Statistical Methods

COURSE SYLLABUS

Fall, 2015
Professor: Youqin Huang

CLASS HOURS:	TuTh 10:15 – 11:35 AM
CLASS LOCATION:	BB 125
OFFICE HOURS:	TuTh 3:00 - 4:00 pm and by appointment (AS 215)
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A. DESCRIPTION AND GOALS

Without statistics, you cannot survive the inform age! We now live in a world filled with data anytime and anywhere. Statistics is essential to be an informed and effective citizen, employee, or activist. The goal of this course is help students master statistics to better understand the world, and to answer questions and solve problems in their work and research. This course introduces basic statistical methods most commonly used in social sciences, including descriptive statistics, inferential statistics, and explanatory analysis. Given the diverse background of students, this course emphasizes conceptual understanding of statistical methods, knowing when to use which methods, how to use them, how to execute them in statistical software, and how to interpret the results. Thus mathematical derivation and manipulation of formulas are de-emphasized. This course aims to help students apply statistical analyses to answer their research questions and test their hypotheses. The final product is a research paper that uses statistics to answer research questions and test hypotheses.

After taking this class, students should be able to do the following:
1) Construct testable hypotheses to answer research questions
2) Collect and locate data needed to answer research questions
3) Identify the purpose and rational for each statistical method
4) Choose appropriate statistical analysis to test hypotheses and answer research questions
5) Conduct statistical analysis using SPSS and interpret results
6) Write a research paper using statistics to answer research questions
7) Evaluate and analyze statistical analyses by others

B. TEXTBOOK AND SUPPLEMENTARY MATERIALS

Required:
Linneman, Thomas, 2014. Social Statistics. NY: Routledge. ISBN: 9780415661478.
Additional readings online

References:
Lewis-Beck, Michael, S. 1989. *Applied Regression*. Newbury Park, CA: SAGE.

Burt, James, Gerald Barber, and David Rigby, 2009. *Elementary Statistics for Geographers*, 3rd edition. NY: The Guilford Press.

C. SOFTWARE

We will use SPSS for Windows to conduct statistical analysis due to its graphic user interface. SPSS is one of the most widely used statistical software for social science data analysis. Excel has become a powerful tool for data manipulation, and it can be used to input/output data and conduct basic statistical analysis. However, Excel has its limitations. For example, it does not have all statistical methods, and it can only analyze relatively small datasets with limited variables. You will learn the basics of SPSS in this course. You learn software by using it. So you are expected to devote time to practice using the software. SPSS has an online tutorial, which should be your best friend. You are expected to use SPSS for your assignments and the final paper. SPSS is available in all public computer labs on campus. By the end of the semester, you should be confident in putting SPSS as a computer skill on your resume.

D. COURSE DESIGN

The Approach: This course adopts the **Team-Based Learning (TBL)** approach. Research shows that people learn best from concrete experience, interacting with texts and with other learners, engaging in challenging reading and writing tasks, being held accountable for their work and receive feedback on their progress. As a result, I have designed this course to provide all of those dimensions.

*The Process***:** Instead of lectures, students will engage in intensive team-based in-class activities in teams that you will be placed on the first day of class and wills stay in for the entire semester. Each team will have their own team folder, where you will record members' attendance and the team scores on assignments. Your interactions and performance in your team will be crucial to your success in the course. You are not required to collaborate outside of class, although you may choose to do so in preparation for certain assignments. In-class collaborations will include team quizzes and /or test questions, and assorted in-class tasks. There will be some mini-lectures to help fill in gaps in your understanding, but the majority of class time is used for team activities when you apply statistical concepts and methods in your in-class team tasks.

Class content will be divided into 6 units, with each unit focusing on one statistical method, and with successive unit building upon concepts and skills learned from the previous unit. For each unit of study, we will go through a similar set of steps called **Readiness Assurance Process (RAP)**:

1. Readings
You will read designated chapters for the unit **before the unit begins** outside of the class. This is crucial for success in this class.

2. Individual Readiness Assessment Test – iRAT
The first in-class activity of each unit is the iRAT on the assigned readings. These tests take the form of multiple choice questions on the main ideas/concepts of the reading.

3. Team Readiness Assessment Test – tRAT
After iRAT, the same test will be taken again by teams. Students will discuss questions as a team and choose answers for questions. You will know immediately what you received on each assessment. Team scores will be posted on the white board so teams can monitor one another's performance.

4. Appeals
After tRAT is completed, teams can appeal any questions they missed on the team test. Appeals have to be in writing and by a team (instead of individuals). This is an open-book process in which teams can submit any reason they have for arguing that their answer should be considered 'correct' rather than 'wrong'.

5. Instructor Feedback
I will provide instant feedback to your questions and confusions. Mini-lecture may be given to help clarify concepts/methods.

6. Applications
As the unit progress, you will continue to read the text, and engage in in-class and out-of class activities, both on your own and as a member of your team. Most of the class time will be devoted to team activities that will allow you to apply the material learned from the readings/mini-lectures. Participation in these activities is very important for you and your teammates' success.

7. **Assessment**
Each unit will end with a final assessment, in the form of an assignment or a test.

