# Statistics

Welcome to Math 2200! My name is Professor Edward Spitznagel. This is an introductory course in statistics and the underlying probability theory supporting it.

## Times and Places

The two sections of our course meet Monday, Wednesday, and Friday 10-11 and 11-12 in Busch 100. **Before you come to class, please study the section of the book to be covered that day.**

My *official* office hours are from 12 to 1 on Monday and Wednesday, in Room 118 of Cupples I. However, I am there at other times, on average perhaps 80 hours a week (Me, a workaholic?), and you are *welcome* to knock anytime you see the light on. My telephone number is 935-6745.

## Textbook

The text is De Veaux, Velleman, and Bock's *Stats: Data and Models*, Second Edition. When you first get a look at it, the cover may give you the impression that it is a "blow-off" book, written by people at bottom-of-the-barrel schools. I assure you that's not true. In fact, I encourage you to look up the rankings of their schools at:

http://www.wsjclassroomedition.com/pdfs/wsj_college_092503.pdf

As opposed to the USNews rankings, this ranking by the Wall Street Journal is fully objective, based solely on the percentage of their graduates admitted to the best professional programs in the country.

## Hand Held Technology

The **Texas Instruments calculators TI-83, TI-84, and TI-89** contain essentially every probability function and statistical program we will be using during the course. It would be foolish not to use such technology in our course, as it saves memorizing a huge number of arcane formulas. I have therefore declared the above to be the official calculators for the course. These calculators obviate use of the tables in the back of the book. Hence, I will not provide those tables for the examinations. ***Verbum sapienti.***

## Homework

There is no graded homework. In past years, only about half of the graded homework was picked up. I've concluded that students will be better off just keeping their homework to study from for the examinations.

I have recommended six homework problems per class meeting, with the promise that 60% of the examination questions will come from those problems. **Before you come to class, please read the recommended homework problems for that day.**

Two will be odd-numbered, with answers in the back of the book. Since the answers are provided, you can practice and test your knowledge by doing them.

Four will be even-numbered. I will usually work two of the even-numbered problems in class. That leaves you with two problems

whose answers and solutions are not available to you.

For those of you who wish, a grader will provide you with feedback on those two problems via email. By 9AM of the Tuesdays and Thursdays following the Monday and Wednesday classes, you may drop off your solutions of the two problems in the Math Dept office, Room 100 of Cupples I. Following the Friday class, you may slip your solutions under my door, Room 118 of Cupples I, by noon Saturday.

Please write only on the front side of each page, use a paperclip (not a staple) to hold them together, and pull off any jaggies if you tore them out of a notebook. Print your Washington University email address ***clearly*** at the top of each page. We will score your solutions and email you scanned copies.

For those of you studying as a team, submit one copy. Whoever submits it will receive the email and can forward it to everyone else. We're sorry that, due to the limitations of our scanner, we can only email a scored assignment back to a single address.

There are two simple conditions on this offer. First, we will only score original, handwritten work, not photocopies. Second, we will only score good-faith attempts to solve the problems. We will not write in solutions, or even provide answers, on blank sheets of paper.

We will keep no records of how well you did on these problems. This is strictly a feedback service. Therefore, there is no need to give us your name; just provide your email address.

## Examinations

As mentioned earlier, examinations are closely linked to the homework problems. If you faithfully work the problems, you should have no trouble scoring well on the examinations. Each examination will contain twenty-five multiple-choice questions, of which fifteen will be homework problems with altered numbers. You may bring one 4×6 inch notecard to each examination.

Over the four examinations, you can achieve a maximum of 100 points. At the end of the semester, the A range will be 90 and above, the B range will be 80 to 90, the C range will be 70 to 80, and the D range will be 60 to 70, with plus and minus grades at the tops and bottoms of each of these ranges.

Students ask if I ever grade on a "curve." Curve grading was popular about fifty years ago. It assigned six letter grades A, B, C, D, E, and F based on a Gaussian, also called a "normal" curve. The grade of A corresponded to being 2 standard deviations above the mean and was awarded to the upper 2.5% of all students. I doubt any of you would like grades to be assigned based on that system.

Instead, I will follow the modern convention, in which the A range will be 90 to 100, the B range will be 80 to 90, the C range will be 70 to 80, and the D range will be 60 to 70, with plus and minus grades at the tops and bottoms of each of these ranges. If you are registered pass/fail, you must achieve at least 70 points to pass, which is the lowest score for a C−.)

In addition to calculating the straight sum of points, I will also average the examination scores following a weighting process, in which each in-semester examination counts 20% and the final counts 40%, giving you whichever score is higher.

The latter weighting system rewards students who have tended to improve over the semester.

## Examination Schedule

The three in-semester examinations will be given from 6:30PM to 8:30PM the following **Tuesday evenings**: September 22nd, October 20th, and November 17th.

The final examination will be given on **Friday, December 11th, 3:30PM-5:30PM**.

As always, examination room assignments are posted on the Math Dept website:

http://www.math.wustl.edu/seatlookup/

the day of the examination.

# Computing

Real statistical analysis is practical only in the context of computer statistical packages. Since it is not practical to allow computers in the examination room, there is no way to test you on your ability to compute. However, since the software in the **TI-83** and its cousins closely follows the style of computer packages, you will learn the basics of statistical computation as you do the homework and the examination problems.

