems, turn them in at the next class, and I will look at them. You are encouraged to work together on problems to enhance your understanding.

To encourage you to keep up with the assignments, short quizzes may be given occasionally. These will generally be taken directly from problems assigned for homework. Missed quizzes and late assignments will be given a grade of zero. There will be no makeups.

Exams: Test questions will indicate the number of points a correct answer is worth. Tests will be graded on the basis of your work, not on the answer alone. Comments and corrections will be indicated on the graded test paper where appropriate. You will have an opportunity to see complete solutions to all test questions.

No makeup exams will be given. Your final exam grade may be substituted for one lower midterm exam grade. The final exam will be given at the published time—no exemptions, no makeups. The final exam is cumulative.

Tentative Calendar

Date	Section	Topic
May 23	1.1	Measurement, stemplots, histograms, time plots
May 24	1.2, 1.3	Center, spread, box plots, density curves, normal distribution
May 25	1.3	Calculating normal probabilities, assessing normality
May 26	2.1 2.2	Scatterplots, correlation
May 29	2.2, 2.4	The least squares line, outliers.
May 30	Exam 1	
May 31	3.1	Data and the need for design
June 1	3.2, 3.3	Experimental design, samples
June 2	3.4	Sampling distributions, bias, variability
June 5	5.1	Normal approx. of binomial distribution
June 6	5.2, 5.3	Distr. of $\bar{x}$, Central Limit Theorem, control charts
June 7	6.1	Confidence intervals
June 8	6.2	Significance tests, tests for means
June 9	6.2, 6.3	Decision tests (fixed α), type I and II errors
June 12	Exam 2	
June 13	7.1	Inference for means
June 14	7.1,7.2	Matched pairs, two-sample procedures
June 15	7.2	Pooled variance procedures
June 16	8.1	Intervals and tests for a proportion, sample size
June 19	8.2	Intervals and tests for comparing proportions
June 20	Exam 3	
June 21	10.1	Regression parameter estimation, tests
June 22	10.1	Confidence and prediction intervals for $y|x$, residuals
June 23	10.1	Outliers, influence points, correlation
June 26	Review	
June 27	Final Exam	