E. COURSE REQUIREMENT AND GRADING

Individual tasks: iRATs, assessments, one research paper.
Team tasks: tRATs, in-class group activities, peer evaluations.

Individual
iRAT	10%
Assessments (assignments/tests)	35%
Research paper and presentation	30% (24% for paper, 1% for proposal, 5% for paper)

Team
tRAT	10%
Team activities/assignments	10%
Team member performance	5%

Please Note:

RATs: RATs include multiple choice questions on readings. You will take RAT twice: once as an individual (iRAT) and once as a team (tRAT). Because the process of completing the RAT as a team is essential to the experience of the course, there will be no opportunities for make-up

RATs except in extreme circumstance. You will have the option of dropping your lowest iRAT score at the end of the semester; this may be used to accommodate an absence or a poor performance.

Assessments: The end of unit assessments can be take-home assignments or in-class tests. Assignments should be typed, with polished tables and figures created by SPSS, and appropriate interpretation of the results. Do not copy SPSS output and directly past it in Word. Use Excel, Word or other software to organize/present your results effectively. The SPSS output should be attached to the assignment. Assignments are due one week after they are assigned.

Research paper: The main goal of the project is to use appropriate statistical methods to answer a research question, or test a hypothesis, using SPSS. You can choose any research question that you are interested in, or a research question (hypothesis) that is related to your thesis/dissertation or work.   In the paper, you need to demonstrate that you have mastered the basic statistical techniques and that you know when to use what method, how to conduct the analysis in SPSS, and how to interpret the results. While you are not expected to use every method discussed in class, you should use all **appropriate** methods for your purpose.   The paper is due on **Dec. 11th (Friday).**   I will give you more details about the paper later in the semester. A Power-point presentation of your research will be given in class.

Team activities: While some team activities are not grade, some are graded. There are no make-ups for in-class team activities.

Team member performance: Because your work in your teams is crucial to your success in this course as well as that of your teammates, you will be held accountable for your contribution to your team. Your team members will give you feedback on your performance at the beginning of the semester, based on your attendance, preparedness, and in-class participation. At the end of the semester, your team members will give you're an evaluation that is counted towards your final grade.

F. COURSE POLICY

Attendance: You in-class performance is crucial to your success in this course. While attendance itself is not graded, but graded in in-class tests and activities that constitute an important part of the course grade. Keeping a satisfactory final grade is impossible without consistent attendance. Missing class will automatically earn the absent student '0' for RATs and class activity. No make-up for missed in-class RATs and team activities except in documented cases of extreme extenuating circumstances.

Missing an assignment or activities that happened at the beginning of class before you arrive or at the end of class after you leave early will also earn a "0", and there will be no make-up opportunities. **If your schedule for work or other obligation conflicts with this class, and you know that it will be difficult for you to consistently get to class on time and stay for the entire period, you should drop this course and take it at a later date when your life's circumstances are more manageable**.

Late Submission: Homework assignments turned in on the due date are eligible for 100 point. If you choose to turn it in after the due date, but within 48 hours, it will be eligible for 80 points.

Assignments turned in after 48 hours will be eligible for 50 points. Assignments turned in after 72 hours receive no points, but I will give feedback.

Make-ups: There are no make-ups for in-class tests and activities, but you can drop one lowest iRAT score. This serves as a safety valve in case there are situations beyond your control that affect your performance.

Plagiarism and cheating: The instructor is required to report any student behavior that has the appearance of cheating or plagiarism to the Graduate Dean. Penalties can be quite severe, and can include 1) failure of course; 2) suspension from the university; 3) expulsion from the university; 4) a notation in your permanent transcripts.   **You cannot afford to enter professional life with any of these stains on your permanent record.**
- In individual test/quiz situations, please keep your eyes on your own work
- In individual assignments, make sure you do your own work
- In papers, make sure you properly cite and document any sources from which you have borrowed ideas or language, including books, journal articles, magazines, and the Internet.   Any information cited from these sources should be acknowledged with both in-text citation and full reference at the end of the paper.

TENTATIVE SCHEDULE
(Subject to change based on progress)

Unit	Date	Topics	Readings	RAT
0	Aug. 27 – Sept. 1	Introduction		#0 (Sept. 1)
1	Sept. 3 - 10	Research Design, Sampling and Measurement	1, Agresti and Finlay 1-2	#1 (Sept. 3)
	Sept. 15 - 17	No class		
2	Sept. 22 - 29	Descriptive Statistics: Visualizing data	2, 3	#2 (Sept. 22)
	Sept. 24	No class		
Peer Evaluation #1				
3	Oct. 1 – 15	Inferential statistics: Using sample to talk about population	4, 5, 6	#3 (Oct. 1)
4	Oct. 20 - 29	Explanatory statistics: Simple regression	7, 8, 9	#4 (Oct. 20)
5	Nov. 3 - 17	Explanatory statistics: Regression in real life	10, 11, 12	#5 (Nov. 3)
6	Nov. 19	Advanced topics	13, additional reading	
Peer Evaluation #2 (graded)				
	Nov. 24 Nov. 26 Dec. 1 – Dec. 8	Real Research: Q & A No class Student presentation		