

MILANO SCHOOL OF INTERNATIONAL AFFAIRS,
MANAGEMENT, AND URBAN POLICY

Syllabus
Quantitative Methods

Spring 2018
Monday 12:00-3:50 pm

Prof. Rachel Meltzer
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72 Fifth Avenue, Room 616
Office hours: Monday 4:30-6:30pm

Teaching Assistant: Jordan Wizman
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COURSE DESCRIPTION

This course introduces students to basic statistical methods and their application to management, policy and financial decision-making. The course develops foundational skills and encourages a critical approach to conducting independent statistical analysis and assessing statistical findings. For those planning to continue studying statistics, this course provides the foundation for that further work. This course will focus on both the theory and application of various statistical tools. The course will also emphasize data analysis, using the software package, R. An emphasis will be placed on the practical applications of these methods, and students will be expected to evaluate policy questions through the lens of quantitative reasoning.

TEXTS/MATERIALS

- * Healey, Joseph F. *Statistics: A Tool For Social Research (10th Edition)*. Stamford CT: Cengage Learning. **(required, referred to as “H” in attached schedule)**. Students are encouraged to seek a used version.
- * Additional readings will be made available via Canvas (“C”) and listed in the attached schedule.
- * Students should obtain a basic hand calculator (capable of computing square roots and squares).

***Recommended Supplementary Texts: these are not required, but might be useful as additional references**

Field, Andy, Jeremy Miles and Zoe Field. *Discovering Statistics Using R*. London: Sage Publications.

Remler, Dahlia K. and Gregg G. Van Ryzin. *Research Methods in Practice: Strategies for Description and Causation (2nd Edition)*. Los Angeles: Sage.

Salkind, Neil. *Statistics for People Who Think They Hate Statistics (6th Edition)*. Los Angeles: Sage Publications.

Edward R. Tufte: *Data Analysis For Politics And Policy*. E-book available for \$2 at <http://www.edwardtufte.com/tufte/ebooks>

Vickers, Andrew. What is a p-value anyway? 34 Stories to Help You Actually Understand Statistics. Boston: Addison-Wesley.

REQUIREMENTS

Class Participation

Students will be expected to attend and be engaged with class. This means that students should read the assigned readings for the class when they are due and participate in the discussion. Assignments are expected to be of high quality and to be completed on time.

Class Project

Students are expected to complete a project in R during the course of the semester. The project will be due at the very end of the semester, but will apply concepts covered throughout the term. Students are encouraged to work with other classmates on this project, but each student must turn in his or her own final product. Students must also indicate on their final submission the names of the other students with whom they collaborated. More details on the project will be forthcoming.

Homework

Students are expected to complete seven homework assignments throughout the semester (see the schedule at the end of the syllabus for exact due dates). Each assignment will cover material from the previous week, and will include both manual calculations and R-based analysis (when R material has been covered). For work done in R, text from the script and console window should be pasted in the homework document (this will be demonstrated in the R lab). Students are encouraged to work with other classmates on their homework assignments, but each student must turn in his or her own final product. All assignments are turned in at the beginning of class the day they are due (either in hard copy or via Canvas) and answers will be posted on Canvas later that week. Homework will be graded with a check, check-plus or check-minus. Please make a copy of your homework for yourself before turning it in.

Exams

All exams will be “closed book” and given in class. Students are allowed to bring with them one, double-sided “cheat sheet” with any information that they find useful. These sheets may be handwritten or typed. Students are expected to note the dates of the midterm and final exams and to get in touch with me the first week of class if there is a conflict.

Grading Breakdown:

In-class midterm exam: 25%

In-class final exam 35%

Class project: 25%

Timely completion of assigned homework and contribution to class discussion: 15%

POSTING OF LECTURE NOTES AND OTHER WRITTEN MATERIAL

All materials for the course (other than the required text) will be posted on Canvas. I will post lecture slides or notes the day before class at the latest. Students are encouraged to use these as guides during class and to augment them with their own notes. However, lecture notes are not a replacement for attending class.

Class schedule

Date	Topic	Reading	Deliverable
1/22	Basic Mathematics Review, Intro to Stats, Basic Descriptive Statistics	H: Prologue , Chptrs. 1 & 2; Guardian article (C) LAB Session I: Introduction to R	H: Exercises 1-5 on pgs. xxvii-xxviii (**not to hand in**); Student Info Sheet
1/29	Measures of Central Tendency, Measures of Dispersion	H: Chptrs. 3 & 4; R&R p. 37-38 (C); NYU Policy Brief (C) LAB Session II: Basic Descriptives	
2/5	The Normal Distribution	H: Chptr. 5; Salkind Chptr. 8 (C) LAB Session III: Variable Recoding	HW #1 Due
2/12	Intro to Inferential Statistics: Sampling and the Sampling Distribution, Estimation Procedures	H: Chptrs. 6 & 7; NYT article (C); R&R p. 115-24 (C); Salkind Chptr. 4 (C); Vickers Chptr. 6 (C) Overlooked infographic, W.E.B. Du Bois infographic LAB Session IV: Data Visualization	HW #2 Due
2/19	NO CLASS—PRESIDENT’S DAY		
2/26	Hypothesis Testing: The One-Sample Case, Comparing means and freq., recoding variables	H: Chptr. 8; R&R p. 268-69 and 272-82 (C); Salkind Chptr. 7 (C) LAB Session V: 1-Sample HT	HW #3 Due
3/5	Review		HW #4 Due
3/12	In-class midterm exam		
3/19	NO CLASS—SPRING BREAK		
3/26	Hypothesis Testing: The Two-Sample Case	H: Chptr. 9 LAB Session VI: 2-Sample HT	
4/2	Hypothesis Testing: The Analysis of Variance	H: Chptr. 10 LAB Session VII: ANOVA	
4/9	Hypothesis Testing: Chi-Square Analysis	H: Chptr. 11 LAB Session VIII: Chi-Square	HW #5 Due
4/16	Bivariate association	H: Chptrs. 12, 13, 14; R&R p. 329-52 (C); AJPH article (C); Retail Services article (C); Furman Center brief (C)	
4/23	Multivariate Techniques (introduction), Dummy Variables	H: Chptr. 15; R&R p. 38-47 (C) LAB Session IX: Correlation & Dummy Variables	HW #6 Due
4/30	Multiple Regression, multivariate analysis	H: Chptr. 15; R&R p. 366-386 (C) LAB Session X: Multiple Regression	
5/7	Review, final project workshop	LAB Session XI: Review & Final Project	HW #7 Due
5/14	In-class final exam		
5/17	Final Project Due	**Feel free to turn it in earlier**	

****Labs will meet in the classroom, 63 Fifth Avenue, U-L100****