

# Statistics

**W**elcome 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

**T**he 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 8:00 to 8:45 on Monday, Wednesday, and Friday in Busch 100. After class ends at noon, I typically take the Metro down to the Med School. You might find me in Room 118 of Cupples I when I get back late in the afternoon. You are *welcome* to knock anytime you see the light on. However, I do recommend calling in advance to see if I'm in. My telephone number is 935-6745.

## Textbook

**T**he text is De Veaux, Velleman, and Bock's *Stats: Data and Models*, Third Edition. If you buy the "official" bundled text at the bookstore, you get not only the book but also a student version of Minitab software and a couple of handy reference cards.

## Hand Held Technology

**T**he **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 a resource 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. Since most of you own one from your high school days, you probably don't need to buy anything (other than perhaps a fresh set of AAA batteries). 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.*

I repeat: just because the book gives you tables of statistical functions in Appendix D, you should not expect those tables to be supplied with your examinations. The TI-83, TI-84, and TI-89 have all those functions built in, more accurately than you could look up values from those tables. In calculus, you didn't use tables of square roots or sines. In statistics, the analogues are the normal, t, chi-square and F distribution functions, and they're all built into the calculators. Of course, you should practice using these new-to-you functions, and you can use the Appendix D tables to check yourselves.

## Attendance

**I**do not give even one extra point for regular attendance, nor do I keep track of who comes to class. However, I have kept a record of who picked up their exams as a rough attendance measure. Generally, those who always picked up their exams got grades of A. Those who never picked up their exams got grades of C or lower. Whether this is causal (which is hard but not impossible to establish in statistics) or simply due to more motivated students both attending class regu-

larly *and* doing well on the exams, I can't say for sure. I just thought you'd like to know.

## Homework

**T**here is no graded homework. In previous years, less than half of the graded homework was picked up. I've concluded that students are 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 problems for that day.

Two problems 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 most commonly work two of the even-numbered problems in class. That leaves two problems whose answers and solutions are not available to you.

For those of you who wish it, a grader will provide you with feedback via email on any problems you choose to do. Those who participated regularly in this service last year all achieved course grades of A- or higher. By 9AM of the Tuesdays and Thursdays following the Monday and Wednesday classes, you may drop off your solutions of whatever problems you wish in the Math Dept office, Room 100 of Cupples I. Following the Friday class, you may drop your solutions in the Room 100 door's mail slot by 9AM Monday. (Please don't give it to me in class Monday because there's too much risk it will get mixed up with the required homework being handed in then.)

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 the pages out of a notebook. Print your

Washington University email address and the course number (Math 2200) *clearly* at the top of each page. We will score your solutions and email you scanned copies. Again, please print your e-mail address clearly. Even one mistake in your address will cause the scanner not to deliver your results, and the scanner does not tell us when that has happened. I do bring your originals to class, but with e-mail, you receive much more timely feedback.

For those of you working 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 score only original, handwritten work, not photocopies. Second, we will score only 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, *printed clearly*.

## Examinations

**A**s 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 in-semester examination, and up to four notecards to the final 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.” Rigid curve grading was popular about fifty years ago. It assigned quotas of 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 that grade assignment.

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

**T**he three in-semester examinations will be given from 7PM to 9PM the following **Wednesday evenings**: September 18<sup>th</sup>, October 16<sup>th</sup>, and November 13<sup>th</sup>.

The final examination will be given on **Thursday, December 12, 3:30PM-5:30PM..**

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

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

on the day of the examination.

## Minitab for Extra Credit!!

**I** have bundled the student version of the Minitab software with your textbook, and I am encouraging you to give it a try. While Minitab isn't as powerful as the software used in Math 3200—SAS, R, SPSS, and STATA—it's considerably more powerful than the statistical add-ons to Excel, and is very easy to use.

Beginning with the second day of class, I will give you one problem each Friday that you can solve with Minitab (excluding the Fall Break and Thanksgiving Fridays). These are worth one half point each, for a total of five extra points over the semester. Thus, by doing these extra credit problems (correctly) you can raise your course GPA by one half point (e.g., from a B+ to an A- or an A). The CD for Minitab is shrink-wrapped into the bundle, and can be installed on your own computer. The datasets are on the CD that is glued into the back of the textbook. Use the files whose names end in “txt”.

