"We shall not cease from exploration and the end of all of our exploring will be to arrive where we started and to know the place for the first time."

T.S. Eliot


Office Hours: Reiland: Tuesday, Thursday, Friday 1:30-2:30; and by appointment.
TAs: Song Yan, Rayan Charest, Yuan Zhang: 009 Patterson Hall (Office hours TBA)

Course Description: This course will dispel the following common myths concerning statistics:

Myth #1: If I had one hour to live, I would live it in statistics class because it would seem to last forever!

Student's lament

Myth #2: If it moves, it's biology; if it changes color, it's chemistry; if it breaks, it's physics; if it puts you to sleep, it's statistics.

Bill Hogg, University of Iowa

Myth #3: Math class is tough!

Barbie's 1992 voice chip, Mattell

Statistics 302 is a statistical methods course that is a continuation of ST 301. The prerequisite is a thorough working knowledge of high school algebra.

If you hang around with nice people you get nice friends, hang around with smart people and you get smart friends, hang around with yo-yo's and you get yo-yo's for friends. It's simple mathematics.

Sylvester Stallone in Rocky

Rocky would definitely say the course is elementary in mathematical level; all we're going to do is add, subtract, multiply, divide, and take an occasional square root. But the course is conceptually rich in statistical ideas and serious in its aim to help you think about data and use statistical methods with understanding; it requires more intellectual effort than the low mathematical level suggests.

The primary goals of the course are to enable you to: i) incorporate statistical thinking into your everyday lives; ii) intelligently apply appropriate data-gathering and data-analysis techniques in other courses and in your professional work; iii) pursue meaningful advanced study in the field of statistics. Interesting examples to convey the broad applicability of statistical methods will be provided, but the principal emphasis throughout the course will be the logic of statistical inference from experimental data.

**Student CD-ROM:** Every text includes a CD-ROM that contains, among other things, the *Electronic Encyclopedia of Statistical Examples and Exercises* (EESEE) application, which is a rich repository of case studies applying the concepts in the text to various real-world venues such as the mass media, sports, natural sciences, social sciences, and medicine. Each case study is accompanied by practice problems, and most include full data sets exportable to various software packages.

In addition to the EESEE application, the CD also contains interactive statistical applets, self quizzes in multiple-choice format for each chapter, additional chapters on nonparametric tests and logistic regression, video clips showing real-world applications of statistics, and special electronic statistical tools.

**Exams:** There will be three exams during the semester and a final exam. No exemptions from the final exam will be granted; the final exam will be given only during final exam week at the place and time scheduled by the registrar. For every exam each student is allowed one 3" x 5" card containing formulae, definitions, and any other information the student thinks will be helpful for the exam. Calculators are required for exams. Exams will be announced at least one week in advance; exams will be given to students outside of class only under very extenuating circumstances. No exam will be given during the last week of class.

- **Exam dates:**
  - Exam 1: Fri. 2/2
  - Exam 2: Fri. 3/2
  - Exam 3: Wed. 4/4
  - Final Exam: Fri. 5/4, 8-11 AM

**Homework:** Twelve homework sets will be assigned during the semester. Each homework assignment will be worth 30 points. **No homework grades will be dropped when determining the course grade.** I will use WebAssign (https://www.webassign.net/ncsu/login.html), an internet-based facility, to distribute and grade the homework. You will be allowed 3 attempts for each homework assignment. Students are encouraged to discuss homework problems with each other; however, submission of the answers must be done independently. Violations of this rule will not be tolerated and will be considered cheating.

**Labs:** The lab meets once a week and is meant to be an introduction to the SAS system, a combination of a statistical package, a database management system, and a high-level programming language. At each lab an assignment will be given that is graded on a 15 point basis. Your 5 best SAS assignment scores will be used to determine your course grade.

**Lecture Worksheets:** During many lectures a lecture worksheet will be distributed. The worksheet will require individual or group participation in a basic activity related to recent lecture material and will be collected at the conclusion of the lecture period. The worksheet will not be graded for accuracy and correctness, but rather is intended to give you feedback without the fear of gradebook reprisals. You will be credited with 5 points for each worksheet that is handed in. Approximately 20 worksheets will be completed during the semester; the best 15 lecture worksheet grades will be used in determining your course grade.

