STAT22000 Autumn 2013 Syllabus

Instructors

- Section 01: **Xiang Zhou** MWF 10:30-11:20am
  Office: Eck120B e-mail: xz7@uchicago.edu
- Section 02: **Yibi Huang** MWF 1:30-2:20pm
  Office: Eck 7 (basement) e-mail: yibih@uchicago.edu

Course Assistants

- Section 01: Duo Jiang – jiangduo@galton.uchicago.edu
- Section 02: Walter Dempsey – wdempsey@uchicago.edu

Course Prerequisite

STAT22000 has a math prerequisite of 2 quarter of single-variable calculus (MATH 13100-13200, 15100-15200 or 16100-16200). If you have AP Calculus credit for these prerequisite courses, you may also enroll.

In this course, you will

- do differentiation — once
- do integration — less than 5 times
- find area under a curve (using tables or softwares) — lots of times
- use summation notation — many times
- see log and exponential functions — many times
- use basic algebra, equation of straight lines, take square root — AS OFTEN AS YOU BREATH

Analysis of problems and scientific reasoning are more important than using formulas, not just "plug-n-chug".

Course Description

This course introduces statistical techniques and methods of data analysis, including the use of computers. Examples are drawn from biological, physical, and social sciences. Students are required to apply the techniques discussed to data drawn from actual research. Topics include data description, graphical techniques, exploratory data analysis, random variation and sampling, one- and two-sample problems, linear regression, analysis of variance, and analysis of discrete data.

Tentative Schedule

Week		Date	Topic	Chapter	HW due
	Mon	Sep 30	Introduction, Graphical Display of Data	1.1	
1	Wed	Oct 2	Numerical Descriptions of Data	1.2	
	Fri	Oct 4	Densities and Normal Distributions	1.3	
	Mon	Oct 7	Scatter plot and Correlation	2.1,2.2	
2	Wed	Oct 9	Least Squares Regression	2.3	HW1 due
	Fri	Oct 11	Regression, Residuals, Outliers	2.4	
	Mon	Oct 14	Experiments and Observational Studies	3.1,3.2	
3	Wed	Oct 16	Sampling, Bias and Variance	3.3,3.4	HW2 due
	Fri	Oct 18	Probability: Introduction	4.1,4.2	
	Mon	Oct 21	Probability Rules	4.5	
4	Wed	Oct 23	Random Variables	4.3	HW3 due
	Fri	Oct 25	Random Variables Continued	4.3,5.1	
	Mon	Oct 28	Mean and Variance of Random Variables	4.4	
5	Wed	Oct 30	Sampling Distributions	5.1	HW4 due
	Fri	Nov 1	Central Limit Theorem	5.2	
	Mon	Nov 4	Confidence Intervals	6.1	
6	Wed	Nov 6	Midterm Review		HW5 due
		Nov 6	**Midterm: 5-7pm in Kent 120**		
	Fri	Nov 8	Hypothesis Testing	6.2,6.3	
	Mon	Nov 11	Type I and Type II Error	6.4	
7	Wed	Nov 13			HW6 due
	Fri	Nov 15	Student t-Test	7.1	
	Mon	Nov 18	Comparing Means	7.2	
8	Wed	Nov 20	Inference for Proportions	8.1,8.2	HW7 due
	Fri	Nov 22	Inference for Two-way Tables	2.5, 9.1-9.2	
	Mon	Nov 25			
9	Wed	Nov 27	Simple Linear Regression	10.1	HW8 due
	Fri	Nov 29	*No class - Thanksgiving Holiday*		
	Mon	Dec 2	Simple Linear Regression Continued	10.2	
10	Wed	Dec 4	Summary and Review		HW9 due
	Fri	Dec 6	*No class - Reading Period*		
	Mon	Dec 9	**Final exam (Session 01)**: 10:30 - 12:30 in Eck133 (may change)		
	Wed	Dec 11	**Final exam (Session 02)**: 1:30 - 3:30 in Eck133 (may change)		

Course Webpage

- **Chalk**: http://chalk.uchicago.edu
  - Check often! Handouts/HWs/solutions/announcements are posted here
- `http://www.stat.uchicago.edu/~yibi/teaching/stat220/` — for guest only

Office Hours & Problem Sessions (Open to Both Sections)

Time	Room	Type	Lead By
Mon 5:30-6:30pm	Eck133	Problem session	CAs
Tue 4-5pm	Eck131	Office hour	Yibi Huang (STAT200/STAT220 joint)
Tue 6:30-7:30pm	Eck117	Problem session	CAs
Wed 4-5pm	Eck131	Office hour	Xiang Zhou
Thur 4-5pm	Eck131	Office hour	Yibi Huang (STAT200/STAT220 joint)

- Appointments available upon request
- The two problem sessions are identical, just pick one to attend
- Attendance to the problem sessions are optional

Textbook

Moore, D. S., McCabe, G. P. and Craig, B. (2010).
Introduction to the Practice of Statistics, **7th edition**.
W. H. Freeman and Company, New York.

Software

- We will mostly use R and calculators. R is available for FREE at: `www.r-project.org`.
- "A (Very) Short Introduction to R" by Torfs and Brauer:

  `http://cran.r-project.org/doc/contrib/Torfs+Brauer-Short-R-Intro.pdf`

Grade Components

- Homework (30%): Lowest will be dropped
- Midterm (30%)
- Final (40%)
- We do not curve.
- Exams are closed-book. You should bring **a calculator**.
- You can bring one letter-sized formula sheet for the midterm and two letter-sized formula sheet for the final.

Final Grade Options

- A Quality Grade (A, A-, B+, B, B-, C+, C, C-, D+,D, or F) will be given unless the student has registered for the grade of R (auditing) or arranges a P/F, I or W grade as outlined below.
- A P/F (Pass/Fail) grade or W (Withdrawal) may be given upon written request to the instructor (email is fine) **before the final exam starts**. The grade of P will be awarded only for work of C- quality or better.
- The grade I (Incomplete) will be given only in clear cases of emergency and must be approved by the department chair. See also the University Policy on Incompletes:

`http://collegecatalog.uchicago.edu/thecollege/gradingandacademicstatus/#grades`

Homework Policies

- Due Wednesday at the **beginning** of class
- Solutions will be posted on chalk at **2:30pm on the due day**;
- **No Late Homework!**
- **Collaboration**: You may discuss with other students with the following restrictions:
  - You must make an honest attempt at homework problems before discussing them with anyone else.
  - You must **do the final write-up independently in your own words**, and **do your own computer work**
  - You may compare final answers with others to check for mistakes.
  - If you receive substantial help on a problem, you must acknowledge it.
- Homework must be **stapled** and include **your name as the one on chalk** (no nickname please) and **section number**.
- Homework must be coherent and legible. Graphs must be properly labeled. CAs may deduct points for poorly presented solutions.
- Please show your work to get full credits.
- No credit will be given for doing incorrect problems/using wrong editions of the book.
- You are encouraged to make sure your exams and assignments are graded accurately. This includes checking if correct answers were mistakenly marked wrong or if points were added incorrectly.

Other Undergraduate Statistics courses

See the overview of all undergraduate Statistics courses:

`http://collegecatalog.uchicago.edu/thecollege/statistics/`

or talk to the Director of Undergraduate Studies, Linda Collins (lcollins@uchicago.edu), in Eck107. Students considering a major or minor in Statistics should communicate directly with Linda as well.