SOC 333 Quantitative Analysis of Sociological Data, Summer 2018
(Curriculum Code: QS, SS)

Instructor: Emma Zang
Day/Time: Mon-Fri 12:30 PM – 1:45 PM
Location: Social Sciences 107
Office Hours: Mon-Fri 2 PM – 3PM in Rubenstein Hall 233 or by appointment.
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Overview:

Do you want to better understand how to use data to predict NCAA players' performances? Do you want a career in consulting, data analytics, or quantitative research? This is an entry-level statistics class for undergraduates focusing on dealing with real life problems. After taking this course, students will be familiar with basic statistical concepts, and able to conduct elementary data analyses that are often required by the job of an entry-level data analyst. In addition to teaching students to deal with data appropriately, this course also prepares students to explain and present their analyses and results to the general public. There is no pre-requisite for this course.

Objectives:

- Explain basic concepts: population, sample, sampling distribution, probability, random variable, the Central Limit Theorem, correlation, and causation.
- Compute and plot descriptive statistics and provide appropriate interpretation of the results.
- Conduct hypothesis testing (z tests, t tests, chi-square tests) and provide appropriate interpretation of the results.
- Apply analysis of variance (ANOVA) and linear regression analysis to solve real life problems.
- Grasp basic knowledge of using the statistical software Stata.

Required Materials:

Diez, D. M., Barr, C. D., & Cetinkaya-Rundel, M. (2012). OpenIntro statistics. Minneapolis: Open Textbook Library. (Free download link: https://drive.google.com/file/d/0B-DHaDEbiOGkc1RycUtIcUtIelE/view).

Recommended Readings:

Frankfort-Nachmias, C., & Leon-Guerrero, A. (2017). Social statistics for a diverse society. Sage Publications.

Course Requirements:

- **In-class quizzes.** There is an in-class quiz at the beginning of every class. There are 10 points total for each quiz. The purpose of the quiz is to assess whether students have read the assigned background materials. As long as students submit the in-class quiz, they will obtain at least 5 points.
- **Stata Problem sets.** There are weekly Stata problem sets. Students are encouraged to work in groups but each student must submit their problem set answers independently. All problem set answers should be submitted via Sakai before class on the due date.
- **Final project report and presentation.** There is no midterm or final exam for this course. Students are required to form groups and pursue a semester-long project. Each group may have up to three people. For the project, students are required to choose a topic of their own interest, find appropriate data to address their questions, conduct data analyses that are covered by this course, write a final report of their analyses and findings, and present their work at the end of the semester. The final report is expected to be no more than 20 pages (including figures, tables and references). In the report, the contribution of each group member should be clearly stated. The final presentation is expected to be 20 minutes per group. There are 50 points for the final project report (see grading rubrics here) and 50 points for the presentation (see grading rubrics here). The final report should be submitted via Sakai before the deadline.
- **No late submission is accepted.**

Course Assessment:

See the table below for grade allocation and cut-points:

Grade Allocation		Cut-points for Final Grades	
Item	% of Final Grade	Final grade	% Point Range
In-class quizzes	10%	A+	100
Problem sets	40%	A	90-99
Final project	50%	A-	85-89
		B+	80-84
		B	75-79
		B-	70-74
		C+	65-69
		C	60-64
		C-	50-59
		F	0-49

Academic Integrity:

Please visit the website of Duke student affairs (https://studentaffairs.duke.edu/conduct/about-us/duke-community-standard) for information on academic integrity. Duke University is a community dedicated to scholarship, leadership, and service and to the principles of honesty, fairness, respect, and accountability. Citizens of this community commit to reflect upon and uphold these principles in all academic and nonacademic endeavors, and to protect and promote a culture of integrity.

To uphold the Duke Community Standard:

- I will not lie, cheat, or steal in my academic endeavors;
- I will conduct myself honorably in all my endeavors; and
- I will act if the Standard is compromised.

Disability Statement:

Students with disabilities who believe they may need accommodations in this class are encouraged to contact the Student Disability Access Office (https://access.duke.edu/students/index.php) at (919) 668-1267 as soon as possible to better ensure that such accommodations can be implemented in a timely fashion.

Preferred Contact:

Please do not hesitate to contact the instructor via email (xz127@duke.edu) with any questions or comments. Expect a response within one business day of email delivery.

Course Schedule:

Date	Topics	Readings	Assignments
July 2	Overview of the course & The research process		Beginning of semester survey
July 3	Types of data	OIS Chapter 1.2 (p.7 - p. 14)	
July 4	No class (Independence Day)		
July 5	Data collection	OIS Chapter 1.3 - 1.5 (p.15 - p. 26)	
July 6	Summarizing data I	OIS Chapter 1.6 (p.26 - p. 42); Handout 1	STATA problem set 1 open
July 9	Summarizing data II	OIS Chapter 1.7 (p.43 - p. 50); Handout 2	STATA problem set 1 due
July 10	Probability I	OIS Chapter 2.1 - 2.2 (p.76 - p. 102)	Start to form a group for final project
July 11	Probability II	OIS Chapter 2.4 - 2.5 (p.104 - p. 115)	STATA problem set 2 open
July 12	Distributions of random variables I	OIS Chapter 3.1 - 3.2 (p.127 - p. 141)	
July 13	Distributions of random variables II	OIS Chapter 3.3 - 3.5 (p.141 - p. 152); Handout 3	Notify the instructor about your final project group
July 16	Introduction to inference I	OIS Chapter 4.1 - 4.2 (p.169 - p. 180)	STATA problem set 2 due
July 17	Introduction to inference II	OIS Chapter 4.3 (p.180 - p. 194)	STATA problem set 3 open
July 18	Introduction to inference III	OIS Chapter 4.4 - 4.5 (p.194 - p. 202)	Midterm survey
July 19	One sample test	OIS Chapter 5.1 (p.219 - p. 227)	
July 20	Two sample test	OIS Chapter 5.2 - 5.3 (p.227 - p. 239)	Final project topic due
July 23	Power calculation	OIS Chapter 5.4 (p.239 - p. 245)	STATA problem set 3 due

July 24	Analysis of variance	OIS Chapter 5.5 (p.246 - p. 256)	Review session questions
July 25	Review session		
July 26	Inference for a single proportion	OIS Chapter 6.1 (p.274 - p. 279); Handout 4	
July 27	Difference of two proportions	OIS Chapter 6.2 (p.280 - p. 286)	STATA problem set 4 open
July 30	Chi-square test	OIS Chapter 6.3 - 6.4 (p.286 - p. 302)	Final project proposal due
July 31	Linear regression I	OIS Chapter 7.1 (p.331 - p. 339); Handout 5	
August 1	Linear regression II	OIS Chapter 7.2 (p.340 - p. 348)	
August 2	Linear regression III	OIS Chapter 7.3 - 7.4 (p.349 - p. 355)	
August 3	Multiple regression I	OIS Chapter 8.1 (p.372 - p. 377); Handout 6	Guest lecture questions
August 6	Guest lecture		STATA problem set 4 due
August 7	Multiple regression II	OIS Chapter 8.2 (p.378 - p. 381); Handout 7	
August 8	Multiple regression III	OIS Chapter 8.3 (p.382 - p. 385)	Review session questions
August 9	Review session		
August 10	Final project presentation		End of semester survey
August 12	End of the course, no meeting		Final project report due