**Grading:** The following components will contribute the indicated points to your final grade:

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams I, II, III</td>
<td>100 each</td>
</tr>
<tr>
<td>Final Exam</td>
<td>100 points</td>
</tr>
<tr>
<td>Homework</td>
<td>360 points</td>
</tr>
<tr>
<td>Labs</td>
<td>75 points</td>
</tr>
<tr>
<td>Lecture worksheets</td>
<td>75 points</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>910 points</strong></td>
</tr>
</tbody>
</table>

If your score on the final exam is higher than the lowest of your first 3 exam scores, I will substitute the mean of your lowest score and final exam score for that lowest score (note that the final exam score will NOT be replaced in this manner). If you have an unexcused absence from one of the
first three exams, I will substitute the lowest of your other three (2 midterms and final) exam scores for the missed exam score. Your grade in the course is assigned according to the percentages shown in the table below. The percentage score, rounded to 2 decimal places, is determined by summing your homework score (360 total points possible), lecture worksheet score (75 points possible), lab score (75 points) and exam scores (400 total points possible) and dividing this sum by 910.

**GRADING SCALE PERCENTAGES:**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>&lt;60</td>
</tr>
<tr>
<td>D-</td>
<td>60.00</td>
</tr>
<tr>
<td>D</td>
<td>62.49 to 67.49</td>
</tr>
<tr>
<td>D+</td>
<td>67.50 to 70.00</td>
</tr>
<tr>
<td>C-</td>
<td>70.00 to 72.50</td>
</tr>
<tr>
<td>C</td>
<td>72.49 to 74.99</td>
</tr>
<tr>
<td>C+</td>
<td>77.50 to 79.99</td>
</tr>
<tr>
<td>B-</td>
<td>80.00 to 82.49</td>
</tr>
<tr>
<td>B</td>
<td>82.49 to 87.49</td>
</tr>
<tr>
<td>B+</td>
<td>87.50 to 90.00</td>
</tr>
<tr>
<td>A-</td>
<td>90.00 to 92.49</td>
</tr>
<tr>
<td>A</td>
<td>92.50 to 97.99</td>
</tr>
<tr>
<td>A+</td>
<td>98.00</td>
</tr>
</tbody>
</table>

**Grading: Special Considerations**  THERE AREN'T ANY!! Do not ask for individually-tailored opportunities for extra credit (such as additional homework or projects) to enhance your grade, particularly at the end of the semester. All students will be assigned a grade based on the work that is assigned to the entire class. If you need to attain a specific grade in this course for whatever reason, make plans at the beginning of the semester to do the work necessary to attain the grade, and stay with the plan.

Students may be given an IN (incomplete) grade for work not completed because of a serious interruption in their work not caused by their own negligence. See http://www.ncsu.edu/policies/academic_affairs/pols_regs/REG205.00.13.php for University IN grade policy. In the case of a student medical condition, no incomplete grade for this course will be considered without a verifiable, written doctor's note indicating more than two week's incapacitation. **Makeup work will be accepted at the discretion of the instructor and must be arranged at the student's initiative within two weeks of due date, prior to two weeks before the end of classes.**

**Class Attendance:** Consistent class attendance is expected and strongly recommended; past experience indicates that excessive absences will hurt your grade.

**Academic Integrity Policy:** Any form of academic misconduct is a violation of the Student Code of Conduct and will not be tolerated. Academic misconduct may be defined as "any activity which tends to compromise the academic integrity of the institution, or subvert the educational process". I expect complete honesty in the completion of exams and assignments. The student's signature on an exam means that the student neither gave nor received unauthorized aid. No help should be offered or accepted during an exam. Cheating on an exam at the least will result in an F in the course. Students are encouraged to discuss homework problems with each other; however, submission of the answers must be done independently. Violations of this rule will not be tolerated and will be considered cheating; violators at the least will receive a 0 on the assignment. Further details on academic integrity are in NC State University's Code of Student Conduct (http://www.ncsu.edu/student_conduct). Also please note the existence of the University policy on academic integrity found in the Code of Student Conduct (in Appendix L of the Handbook for Advising and Teaching and http://www.ncsu.edu/policies/student_services/student_discipline/POL11.35.1.php).

**Student Effort:** **Statistics is not a spectator sport!** Like any other endeavor, you will get out of this course what you put into it. The material that we discuss in this course does not "go away" when
the semester is over. The remainder of your undergraduate career and your career after graduation will benefit greatly if you learn this material now rather than later when teachers and bosses simply assume it is already part of your analytical toolbox. Some of you are already involved in careers and have nonacademic jobs, but for most of you school is your primary job; treat this class as part of that primary job. In the workplace, skipping days on the job can have negative consequences (such as getting fired!) Your college courses are no different.

i) **Prerequisites:** The mathematical prerequisite for this course is minimal - high school algebra. Do not let this elementary level prerequisite deceive you as to the level of intellectual effort required. For example, since the 4th grade you've been familiar with topics we discussed early in the course such as histograms and mean, median, and mode; however, prior to this, calculation was probably emphasized. Throughout this course calculations will be a “given”; we will quickly move beyond calculation to understanding, analysis, and interpretation.

