22S:008 *Statistics for Business*, Spring 2001

Instructor

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Lectures: MWF McBride Auditorium **8:30 a.m.!!!**

Teaching Assistants

Check course web page for current TA information

Required Course Materials (available at University Bookstore, IMU)

Text: *Statistics for Business: Data Analysis and Modeling*, second edition, by Jonathan D. Cryer and Robert B. Miller, 1994, Duxbury Press. Available at the University Bookstore.

Software Manual: *Minitab Handbook for Windows, Release 13*, fourth edition, to accompany *Statistics for Business: Data Analysis and Modeling*, fourth edition, by Jonathan D. Cryer, 2000, Haden-McNeil Publishers. Available at the University Bookstore for $17.80.

You will also need a blank computer disk for storing data for homework problems. The datasets needed for working many of the text exercises may be found on the University ITC network and may also be downloaded to your own disk.

Optional Course Materials

Multimedia CD-ROM and Workbook: *An Electronic Companion to Business Statistics* by Jonathan D. Cryer and George W. Cobb, 1997, Cogito Learning Media. A multimedia CD-ROM and workbook study aid. The CD-ROM contains review material with animations, video clips, interactive screens, and hundreds of self-test questions to assess your knowledge. It works on both Windows and Macintosh computers. The best source for the *Electronic Companion* is online at www.JourneyEd.com for $29.95. Other sites, including the publisher, sell it for a higher price. The University of Iowa Bookstore can get it for $49.95.

Solutions Manual: *Student's Solutions Manual for Statistics for Business: Data Analysis and Modeling*, second edition, by Jonathan D. Cryer and Robert B. Miller with assistance from Phyllis Barnidge, 1994, Duxbury Press.

What is *Statistics* Anyway?

This course is about statistics or really, statistics for business. Statistics includes the study of procedures for collecting and interpreting data that inform people about the world around them. Statisticians are experts on how to design studies that yield relevant and meaningful data as efficiently as possible, on how to interpret data in light of theories, and on how to present the conclusions of empirical studies truthfully and clearly.

Data may come from a carefully designed experiment, a sample survey, or from a data base of regularly kept records. But all data vary. People have different tastes and preferences. Even in a carefully controlled experiment results vary to some degree. Measuring devices such as thermometers and scales are imperfect. Results also vary when an experiment is performed under different conditions. Variability arises from seasonal factors such as the increase in retail sales preceding seasonal holidays and from environmental factors such as the natural warming that takes place during the day. In surveys variability arises because different people have different opinions, different ages, different cultures, and so on. Survey results also vary because we only collect data on a part of the group we wish to study—a sample. Variability is inherent in various processes—when a coin is tossed it sometimes comes up tails and sometimes heads. Business sales vary from month to month.

***Statistics* is the systematic study of variation in data: how to measure it, display it, model it, and use it to gain new knowledge.**

Variation, variation, variation—you will hear that a million times before we are finished this semester.

Responsibilities

We cover a lot of material in this course—17 chapters in all. You will need to read ahead and read some material mostly on your own. I will make clear as we go what you are or are not responsible for in the book. **Exams and quizzes cover material from lectures, the book, and videos that I will show.** I will spend lecture time discussing examples, doing demonstrations, and elaborating on more difficult material. TAs will use time in the discussion section guiding you through the use of the statistical computer software (Minitab), discussing homework, administering quizzes, and answering questions. **The discussion section will not repeat the lecture material.**

Please turn off all cell phones, pagers, and other electronic communications devices during lecture. We have work to do.

Many students find this to be a very difficult course. Very few students are able to master this course without keeping up on a regular basis. You expect me to be prepared for class and I will be. In return, **I expect you to be present and be prepared**. This means you must do your reading, attend lecture and discussion sections regularly, and study your class notes and appropriate sections of the book ***before*** attempting the week's homework assignment. **The discussion section cannot be used to repeat lectures that you missed**. The TAs and myself are available during office hours at a variety of times. If these hours don't fit your schedule please ask us to meet you at some mutually agreeable time. (However, don't forget that the TAs are students also and have many constraints on their time.)

We also have a ***Statistical Tutorial Lab*** in 629-631 Phillips Hall that is open a variety of times for extra help. Check the class Web page for more information. Do not wait until the week of the first exam to get help (or, worse yet, *after* the first exam).

The material in this course is very cumulative. If you get off to a poor start it is very difficult to catch up. Most people find the first third of the course to be fairly easy, the middle third harder, and the last third much more difficult. You have been warned!

Approximate Pace and Coverage

Week	Topic	Chapter
1	Introduction and Problem Formulation Tools	1 & 25
2	Plotting Process Data	2
3	Plotting Distributions	3
4	Summarizing Continuous Data and Describing Categorical Variables	4 & 5
5	Relating Continuous Variables	6
First Midterm Exam: Thursday, February 22, 2001		
6	Straight-Line Models	7
7	Multiple Regression Models	8
8	Multiple Regression Models (continued)	8
9	Normal Distributions	9
10	Control Charts for Continuous Variables	10
Second Midterm Exam: Thursday, March 29, 2001		
11	Binomial Distributions and Control Charts for Binary Variables	11 & 12
12	Data Collection	13
13	Sampling and Confidence Intervals for Proportions	parts of 14 & 15
14	Significance Tests, Confidence Intervals, and Prediction Intervals	17
15	Wrapup	17
Comprehensive Final Exam: Monday, May 7, 2001, 7:30–9:30 a.m. !!!		

