URBDP 520 A Au 18: Quantitative Methods In Urban Design And Planning

Location and Time

TTH - 1:30pm - 3:20pm

Instructor

Himanshu Grover (AICP)

O: 410-J Gould Hall | Email: groverh@uw.edu

Office Hours

Tuesdays: Noon-1:30pm (Or email groverh@uw.edu for appointment)

Teaching Assistant

Meenchel "Meen" Jung

Office Hours: Friday 10:00-12:00pm Gould 432 (or email jmc129@uw.edu for appointment)

R Help

Kate Pedersen (katep31@uw.edu)

Course Website

URBDP 520A @*Canvas*

Course Website

We will use Statistical Software - R in this course. Please refer to R Installation Guide to install it on your systems.

Course Description

The primary objective of this course is to familiarize planning students with the methods and techniques they are likely to encounter and use in various forms in planning departments and organizations. Planners must be quite versatile, in that they must be knowledgeable of a variety of analytical methods, including statistical analysis and techniques, demographic techniques; economic analysis, project planning techniques, geographical and spatial analysis techniques and analysis, and various forms of transportation analysis to name but a few.

This course cannot provide you with the knowledge of all these various methods and techniques. However, I will strive to provide you with a survey of some of these techniques and methods and the underlying logic behind various approaches. Our focus will be on basic statistical techniques required for analyzing data and information necessary for undertaking planning decisions. My hope is that the skills and knowledge you acquire during this course will provide you with a foundation from which you can quickly grasp and tackle new or

alternative approaches you may encounter in your professional life and, most importantly, gain an understanding that will make you a critical and discerning consumer of more quantitative analysis and planning data.

Although the course material necessarily requires some familiarity with arithmetic, basic algebra, and logic, I will try my best not to over emphasize its mathematical content. I will at times present mathematical formulas and elements in the hopes of providing those comfortable with this approach some insights; however, this approach will not be a central emphasis of the course. I will strive to provide students with a more substantive, intuitive understanding to why one must do the things we do when working with data. So, if you feel weak in mathematics you should not be intimidated by this course. We will concentrate on using standard approaches and computational software to help make meaningful "order" out of the initial "chaos" represented by data often utilized by planning departments and agencies.

Class periods will be devoted to lectures, discussions, and "lab" sessions in which we will work with the statistical software. The lecture material will follow the detailed schedule (outlined later in this syllabus) in which I will present material predominantly in PowerPoint presentations, which will draw upon required and supplemental reading materials. I urge you to keep up with the readings – that way you can have the information on your mind and ask questions during lecture to ensure that you grasp the materials.

Course Objectives

The fundamental task in all good planning activities is to have a good "fact basis" upon which to guide planning activities and to make sound and informed planning decisions. Two of the most important roles of planning departments in most communities are to provide the critical information making up the "fact basis" and then to help the community and its leaders undertake sound planning processes using these data. By "fact basis" I mean gathering data and transforming it into information (so called "facts") about the nature of the community. This often involves not only describing what things look like now, but also making reasonable projections about what a community's characteristics are likely to look like in some future time.

Developing the data and fact basis, or more simply the data necessary to know your community, demands the ability to employ a great variety of different types of data and analysis techniques to describe and make projections about a jurisdiction (community, county, region, etc.). The purpose of this course it to give students a broad survey of the variety of techniques often employed in planning departments. This course has three specific objectives:

1. The first objective is to explore the wealth of quantitative and mathematical approaches that can be utilized by planners to analyze and make sense out of the data that can be employed to understand the community's characteristics such as its population and economy as well as understand the nature and wishes of its populace or whether some policy, program or event has resulted in change or differences. These techniques will range from simple statistical approaches for describing data, such as descriptive statistics, creating graphs and charts and making inferences about the population to much more complex approaches for understanding the composition of a jurisdiction's population or economy.
2. The second objective is to explore the variety of data (from raw to processed) that one is likely to employ when working in planning departments. Examples of these data include:

survey data, decennial census data (block, block-group, tracks, TAZ, etc.), census survey data such as the American Community Survey (ACS) and American Housing Survey (AHS), various forms of business and employment data collected by the US Census and a host of state and federal agencies, and even some examples of local data such as permit and tax assessors data. We will also address problems and issues associated with working with these data related to various forms of manipulation, merging, aggregating and restructuring. One of the most valuable skill sets you should develop in this program will be to gain technical knowledge of these various data sets and how to work with them. Another important skill is acquiring knowledge of GIS applications so you can take these data and portray them on maps. However, we will not cover GIS in this course, but I do recommend that you pursue this through other graduate courses in the program.

