Urban Planning 503: Introduction to Statistics

Fall 2013, Mondays and Wednesdays, 1:00 – 2:30PM, 1227 A&AB

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Office Hours: Mon 12 – 1PM, Wed 2:30 – 4:30PM, 2207A, or by appointment

GSI: Casey Wen, caseywen@umich.edu
Office Hours: Mon 4 – 5PM, Wed 4:30 – 5:30PM, Fri 12 – 1PM, location TBA

Course Description

This course is intended primarily for students who have no background in statistics and should be taken before UP 504. It introduces statistical concepts such as probability, descriptive statistics, tests of differences in populations, correlation, and linear regression. The course will familiarize students with computerized spreadsheets and the graphical presentation of quantitative data. One of the major goals of this course is train students to critically consume planning publications that use quantitative techniques. UP 504 will train students to find relevant planning data and independently execute some of these techniques.

Course Materials

The required text for this course is Healey's *Statistics*. Assigned readings and problem sets correspond to the ninth edition of the text, problem sets will be made available to students using a previous edition of the text. Additional required readings will be available via CTools. Many of these come from Meier & Brudney. Others are from *The Journal of the American Association of Planning* or similar publications. Students are not expected to read or understand the entirety of these articles, but they should read for content relevant to the topic being covered that day. For example, if the course is covering analysis of variance (ANOVA) on a particular day, be sure to look for instances of ANOVA.

This course uses Microsoft Excel for statistical analysis. Planners need to be familiar with this software for professional purposes, and its statistical functions are adequate for basic quantitative analysis. Open-source alternatives lack the necessary data analysis capabilities. The Dretzke text is strongly recommended, though not required.

Healey, J. F. (2011). *Statistics: A tool for social research*. 9th Ed. Belmont, CA: Wadsworth.
Dretzke, B. J. (2011). *Statistics with Microsoft Excel*. 5th Ed. Boston: Pearson.
Meier, K. J., & Brudney, J. L. (1993). *Applied statistics for public administration.* 3rd Ed. Belmont, CA: Wadsworth.

Assignments and Expectations (dates subject to change)

- Six problem sets (50% of grade): These problem sets will draw primarily from the required text, but they will also consist of data analysis exercises requiring the use of Excel and the interpretation of popular and academic reports using quantitative techniques. Later problem sets will be more involved and count more toward the final grade. All problem sets should be completed independently unless specified by the instructor. Problem sets are due at the beginning of class. Late assignments will receive a 10% reduction in credit for each day late, unless the student has received prior permission from the instructor or has an authorized excuse (e.g., medical). All work should be neatly prepared and clearly legible.
- Midterm Exam (25% of grade): Take-home, open-book, exam. The midterm exam will be posted to Ctools on the Wednesday after the Fall Study Break, and it is due at the start of class the following Monday. The exam will clearly state which sections may be handwritten and which need to be typed or produced electronically.
- Final Exam (25% of grade): Take-home, open-book, exam. The final exam will be posted to Ctools on the final day of class, and it is due to the GSI the following Wednesday at 5PM. The exam will clearly state which sections may be handwritten and which need to be typed or produced electronically.
- Participation: In class participation—attendance, preparedness and quality contributions to discussions—may be used as the basis for downward or upward adjustment in the final course grade, based on the instructor's judgment.

Schedule

The tentative schedule is presented in the table below The schedule is subject to revision due to the ease or difficulty of fully covering different topics. All changes will be noted in class and on CTools. Students are expected to have read the material listed for a given section *prior* to class. The seminars will not simply repeat the content of the readings.

Session	Topics	Readings	Assignments
Week 1: Introduction			
Wed, 9/4	Course overview. Texts. Software. Waivers and Overrides. Student survey.		
Week 2: Measurement, Descriptive Statistics			
Mon, 9/9	Measurement, reliability, and	Healey: Ch 1	

Session	Topics	Readings	Assignments
	validity. Descriptive and inferential statistics.	Babbie: The practice of social research, Ch 5 Hodge: Use and misuse of measurement scales Dretzke: Ch 1, Ch2, Ch3	
Wed, 9/11	Descriptive statistics, measures of central tendency, graphical summaries of data	Healey: Ch 2, Ch 3 Dretzke: Ch 4, Ch 5 Gould: The median isn't the message	
Week 3: Measures of Dispersion, Intro to Probability			
Mon, 9/16	Measures of dispersion, Basic probability	Healey: Ch 4 Meier: Ch 4	Problem set 1 posted
Wed, 9/18	Expanded Horizons – no class		
Week 4: Probability			
Mon, 9/23	The normal curve	Healey: Ch 5	Problem set 1 due
Wed, 9/25	Binomial probability function	Meier: Ch 5 Dretzke: Ch 6	Problem set 2 posted
Week 5: Sampling			
Mon 9/30	Random sampling, the sampling distribution	Healey: Ch 6	Problem set 2 due
Wed, 10/2	Estimation procedures: point estimates, confidence intervals	Healey: Ch 7	Problem set 3 posted
Week 6: Introduction to Hypothesis Testing			
Mon, 10/7	Overview of hypothesis testing	Healey: Ch 8	Problem set 3 due
Wed, 10/9	Comparing two groups	Healey: Ch 9 Boarnat et al: Evaluation of the California Safe Routes to School legislation Rodriguez: Can new urbanism encourage physical activity?	
Week 7: Fall Break, Review			
Mon, 10/14	Fall Study Break		

Session	Topics	Readings	Assignments
Wed, 10/16	Review		Midterm posted
Week 8: Analysis of Variance (ANOVA)			
Mon, 10/21	ANOVA	Healey: Ch 10 Dretzke: Ch 9	Midterm due
Wed, 10/23	ANOVA, cont.	Coley et al: Where does community grow? Lee et al: Exploring housing conditions of low-income minorities in the southern US	Problem set 4 posted
Week 9: Chi Square and Cross Tabulation			
Mon, 10/28	Chi square test and contingency tables	Healey: Ch 11 Meier: Ch 13, Ch 14 Dretzke: Ch 12	Problem set 4 due
Wed, 10/30	Chi square test and contingency tables, cont.	Farley: Racial differences in the search for housing Owusu : Residential patterns and housing choices of Ghanaian immigrants	Problem set 5 posted
Week 10: Bivariate Measures of Association			
Mon, 11/4	Association between variables measured at the nominal level	Healey: Ch 12	Problem set 5 due
Wed, 11/6	Association between variables measured at the ordinal level	Healey: Ch 13	
Week 11: Regression and Correlation			
Mon, 11/11	Regression and correlation	Healey: Ch 14 Dretzke: Ch 10	
Wed, 11/13	Assumptions of regression	Meier: Ch 17 Dretzke: Ch 11	
Week 12: Regression and Correlation, cont.			
Mon, 11/18	Applications of regression	Glaeser: Smart growth Kneebone & Raphael: Neighborhood crime	

Session	Topics	Readings	Assignments
Wed, 11/20	Regression review		Problem set 6 posted
Week 13: Control Variables and Partial Tables			
Mon, 11/25	Controlling for a third variable	Healey: Ch 15	
Wed, 11/27	Partial tables		
Week 14: Partial Correlation and Multiple Regression and Correlation			
Mon, 12/2	Partial correlation	Healey: Ch 16	
Wed, 12/4	Multiple regression	CEOs for Cities: Walking the walk	Problem set 6 due
Week 15: Review			
Mon, 12/9	Catch-up, review		
Wed, 12/11	Last class. Wrap-up. Review		Exam posted
Week 16: Final Exam			
Mon, 12/16			
Wed, 12/18			Exam due 5PM