Minute Papers

At the end of many lectures I will ask you to take **one minute** to write a ***minute paper***. Minute papers ask you to constructively criticize that days' lecture so that questions which remain may be addressed at the next lecture. The minute paper questions are always the same.

1. **What was the most important thing you learned during today's class?**
2. **What would you like to learn more about?**
3. **What was the "muddiest" part of this class?**

I will remind you of the questions at the end of each lecture. A small amount of ***extra credit*** will be given for minute papers that are thoughtfully written. This is one of several opportunities for you to give me feedback on the course. Please use it! Of course, you may always talk to me personally or by email or phone.

Evaluation and Grading

There will be two midterm exams as announced above. A **comprehensive final exam** will be given Monday, May 7, 2001 at **7:30 a.m**. Homework assignments will be collected nearly every week. Assignments must be in on time to be counted. Short quizzes will be given every week. These will usually be given in lecture and but sometimes in the discussion sections. They will ***not*** be announced ahead of time.

Grades will be based on the following table. This system permits each of you to get an A. Of course, this also means that each of you could fail! **Grades will not be done "on the curve."** A curve forces me to give only a few As and also forces me to assign a certain percentage of Fs even if the lowest scoring student does fairly well! **You are not competing against your fellow students. Rather, you are attempting to learn a certain body of material as well as you possibly can.**

Grade	Percent†		Grade	Percent
A+	95		C+	75
A	90		C	70
A–	88		C–	68
B+	85		D+	65
B	80		D	60
B–	78		F	<60

† percent of possible points

Your composite score S is based on the equation: $S=0.25M_1+0.25M_2+0.35F+0.05Q+0.10D$ where M_1=% correct on first midterm, M_2=% correct on second midterm, F=% correct on final, Q=% correct on quizzes, and D=% correct in discussion (includes homework and participation). Missed quizzes cannot be made up, except as required by University policies, that is, "illness, mandatory religious obligations, or other unavoidable circumstances or University activities (*University Operations Manual*, 50.021)."

Ground Rules for Homework

Your name and section number should appear at the top of the page. Homework must be submitted as original work—no photocopies. ***Do not copy*** straight out of the *Student's Solution Manual*—use your own words! Computer paper with notes written in here and there will not be accepted. Computer output which relates to a problem must be "copied and pasted in" at the appropriate place with full English sentences explaining what it means. This is quite easy to do electronically and is a valuable skill to learn for future work in business and elsewhere. In general, homework should be written as a report explaining as you go—not isolated numbers and phrases without context. **Late homework and missed quizzes or exams cannot be made up**, except as required by University policies, that is, "illness, mandatory religious obligations, or other unavoidable circumstances or University activities (*University Operations Manual*, 50.021)."

Computer Software

We will be using Minitab® Statistical Software for all of our statistical analyses. The *Minitab Handbook* shows you, in a step-by-step manner, how to use Minitab to solve all sorts of statistics problems. Be sure to bring the *Minitab Handbook* to your weekly computer lab discussion sessions. Minitab has a simple word processor built-in, the ReportPad®. It permits you to write-up and print computer based homework problems with ease.

Some quizzes and exam questions will test your knowledge of Minitab. It is the most widely used statistical software in all universities and colleges around the world. It is also used in most of the best corporations around the world including, for example, Motorola and General Electric.

Minitab is available for your use in all of the campus Instructional Technology Centers (ITCs) such as Schaeffer Hall ITC (41 SH), Weeg ITC, the Information Arcade, IMU ITC, Stanley ITC, Quadrangle ITC and the College of Business ITC. If you have access to your own IBM-compatible or Macintosh computer you may wish to purchase or rent a copy of the software. The normal single copy price of this software is $995.00. However, the University of Iowa has made an agreement with Minitab, Inc. for bulk purchasing. You may purchase Minitab for Windows, Release 13, (or Release 10.5 for Macintosh) for about $106 through the University Bookstore, Iowa Memorial Union. **You have to ask for it at the textbook office in the very back. It is not shelved with the other computer software**. These are the same versions currently available in the ITCs. You can also download a full demo version of Minitab from their Web site at Minitab.com. This is the full version but it will only work for 30 days.

The full version of Minitab for Windows, Release 13, may also be ***rented*** for $25.99 for a semester from www.e-academy.com. Check out their web site for more details.

Please note: You are *not* required to buy or rent a copy of the Minitab software for this course.

I must hear from anyone who has a disability which may require some modification of seating, testing or other class requirements so that appropriate arrangements may be made. Please see me after class or during my office hours.