3. The third objective is to learn the use of statistical packages to manipulate and analyze data. In my research, I use many different packages such as SPSS, SAS, SYSTAT, BMDP, HLM, and EXCEL. I have learned that one package does not always do what you need it to do. In my opinion, at this point, *Statistical Software - R* offers several clear advantages for statistical analysis and programing. It also has well-developed user groups in which many users are developing and contributing new techniques and methods that can be incorporated into the program. And, to top it all off, it is not prohibitively expensive, it is available for free!!

Learning Outcomes

By the end of this course, students should be able to understand the basic tools, ideas, and language of statistics. This knowledge will enable students to critically evaluate the suitability of various statistical tools for addressing research problems and report analytical results. If you apply yourself in this course, you should, upon completion of this course, have a working knowledge of:

- Basic descriptive statistics and graphical techniques
- Inferential statistics
- Using census data
- Simple linear regression
- Working with data in software package R.

Course Requirements

While **not mandatory**, class **attendance** and participation are integral parts of this course; much of the key material will be introduced and discussed in lectures. Good note-taking skills are essential, since the instructor often discusses material and provides examples that may not be directly quoted on the slides. The slides for every lecture will be posted on the course website (canvas) on the day following the lecture. Assigned **readings** are identified for each week classes and should be completed as preparation ***before*** coming to class. Students are expected to keep track of the schedule, and assignment due dates. Teaching Assistant will use *Canvas* to communicate important information updates (such as new articles being added to ***Electronic Readings on the Course Website @canvas***), posting of test grades, etc. Students are advised to check this source (***canvas***) regularly.

Assignments and Examinations:

1. Assignments: A critical aspect of learning statistics is practice and more practice. Each lab session will be accompanied by a take home assignment. Detailed instructions will be provided with each assignment. All submissions are to be submitted online on the canvas website. Each assignment must be turned in as a Microsoft word or Adobe Acrobat (pdf) document and is due on the day specified by 9 pm PT. You will lose 10% of possible points for every day the assignment is late. You may (in fact I encourage you to) work together on homework assignments, but for your own sake, do not simply copy someone else's work. Copying will not be tolerated and will result in you receiving a zero (0) on the assignment. Doing the assignment, will provide you with valuable practice for the tests. The purpose of these assignments is to provide you with feedback about what you do not understand. If you are not getting something when you are doing your assignment, feel free to discuss it with the TA or the instructor.
2. Class Participation: In addition to reading the assigned chapters, each student is also expected to actively participate in class discussions. Each student is expected to review the articles are assigned for each lecture. Here are a few of the questions to think about when reviewing the articles (caution: not all questions will be relevant to every article, use your judgement):
   1. What is the research hypothesis being explained?
   2. How does the author set his or her work in the context of other studies?
   3. What concepts does the author want to explore/understand? How are they operationalized and measured?
   4. What data is the study based on? How was it collected and/or modified? What controls are in place to eliminate "noise" and "bias"? What limitations does the author admit?
   5. What is the argument being put forth? (Remember the idea of looking for a logical flowchart to an argument.)
   6. How was the regression model developed, what was included, and what was left out? What else might you want to include if you had the option of working with the author?
   7. How well are the results presented? How well are they interpreted? Do you agree with the author's analysis of the all the relevant statistics?
   8. How well a case does the author make for a causal relationship, and not simply a statistical correlation. Can you draw a causal diagram of the sort you find in The Logic of Causal Order?
   9. What are the strongest statements the author can make about the results of his or her study? What are the weakest spots in his or her argument?
   10. How might you (or someone else) use, or be tempted to use, these results? What are the implications of this research? How generalizable are they for other settings or time periods?
3. Article Review Quiz: A short quiz has been designed to assess your comprehension of the assigned articles. If you attend the class regularly, you should be able to answer the quiz with minimum effort. This is a graded quiz so make sure that you answer them by the due date.
4. Examinations: There will be two examinations. These are take-home exams and are open book – in other words you can use all class materials to assist you in completing the exam. DO NOT make the mistake of thinking that this means the exams will be easy. My exams will require you to do a considerable number of computer operations, thinking and writing. If you have not kept up with the lectures, reading and homework assignments, you will not do well on the exams. The content of the exam will depend upon the materials we have covered by the exam and I will make this clear in weeks prior to the exam day.

