Math 3200
Elementary to Intermediate Statistics
MWF: (1) 12:00-1:00, Hillman 60; (2) 2:00-3:00, Wilson 214
Washington University in St. Louis, Spring 2016

Instructor: José E. Figueroa-López

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Course description

An introduction to probability and statistics. Discrete and continuous random variables, mean and variance, hypothesis testing and confidence intervals, simple and multiple linear regression, introduction to likelihood and bayesian Inference. The standard statistical software, R and SAS, will be introduced and used in an essential way throughout the semester.

Textbooks

A. J. Tamhane and D. D. Dunlop. Statistics and Data Analysis from Elementary to Intermediate, Prentice-Hall, 2000. (http://www.prenhall.com/tamhane)

Prerequisites:

Math 233 (multivariable calculus). We will also use some tools from discrete mathematics and (possibly) matrix algebra. Prior experience with these ideas is helpful but not essential.

Course website:

All homework assignments, handouts, and other information will be available on **Blackboard** (http://bb.wustl.edu/).

Exams:

- **Three midterm exams** and **a comprehensive final** will test your grasp of the material covered in class. Times and dates for midterm exams are set as 7:00-9:00 p.m. on Tuesdays February 9, March 8, and April 12.
- All exams are close-notes and close-book. A one-sided letter-sized page with **only formulas/equations** may be brought to each midterm. All previous midterm notes plus one additional one-sided page with formulas may be brought to the final exam. These notes would be collected and returned with the exams (just in case, make copies).
- The exams typically will be multiple choice. Exam questions are going to be drawn from both the examples/questions seen in lectures and the homework exercises, probably after some minor modifications.
- Exam questions can be done by hand with the help of a basic scientific calculator (they shouldn't be graphing calculators).
- You should always bring your Washington University Photo ID to exams. Proctors will check student's IDs.
- Make-up exams are strongly discouraged. If you are aware of a conflict, please inform the instructor before the exam. Be also aware of the following Mathematics Department policy:

The exam dates including the final were set by the College office before you registered for this class. You are therefore expected to take the exams at their scheduled times. If you are away because of a university sporting event or field trip, then you may arrange for your coach or professor to administer the exam. Excused absences may be granted in the case of illness or bereavement. All excused absences must be granted by Blake Thornton at (bthornton@wustl.edu).

Homework

- There will be about 11 HWs, roughly on a weekly basis; HWs may include 1 or 2 computer problems in R or SAS. Only a few selected problems will be graded each week and counted towards your HW score.
- The lowest two HW scores will be dropped;
- Written homework should be submitted at the BEGINNING of class on Friday. Whenever assigned, the computer portion of the homework should be submitted to bb.wustl.edu by 5pm. on the due date. NO LATE HOMEWORK WILL BE ACCEPTED.
- You will receive no credits for solutions with no work or justifications. The grader and instructor reserves the right to deduct points for messy papers.
- While it is acceptable to briefly discuss individual assignments among students, the student's work that is turn in for grading must reflect his/her understanding of the material ("almost" identical solutions will not be accepted and tolerated).

Tentative grading procedure (The following is tentative; any changes will be announced in advanced.)

- Broadly, the A range will be 85 to 100, the B range will be 70 to 85, the C range will be 60 to 70, and the D range will be 50 to 60, with plus and minus grades given to roughly the top 10% and bottom 10% students in each of these ranges.
- Weights:

Three midterm exams	15% each
One comprehensive final exam	30%
Homeworks	25%

- If you register for "Pass/Fail" (or "Credit/No Credit"), you must achieve at least 60 to pass, which is the lowest score for a C-.

Attendance:

Class attendance is encouraged. Experience has shown that students who attend class regularly perform better. Lectures will involve discussion of topics and, more importantly, solving examples that will be similar to those appearing in the exams.

Regrading Policy:

Students have only one week to request the regrading of an assignment or an exam after the time that this has been returned to the class.

Tentative course outline:

Week	Dates	Topic	Sections
1	01/20 - 01/22	Introduction to Statistics & Probability	1.1-1.2 & 2.1-2.2
2	01/25 - 01/29	Review of Probability	2.3-2.5
3	02/01 - 02/05	Review of Probability	2.7-2.9
Midterm Exam 1: Feb. 9th			
4	02/08 - 02/12	Collecting & Exploring Data	3.1-3.4† & 4.1-4.2
5	02/15 - 02/19	Exploring Data & Sampling Distributions	4.3-4.4 & 5.1-5.2
6	02/22 - 02/26	Sampling Distributions	5.3-5.4
7	02/29 - 03/04	Concepts of Inference	6.1-6.3
Midterm Exam 2: Mar. 8th			
8	03/07 - 03/11	Inference on Mean & Variance	7.1-7.3
9	03/14 - 03/18	Inference for Two Samples	8.1-8.4 & 9.1-9.2
10	03/21 - 03/25	**Spring Break**	
11	03/28 - 04/01	Linear Regression	10.1-10.4
12	04/04 - 04/08	Linear & Multiple Regression	11.1-11.3
Midterm Exam 3: Apr. 12th			
13	04/11 - 04/15	Multiple Regression	11.4-11.8
14	04/18 - 04/22	Likelihood & Bayesian Inference	15.1-15.4‡
15	04/25 - 04/29	Review‡	

† Selected concepts to be covered.

‡ if time allows it.

I hope you will enjoy this course. Have a nice semester.