I will occasionally show you how the problems can be solved using MS Excel and professional statistical software such as SAS. While we do not expect you to become skilled at doing data analyses with a computer, it is very important for you to be able to read intelligently the results of such analyses. The authors of our textbook realize this, and from time to time they display computer output (usually without identifying which software package generated it). If I show you computer output in class and explain what it contains, you can expect that I will devote questions to it on our examinations. Those will be part of the ten questions that are not taken directly from the homework.

By comparison, students in Math 3200 will be taught how to do data analysis in four of the most powerful and popular computer packages, SAS®, STATA®, R®, and SPSS®. If you have the prerequisites for Math 3200, you might consider taking it rather than Math 2200. Knowledge of how to do statistics with these packages can open a lot more doors than just a basic knowledge of statistics.

# Recommended Homework

Here are the recommended homework problems. In each day's list, two are odd-numbered, for which you will find answers in the back of the book.

Mastering these and faithfully reading the book should give you the two hours-out-of-class-for-every-one-in-class needed for success in the typical undergraduate course.

Two schools, CalTech and MIT, award credits equal to the weekly sum of lecture hours and expected amount of hours outside of class. As a reality check, I visited their websites and found the credits for their equivalent statistics courses to be:

CalTech: Ma112a lists 9 units of credit.
MIT: 18.443 lists 12 units of credit.

Thus, these two schools expect their students to spend between two and three hours outside of class for every hour inside class.

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|---|---|---|
| Aug 26 | Chapter 2 | 15,18,20,22,24,25 |
| Aug 28 | Chapter 3 | 11,15,16,18,30,38 |
| Aug 31 | Chapter 4 | 18,22,26,33,39,42 |
| Sept 2 | Chapter 5 | 18,26,29,33,36,38 |
| Sept 4 | Chapter 6 | 38,40,42,45,49,50 |
| Sept 7 | Labor Day Holiday | |
| Sept 9 | Part I Rev. | 22,28,33,36,38,39 |
| Sept 11 | Chapter 7 | 18,20,26,33,34,35 |
| Sept 14 | Chapter 8 | 42,44,46,47,49,50 |
| Sept 16 | Chapter 9 | 19,22,24,25,26,28 |
| Sept 18 | Chapter 10 | 12,23,27,28,30,32 |
| Sept 21 | Part II Rev. | 33,36,37,38,40,42 |
| Sept 22 | **First Examination** | |
| Sept 23 | Chapter 11 | 11,24,32,34,35,36 |

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| Sept 25 | Chapter 12 | 24,26,28,29,31,32 |
| Sept 28 | Chapter 13 | 24,26,27,38,42,43 |
| Sept 30 | Part III Rev. | 30,34,35,36,39,40 |
| Oct 2 | Chapter 14 | 27,28,32,34,35,38 |
| Oct 5 | Chapter 15 | 26,35,36,40,41,44 |
| Oct 7 | Chapter 16 | 17,26,34,36,39,40 |
| Oct 9 | Chapter 17 | 28,38,39,40,43,44 |
| Oct 12 | Part IV Rev | 33,34,37,39,42,44 |
| Oct 14 | Chapter 18 | 29,30,36,38,39,42 |
| Oct 16 | Fall Break | |
| Oct 19 | Chapter 19 | 6,11,14,25,34,38 |
| Oct 20 | **Second Examination** | |
| Oct 21 | Chapter 20 | 13,16,18,21,26,30 |
| Oct 23 | Chapter 21 | 15,16,20,23,24,28 |
| Oct 26 | Chapter 22 | 15,16,17,24,26,28 |
| Oct 28 | Part V Rev. | 22,25,28,32,37,38 |
| Oct 30 | Chapter 23 | 7,8,14,26,33,34 |
| Nov 2 | Chapter 24 | 1,8,17,26,28,30 |
| Nov 4 | Chapter 25 | 17,18,26,28,29,30 |
| Nov 6 | Chapter 26 | 3,4,11,12,16,30 |
| Nov 9 | Part VI Rev. | 12,13,15,16,26,44 |
| Nov 11 | Chapter 27 | 1,2,6,8,10,15 |
| Nov 13 | Chapter 27 | 28,29,30,3× L.R. |
| Nov 16 | Chapter 28 | 1,2,8,13,14,16 |
| Nov 17 | **Third Examination** | |
| Nov 18 | Chapter 28 | 5,6,12,18,19,22 |
| Nov 20 | Chapter 29 | 2,8,16,18,19,21 |
| Nov 23 | Chapter 30 | 1,2,3,4,6,10 |
| Nov 25 | **Thanksgiving Holiday** | |
| Nov 27 | **Thanksgiving Holiday** | |
| Nov 30 | Chapter 30 | 7,8,11,12,14,16 |
| Dec 2 | Chapter 31 | 1,2,3,4,8(just 5) |
| Dec 4 | Chapter 31 | 5,6,7,10,12(just 5) |
| Dec 7 | Part VII Rev. | 2,5,8,22,31,38 |
| Dec 8-10 | Reading Period | |
| Dec 11 | **Final Examination** | |