Late Assignments

Not submitting the assignments on time is a problem. It raises ethical issues (if I give you more time, do I need to give everyone more time too), and will affect your performance in subsequent assignments and class participation, as each of the assignments is designed to help you with subsequent coursework. Therefore, please do your best to turn in your assignments on time. However, if you have a compelling and legitimate reason for late submission, I will consider extensions on case-by-case basis. But, I need to be contacted at least 2 days before the date assignment is due. I will not entertain excuses for late submission after the due date.

Required Text and Materials

There is not a single text that I can assign in this course that covers all the issues that we need to address. However, if I made you buy them all it would cost you a small fortune. Thus, in the interest of your bank accounts, I have assigned only 1 book:

- Frankfort-Nachmias, C., & Leon-Guerrero, A. (2017). Social statistics for a diverse society. Sage Publications. (*Identified as FL in the syllabus*)

The book is available in the UW bookstore. In addition to the assigned chapters, relevant readings are provided on the canvas website.

Grade Distribution

The grade distribution for this course is follows:

1. Assignments (30%). There will be weekly assignments (6 in total) throughout the semester.
2. Class Participation (10%).
3. Reading Quiz (10%)
4. Mid-term Examination (25%). Oct. 25-31.
5. Final Examination (25%). Dec 06-14.

All assignments/ submissions are due by 9 pm PT on the due date. Unless specified, all assignments are to be uploaded to the assignments folder on the Canvas course website.

Final Grade - Total scores will be transformed into the UW numerical grading system for graduate courses ranging from 4.0 to 1.7 in 0.1 increments.

Academic Integrity Statement

Students at the University of Washington (UW) are expected to maintain the highest standards of academic conduct, professional honesty, and personal integrity. The UW College of Built Environment is committed to upholding standards of academic integrity consistent with the academic and professional communities of which it is a part. Plagiarism, cheating, and other misconduct are serious violations of the University of Washington Student Conduct Code

(WAC 478-120). We expect you to know and follow the university's policies on cheating and plagiarism. Any suspected cases of academic misconduct will be handled according to University of Washington regulations. It is in your best interest to follow all policies laid out here and elsewhere on the university website, and familiarize yourself with the university guidelines for academic honesty. This page explains what academic misconduct is, how the UW deals with it, and how you can avoid committing it: http://www.washington.edu/uaa/advising/help/academicintegrity.php (Links to an external site.)Links to an external site.

Important Note on Plagiarism Detection

The University has a license agreement with VeriCite, an educational tool that helps prevent or identify plagiarism from Internet resources. Your instructor may use the service in this class by requiring that assignments are submitted electronically to be checked by VeriCite. The VeriCite Report will indicate the amount of original text in your work and whether all material that you quoted, paraphrased, summarized, or used from another source is appropriately referenced.

Academic Accommodations

If you would like to request academic accommodations due to a disability, please contact Disability Resources for Students (DRS), 448 Schmitz, 206-543-8924 (V) or 206-543-8925 (TTY). If you have a letter from Disability Resources for Students indicating you have a disability that requires academic accommodations, please meet with the instructor as soon as possible to discuss the accommodations you need. Disability Resources for Students (www.disability.uw.edu) offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS.

