



Minzu University of China
STAT 202-Introduction to Statistics Methods II
Summer 2020

Basic Information

Class hours: Monday through Thursday, 2 hours each day
Discussion: Friday, 1 hour (60 minutes)
Review Section: Saturday, 1 hour (60 minutes)
Office Hour: 2 hours (According to professors' teaching plan)
Field trip: According to professors' teaching plan
Credit: 4
Total contact hours: 60 (50 minutes each)
Professor: Olga Cordero-Brana

Course Description

This is a second course in applied statistics. The course will cover more complex data structures and have a higher emphasis on analyzing the relation between variables and on forecasting. The topics include comparisons of population parameters between two populations, goodness of fit, tests of independence, one-way and two-way ANOVA, multiple linear regression, logistic regression and time series data analysis. Students will also learn how to use R to manage data and carry out statistical analysis.

Prerequisites

Completion of college-level algebra. An introductory course in statistics at least including confidence interval estimation and hypothesis testing of a single population (these are the first ten chapters in the class textbook). A quick review will be provided the first day of class, but it will be assumed that the student is familiar with the topics included in the first ten chapters of the textbook. Basic knowledge in Microsoft Excel will also be necessary.

Learning Outcomes

- Formulate hypothesis and choose the appropriate tests for common data problems.
- Calculate and interpret statistics to analyze the relationship between quantitative and qualitative variables using parametric and non-parametric methods.
- Forecast using multiple linear regression and logistic models.
- Analyze time series data using detrended and seasonally adjusted variables.
- Communicate statistical results effectively and use statistical results to make decisions.
- Apply the statistical tools to common situations like clinical trials, policy evaluation, quality control and business decisions.
- Identify statistical questions in real world examples and think critically about data sources, experimental design and assumptions made in studies.
- Use R to manage data and carry out statistical tests.

Required Text

Anderson, Sweeney, Williams, Camm and Cochran (2017): Statistics for Business & Economics, Revised 13th Edition. Cengage Learning.

Required Software

- About 10% of the course grade will require the use of the software below.



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- Microsoft's Excel. Other spreadsheet software (e.g., Google Sheets, Open Office Spreadsheet, etc.) do not have the necessary tools for the data analysis we will do during the course.
- R. It is a powerful, open source and popular software for statistical analysis. You can download it from here: <https://cran.cnr.berkeley.edu/>
- R Studio. Is a software used jointly with R. It has some additional tools that makes using R simpler in some situations. You can download it from here: <https://www.rstudio.com/products/rstudio/>
- Personal computer with Windows, iOS or Linux operating system. R and R Studio will not work on Chromebooks.

Grades will be calculated as follows:

Exam 1	35%
Exam 2	40%
Homework & Quizzes	20%
Class Participation	5%

Exams

There will be two exams. There are no make-up exams under any circumstance. No exceptions.

Homework

There will be three graded homework plus additional non-graded practice exercises not to be submitted. About half of the homework grade will consist of data analysis with the use of R and Microsoft Excel. All homework is due in hard copy at the beginning of class. Late assignments or electronic submissions are not accepted. Completing the homework is an important part of learning and will help you better understand the statistical concepts and provide hands-on practice analyzing real data. Each homework set must be a unique and original homework consisting of only your work. Similar homework from different students or third-party sources will be considered cheating.

Quizzes

There may be announced or unannounced quizzes in class. If the course has quizzes, it will count towards the homework grade up to 10% of the final grade.

Use of Technology

- Smartphones, laptops and tablets are *not allowed* during lecture without my explicit consent. All cellphones should be in *silent mode* and *out-of-sight*.
- Audio, photo or video recording is *strictly prohibited*. The class lecture and material, in whole or in part, is property of the instructor.

Expectations About Students, Class Attendance and Participation

Students are expected to read before class and be prepare for class discussion. Attendance is mandatory and will be taken every day. Leaving before the end of class without the instructor's permission will constitute as an absence. Students are expected to regularly participate in the class discussion in some way: asking questions, answering questions, helping classmates and/or making orderly comments about pertinent real-life situations relevant to the class discussion. Everyone has something to contribute and we can all learn from each other. Note, it is class participation which matters for grade and not mere attendance. Furthermore, recurrent absences might lead to an "F" according to the policies of the Minzu University of China.

Students with Disabilities

Please inform me during the first week of class about any disabilities that might require special accommodations. Bring the necessary documentation to substantiate your condition and special needs. All accommodations should be approved in accordance to the policies of the Minzu University of China.

Academic Integrity

Academic integrity is unconditionally upheld in this course. Homework assignments, quizzes and exams are to be completed independently. However, active discussion and team spirit are encouraged in appropriate



context, for example; discussing a homework question with a classmate before each answer it separately, comparing completed answers after finishing an assignment or giving hints to a classmate to get started with a question. Cheating and plagiarism in any fashion are unacceptable. Obvious instances of cheating are, for example, copying answers from a classmate for a homework in *whole or in part*, copying answers during a quiz or exam; or copying text from online sources. Violators will lose points commensurate with the violation up to failing the course and notifying the student's university about the offense to academic integrity.

Class Calendar

Week	Due	Chapter #	Topic	Sections	
1	Mon	Ch. 7, 9 & 11	Intro: Statistical Inference, Sampling Distributions and Hypothesis Testing	7.4-7.6, 9.1-9.4, 11.1	
	Tues	Chap. 10 & 11	Hypothesis Testing About Two Population Parameters	10.1-10.4, 11.2	
	Wed	Chapter 12	Comparing Multiple Proportions and Test of Independence	12.1, 12.2	
	Thurs	HW 1	Chapter 12	Goodness of Fit	12.3
	Fri			Discussion	
2	Mon	Chapter 13	Analysis of Variance	13.1-13.3	
	Tues	Chapter 13	Analysis of Variance	13.3-13.5	
	Wed	Chapter 14	Simple Linear Regression	14.1-14.5	
	Thurs	HW 2	Chapter 14	Simple Linear Regression	14.6-14.9
	Fri			Discussion	
3	Mon	Chapter 15	Multiple Regression	15.1-15.4	
	Tues	Chapter 15	Multiple Regression	15.5-15.9	
	Wed			Exam Review	
	Thurs	EXAM 1	Chap. 10-15	Exam 1	
	Fri			Discussion	
4	Mon	Chapter 17	Time Series Analysis and Forecasting	17.1-17.4	
	Tues	Chapter 17	Time Series Analysis and Forecasting	17.5-17.6	
	Wed	Chapter 18	Nonparametric Methods	18.1-18.3	
	Thurs	HW 3	Chapter 18	Nonparametric Methods	18.4-18.5
	Fri			Discussion	
5	Mon	Chapter 19	Statistical Methods for Quality Control	19.1-19.3	
	Tues	Chapter 22	Sample Survey	22.1-22.5	
	Wed			Exam Review	
	Thurs	EXAM 2	Ch. 17-19, 22	Exam 2	
	Fri				