I will provide an MS Word template for each problem by class time on Friday, and the completed problem will be due in class the following Monday (except for Labor Day, with the first assignment being due on Wednesday, September 4<sup>th</sup>). If you did not buy the bundle from the bookstore, you may be able to team up with another student who has Minitab. In fact, you may work in pairs, submitting one report for two of you. If you do so, just put both of your names at the top of the first page. The limit is two per group, and I request that you do not run off extra copies for others to hand in. If we catch you in such polygamous arrangements, all group members will receive a score of zero and be barred from handing in any future assignments. This is a gentle, tentative attempt to reintroduce computing into our introductory course. If it works out well, we may make it a regular feature.

## 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 traditional two-hours-out-of-class-for-every-one-in-class needed for success in the typical undergraduate course.

At least 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 surfed 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.

Aug 28	Chapter 2	8,10,12,17,19,24
Aug 30	Chapter 3	12,18,19,32,34,37
Sept 2	<b>Labor Day Holiday</b>	
Sept 4	Chapter 4	16,17,26,28,29,30
Sept 6	Chapter 5	7,10,12,14,20,35
Sept 9	Chapter 6	14,16,35,44,47,48
Sept 11	Part I Rev	21,24,28,34,37,38
Sept 13	Chapter 7	16,17,32,36,40,41
Sept 16	Chapter 8	44,45,47,48,56,64
Sept 18	Chapter 9	9,14,30,32,33,34
Sept 18	<b>First Examination</b>	
Sept 20	Chapter 10	11,12,15,20,22,30
Sept 23	Part II Rev	1,8,10,18,19,28,34
Sept 25	Chapter 11	11,12,34,35,36,40*
*At this point in the course, you are asked to solve these problems by simulations. By the time the next exam rolls around, you will be able to replace the simulation answers with exact answers, which is what I will ask you to do on the exam.		
Sept 27	Chapter 12	2,3,6,18,34,35
Sept 30	Chapter 13	3,4,7,24,32,42
Oct 2	Part III Rev	3,6,9,12,18,30
Oct 4	Chapter 14	12,13,16,18,31,42
Oct 7	Chapter 15	4,17,38,40,42,45

Oct 9	Chapter 16	18,19,20,23,44,46
Oct 11	Chapter 17	34,30,41,43,50,52
Oct 14	Part IV Rev	27,28,37,40,42,44
Oct 16	Chapter 18	4,14,23,38,48,53
Oct 16	<b>Second Examination</b>	
Oct 18	<b>Fall Break</b>	
Oct 21	Chapter 19	3,11,12,18,24,34
Oct 23	Chapter 20	10,11,18,22,24,29
Oct 25	Chapter 21	3,15,16,24,32,34
Oct 28	Chapter 22	6,11,12,14,16,31
Oct 30	Part V Rev	6,10,18,20,31,39
Nov 1	Chapter 23	7,8,12,30,34,39
Nov 4	Chapter 24	3,6,8,11,30,36
Nov 6	Chapter 25	6,10,15,22,28,32
Nov 8	Chapter 26	9,11,16,24,28,40
Nov 11	Part VI Rev	1,2,25,34,40,42
Nov 13	Chapter 27	1,4,6,14,16,19
Nov 13	<b>Third Examination</b>	
Nov 15	Chapter 27	21,22,24,32,43,44
Nov 18	Chapter 28	1,2,5,6,8,10
Nov 20	Chapter 28	12,13,15,18,20,22
Nov 22	Chapter 29	6,8,10,12,19,21
Nov 25	Chapter 30	1,2,4,6,8,9
Nov 27	<b>Thanksgiving Holiday</b>	
Nov 29	<b>Thanksgiving Holiday</b>	
Dec 2	Chapter 30	10,12,14,15,16,17
Dec 4	Chapter 31	1,2,3,6,8,12
Dec 6	Part VII Rev	26,32,40,42,43,44
Dec 9-11	<b>Reading Period</b>	
Dec 12	<b>Final Examination</b>	