DETAILED SCHEDULE

Date	Topics and Assignments	Assigned Readings (articles and handouts available on canvas)
Sep 27 (Th)	Orientation – Course organization Deliverables and Expectations Introduction to Research and Statistics	Review the Syllabus Lecture 1
Oct 2 (T)	The What and The Why of Statistics Quiz 1 (Due Oct. 8)	Lecture 2 FL Chapter 1 Chen&Short2008.pdf McBrier&Wilson2004.pdf Visual and Statistical Thinking.pdf
Oct 4 (Th)	Introduction to R	Lab0_Introduction to R.pdf

		RMarkdown_examples.zip GSS14SSDS-A.sav
Oct 9 (T)	Organization and Graphical Presentation of Data Quiz 2 (Due Oct. 15)	Lecture 3 FL Chapter 2 Joseph&Pearson2002.pdf Venturelli2000.pdf
Oct 11 (Th)	Lab Session I Assignment I (Due Oct. 17)	Lab1_Graphic Presentation of Data.pdf Lab1.Rmd Homework I.pdf Homework1_template.Rmd Data for Homework_1.zip
Oct 16 (T)	Measures of Central Tendency Measures of Variability Quiz 3 (Due Oct. 22)	FL Chapter 3 FL Chapter 4 Actions Handel2005.pdf Actions Ramirezetal2010.pdf Actions Lecture 4 Actions
Oct 18 (Th)	Lab session II Assignment II (Due Oct. 26)	Homework_02.zip Actions
Oct 23 (T)	Comprehensive Review Lecture 5 Lecture_5.pdf Actions	Homework 2 cheat sheet.pdf Actions Lab_02.zip
Oct 25 (Th)	R - Comprehensive Review Lab; Home work 2 Review	Review everything done so far. We will discuss your Questions/Issues.
Oct 30 (T)	Normal Distribution Sampling and Sampling Distribution Mid-term Examination (Due Nov. 19)	FL Chapter 5 FL Chapter 6 Actions Skaburskis2012.pdf Actions Ueno2010.pdf Actions URBDP520_Midterm_Fall2018.zip Lecture 6 Actions
Nov 1 (Th)	Estimation Hypothesis Testing	FL Chapter 7 Actions

	Quiz 5 (Due Nov. 15) Lab session III Assignment III (Due Nov. 7)	FL Chapter 8 Actions Jones&Rainey2006.pdf Actions Staceyetal2011.pdf Actions Lecture 7 Actions
Nov 6 (T)	Bivariate Tables Chi-square test and Measures of Association Analysis of Variance Correlation Quiz 6 (Due Nov. 21)	Chapter 09.pdf Actions Chapter 10.pdf Actions Chapter 11.pdf Actions z-and t-.pdf Actions Leite&McKenry2002.pdf Actions Phillips&Smith2004.pdf Actions Lecture 8 Actions
Nov 8 (Th)	Lab session IV Assignment IV (Due Nov. 14	Lab_03.zip
Nov 13 (T)	Lab session V-A Quiz 7 (Due Nov 26)	Lab_04.zip Fothergilletal2009.pdf Actions Pettinichio&Crutchfield2009.pdf Actions
Nov 15 (Th)	Lab session V-B Assignment V (Due Nov. 28)	Lab_05.zip
Nov 20 (T)	Regression and Regression Diagnostics Quiz 8 (Due Nov 26)	Homework_05.zip Sirin__Rogers-Sirin_2004.pdf Actions Vick&Packard2008.pdf Actions Chapter 12.pdf Actions *Regression Diag. Handouts

Nov 22 (Th)	No Class – Thanksgiving	
Nov 27 (T)	Lab Session VI - Regression	mtcars.csv Regressionanddiagnostics.pdf Actions Homework_06.zip
Nov 29 (Th)	Introduction to Qualitative Methods Sources of Planning data and Information	TBD
Dec 4 (T)	Course Wrap-Up Assignment VI (Due Dec. 8)	Lecture_RegressionsDiagnostics_2_Summary.pdf Actions URBDP520_Final_Fall2018.zip
Dec 6 (Th)	Lab Session VII - Comprehensive R Review; Final Exam Review Session Take Home Final Exam (Due Dec 14)	Lab_06.zip