Math 111

Introduction to Applied Statistics

Spring 2012

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Office Hours:
MW 2:00 – 3:00
TuTh 1:30 – 3:00
or by arrangement

Grades

Course grades will be determined on the basis of two midterms, a final exam, daily exercises, homework, and two group projects. All graded activities will be combined into a weighted percentage (details available if you wish) that will be converted to a course grade on a scale that is at least as generous as the following:

93 – 100	A	80 – 82	B–	65 – 67	D+	
90 – 93	A–	77 – 80	C+	< 65	D, D–, or F	(depending in part on a subjective assessment of your work)
88 – 90	B+	70 – 77	C			
82 – 88	B	67 – 70	C–			

Final exam is scheduled Friday, May 4, 8:30 – 11:00 a.m. Note that this is late in the exam week. The final will **not** be offered any other time – *please plan accordingly*.

Midterm exams are *Wednesday evenings*, February 15 and March 28, at 7:00 p.m. (If Wednesday evening is not suitable for you, you will have the option of taking the exam at some time on Thursday.)

Daily exercises After nearly every class meeting, you will be given a set of exercises that will encourage you to think about and practice techniques related to the material introduced in the class lecture that day. These exercises will be posted in our class folder on the academic file server. They may require you to use software (see below) or pencil-and-paper. While you may work on daily exercises with other students and/or tutors in the Math Support Center, you must write up solutions to the daily exercises in your own words. You will grade your own daily exercise using a solution sheet which is also available in the class folder on the academic fileserver. You will then hand in your graded work at the next class meeting. You will receive a grade of either Completed (full credit) or Not Completed (no credit); to receive credit your write-up must be *complete*, *neat*, and *graded*.

Homework There will be approximately 8 to 10 homework assignments during the semester, which are longer, more formal, and more comprehensive than daily exercises. You will hand these in to be graded. While you are allowed to work with other students or with assistance from tutors at the Math Support Center, you must write out the solutions to each homework assignment in your own words.

(Over)

Projects There will be two group projects during the semester which will require that you synthesize skills and concepts from multiple topics in the class. On each project you will work in a group, and your group will turn in a single scientific report. In general, you will be able to choose the data for these projects from a collection of data

sets that we have assembled for this course. Some of these data sets are from research projects undertaken by Rhodes faculty and students.

Software

We will use two statistical software packages. *Fathom* is a teaching tool that introduces and illustrates many of the important concepts of the course. *SPSS* is a professional statistical package that is widely used in research. (From time to time, Microsoft *Excel* may be useful as well.)

Electronic copies

Electronic copies of many course documents and files (handouts, daily exercises and solutions, homework assignments, data sets, etc.) will be placed in the public folder for this course on the academic file server. This is the **only way** that homework assignments will be distributed. You are also invited to access other documents in the folder whenever you like.

Textbook There is no textbook for this course. Plentiful supplementary resources will be available in class and in the class folder on the file server.

Cell phones Please turn them OFF.

Computers Obviously there are computers in our classroom. During class time they are for class activities only: no Facebook, email, assignments for other courses, etc.

Tutors for Math 111 will be available at the Math Support Center (upstairs in Ohlendorf) on a regular basis. The exact schedule will be announced soon.

Policy on homework collaboration

Working together with other people is a great way to learn statistics. I encourage you to work together on the daily exercises and homework, if you find that it helps you to learn. However, homework for this course is also graded, as part of your final course grade. Each student must write up his or her own homework solutions. By handing in homework solutions to be graded, you are promising that you took part in solving the problems, and that you are not just copying someone else's work. Similarly, on group projects, if your name is on the project write-up, you are promising that you did a share of the work in the process of solving the problems and creating the report. Handing in homework or projects when you did not actively participate in their creation is a violation of the Honor Code.

Make-up Exams and Extensions on Assignments

Extensions on the due dates of assignments and individual re-scheduling of exams will be granted only for the following reasons:

- Serious and verifiable illness or medical emergency
- Participation in an *official* Rhodes College activity (e.g., course field trip, sports team travel)
- Religious holidays
- Major life event (such as birth, wedding, death) – your own or a close family member
- Other genuine emergency that is beyond your control

Notice that this is an extensive list. It does not, however, include situations in which the timing of an exam or assignment is simply inconvenient for you. In particular, there will be no accommodation for ordinary travel arrangements before or after college breaks.

If you wish to request an extension or re-scheduling because of a situation which can be known ahead of time, it is your responsibility to make arrangements in advance. Permission might not be given after the fact. You may be asked to make your request in writing.

In all cases, your instructor is the final judge of whether an accommodation is warranted.

About the course

Statistics is an exciting, dynamic, and intrinsically interdisciplinary science. Modern statistics is widely employed in government, business, and the natural and social sciences. The work of statisticians powers search engines like Google, is critical to the exploration of the human genome, and is applied constantly in the worlds of economics and finance.

Computers are transforming the field at a breathtaking pace. This semester, our approach to the two main tasks of statistical inference – constructing *confidence intervals* and executing *hypothesis tests* – will be motivated by simulations and visualizations in a software environment. These kinds of approaches are quickly coming to shape the way statistical analysis will be carried out in years to come. Because hard drive space is becoming much cheaper (i.e., it is easy to collect and store vast quantities of data) and processing speeds are becoming much faster (i.e., it is easy to do more things with data than ever before), the world of tomorrow will be dominated by the kind of computer-driven data analysis we will undertake this semester.

Course goals Any student who successfully completes this course should come away with a robust and applicable understanding that:

- Statistics helps us acquire knowledge and make decisions;
- Variation occurs in every measurable process;
- Inferences about populations are made based on the characteristics of samples;
- Valid inference requires randomization (or good sampling techniques);
- Valid conclusions can be drawn from experiments only when the experimental design is sound;
- Because variation occurs, all inferences have probabilities that quantify the uncertainties associated with them.

In addition, students who successfully complete this course should be able to make randomization-based inferences using a software package like *Fathom*, as well as more traditional normality-based inferences using a software package like SPSS. Students should be able to use either approach to undertake statistical investigations in appropriate upper-division work at Rhodes College. The techniques we will learn from these two perspectives include one- and two-sample inferences on proportions and means, inferences related to correlation and linear regression models, and a sampling of inferences in other settings.