ii) **Attendance** Consistent class attendance (lecture and lab) is expected and strongly recommended. In a rather large lecture class such as this it is natural to feel anonymous and invisible, which in turn makes it easy to rationalize that “cutting” class is inconsequential. **This is not the case!** Experience shows that poor attendance causes many student problems and has a negative impact on grades. There are good reasons for occasionally missing class (your own or a family member's illness, for example). If you are diligent in your attendance when you are able to attend, legitimate absences beyond your control should not be a problem.

iii) **Homework** The best way to learn the course material is to do the homework! The Chinese proverb you've heard many times before applies here: “I hear, I forget; I see, I remember; I do, I understand”. I used to count only the top 5 homework grades but too many students became “minimizers”: they would get good grades on the first 5 assignments and then not do any more homework; their grades the last 2/3 of the semester reflected this lack of effort. It is deceptively easy to walk out of the lecture convinced that you understand the material and that no additional effort is necessary. Do not fall into this trap!

iv) **Lecture Worksheets** The purpose of these worksheets is to actively involve you in the recent lecture material in a non-threatening manner; they are not graded so you can muddle your way through the problems without fear of gradebook reprisals. **The key here is effort.** The worksheet will frequently be where you perform for the first time some of the many statistical operations on your calculator that you must learn. Those students who make minimal effort defeat the purpose of the worksheets. If you make an honest individual or group effort the worksheets will show you, without penalty, what you do not yet understand about the lecture material and enable you to focus your homework effort and exam preparation.
ST 302_002 Spring 2007
Statistical Methods II

Syllabus


TOPIC OUTLINE

"But where shall I begin?" asked Alice. "Begin at the beginning," the King said gravely, "and go on till you come to the end; then stop."

Lewis Carroll, Alice's Adventures in Wonderland

UNIT 1 Sampling Distributions; Central Limit Theorem
Sections 5.1-5.2

UNIT 2 Confidence Intervals and Hypothesis Tests: General Concepts
Sections 6.2-6.4 & Supplementary Notes

UNIT 3 Confidence Intervals and Hypothesis Tests for Means: One and Two Samples
Sections 7.1-7.3 & Supplementary Notes

UNIT 4 Confidence Intervals and Hypothesis Tests for Proportions: One and Two Samples
Sections 8.1-8.2 & Supplementary Notes

UNIT 5 Categorical Data Analysis
Sections 9.1-9.3 & Supplementary Notes

UNIT 6 Inference for Simple Linear Regression
Sections 10.1-10.2 & Supplementary Notes

UNIT 7 One-Way Analysis of Variance
Sections 12.1-12.2 & Supplementary Notes

UNIT 8 Two-Way Analysis of Variance
Sections 13.1-13.2 & Supplementary Notes

UNIT 9 Nonparametric Statistics
Sections 15.1-15.3 (on the CD-ROM included with the text)
Rights of Students

1. Students have the right to be treated as adult human beings.
2. Students have the right to be taught in an understandable manner.
3. Students have the right to ask questions and to clarify their understanding without being harassed or embarrassed.
4. Students have the right to receive their education from high quality teachers who are experts in their field.
5. Students have the right to evaluate their teachers and the evaluations should have an effect.
6. Students have the right to expect certain services and courtesies from the teacher. For example:
   A. The teacher should provide the class with a course syllabus on the first day of class and should follow the syllabus.
   B. The teacher should have posted office hours, and should be present during those hours.
   C. The teacher should grade tests and homework within one week.
   D. The teacher should be present in the classroom during tests to answer questions.
   E. The teacher should be prepared for class.
   F. The teacher should begin and end class on time.

7. Students have the right to expect that all university rules and policies will be enforced, and that violations will be dealt with immediately.
8. Students have the right to be graded fairly, and to graded consistently with other students in their section. Student should be told how they will be graded in the course syllabus.
9. Students have the right to be tested fairly and to know what material will be covered on a test. Material on a test should be representative of material covered in class and assigned on homework. Students have the right to know the correct test answers, grading scale, grade average and distribution on a test.
10. Students have the right to a classroom environment that is conducive to learning. Students have the right to a lecture free of annoying distractions caused by other students.

Rights of Faculty

1. Students will do homework and prepare for class by doing assigned readings.
2. Faculty have the right to privacy in their offices. For example, if a student arrives unannounced and not during office hours, the faculty member has the right to ask the student to return during office hours or to make an appointment.
3. Faculty have the right to expect certain courtesies from the students in the classroom. For example:
   A. Students should make every effort to be in the classroom on time (late arrivals are disruptive and distracting to the other students).
   B. Students who know that they will leave class early (for job interviews, etc.) should inform the instructor at the beginning of class.
   C. Students should put “The Technician” away when class begins.
   D. Students should make every effort to stay awake during class.
   E. Student should refrain from disruptive or distracting behavior during class (extended conversations with neighbors, squeezing aluminum soft drink cans, etc.)