

## UP 316 Urban Informatics II

Department of Urban and Regional Planning  
University of Illinois at Urbana-Champaign  
Spring 2023

---

<b>LECTURES:</b>	Monday and Wednesday, 11:00 – 11:50am, TBH 225
<b>LABS:</b>	Friday, 11:00–11:50am, 101 Oregon Building Computer Lab (901 W Oregon St)
<b>INSTRUCTOR:</b>	Bumsoo Lee, M206 TBH, <a href="mailto:bumsoo@illinois.edu">bumsoo@illinois.edu</a> Office hours: 10:00-10:50am on Monday and by appointment, TBH M206
<b>TEACHING ASSISTANT:</b>	Josh Riebe, <a href="mailto:jriebe2@illinois.edu">jriebe2@illinois.edu</a> Office hours: 12:00pm-12:50pm on Friday and by appointment, Oregon lab (or TBH 224)
<b>HOURS:</b>	3 credit hours; 3 contact hours (3 days/week for 50 minutes each)

---

### COURSE OVERVIEW

---

Any successful planning process requires *information and data* on the current and future conditions of cities and regions. UP 316 is designed to teach data analytics that help planners and urban researchers collect, analyze, and interpret urban data that are critical for various planning projects. The first half of the semester will focus on a primary data collection method, sample survey research. Students will learn how to design and administer an effective sample survey and how to analyze and interpret survey results. Students will also have a hands-on experience of conducting their own sample survey research for a group project. In the second half of the course, students will learn additional data analysis techniques that are widely used by planners to understand demographic and socio-economic conditions of a city and its future.

Among the topics to be covered are:

- Survey research – questionnaire design, administering survey, data analysis and report writing
- Review of statistical tools and their application to survey data analysis
- Demographic analysis and population projection
- Economic analysis: economic base model and shift-share analysis
- Cost-benefit analysis as a project evaluation method
- Using MS-Excel and R for urban data analytics

Monday and Wednesday classes are lectures/discussion. Students will learn and discuss foundational concepts, theories, and tools in urban informatics. In Lab sessions on Friday, students will have opportunities to apply these tools using real world data and computer programs. The best way to learn urban data analytics is *learning by doing*. Thus, various exercises and assignments will be given throughout the semester.

Students should read required readings, be prepared for class, and actively participate in class discussion. All the lecture notes will be posted to the Canvas course webpage ([canvas.illinois.edu](https://canvas.illinois.edu)) so that students can reduce the need for note taking and actively participate in class discussion.

### PREREQUISITE

---

UP 116 Urban Informatics I or an equivalent introductory statistics course.

**COURSE AT A GLANCE**

Week	Dates	Topic	Assignment
1	Jan 18	Introduction	
2	Jan 23, 25	Overview of survey process; Survey design	
3	Jan 30, Feb 1	Survey design & administration	Survey-5 Likert scale questions (2/2)
4	Feb 6, 8	Statistical tools—Descriptive statistics; Confidence intervals	Survey-survey draft (2/10)
5	Feb 13, 15	Statistical tools—Difference in means test	Survey-pre-test report (2/17)
6	Feb 20, 22	Statistical tools—Correlation and regression	
7	Feb 27, Mar 1	Survey sampling	Survey-completed survey data (3/3)
8	Mar 6, 8	Census geography	<b>EXAM</b>
	Mar 13, 15	Spring break	
9	Mar 20, 22	Demographic analysis & Population projection	Survey-Final report (3/24)
10	Mar 27, 29	Population projection	
11	Apr 3, 5	Population projection	
12	Apr 10, 12	Regional economic analysis	Assignment 1 (4/14)
13	Apr 17, 19	Regional economic analysis	
14	Apr 24, 26	Regional economic analysis; Cost-benefit analysis	Assignment 2 (4/28)
15	May 1, 3	Cost-benefit analysis	Assignment 3 (5/8)

**LAB & LAB ASSIGNMENT AT A GLANCE**

Week	Dates	Lab Topic	Lab Assignment
1	Jan 20	Excel 101	Lab assignment 1
2	Jan 27	Introduction to R & R-Studio	Lab assignment 2
3	Feb 3	Survey project team building and discussion	
4	Feb 10	Data analysis with R—Descriptive statistics	Lab assignment 3
5	Feb 17	Data analysis with R—Cross-tab, t-test, ANOVA	Lab assignment 4
6	Feb 24	Data analysis with R—Correlation & Regression	Lab assignment 5
7	Mar 3	Group work—Survey data analysis	
8	Mar 10	Data visualization with Excel and R	Lab assignment 6
	Mar 17	Spring break	
9	Mar 24	Downloading census data & population pyramid	Lab assignment 7
10	Mar 31	Trend extrapolation method exercise	Lab assignment 8
11	Apr 7	Cohort component method exercise	Lab assignment 9
12	Apr 14	Economic base analysis exercise	Lab assignment 10
13	Apr 21	Shift-share analysis exercise	Lab assignment 11
14	Apr 28	Cost-benefit analysis (CBA) exercise	
15		No lab	

**TEXTBOOKS**

Rea, Louis M. and Richard A. Parker. 2014. *Designing and Conducting Survey Research: A Comprehensive Guide*, 4th edition. San Francisco, CA: Josey-Bass Inc. E-book available at UIUC Library

<https://learning.oreilly.com/library/view/designing-and-conducting/9781118767023/?ar=>

\* U of I is not in the institution list. Select “Institution not listed?”, and then enter your university email.

Klosterman, Richard E., et al. 2018. *Planning Support Methods: Urban and Regional Analysis and Projection*. Lanham, MD: Rowman & Littlefield. Reserved at the Funk ACES Library.

Additional reading assignments (or the links to them) will be posted on the Canvas.

## REQUIREMENTS

Students will be required to complete one group survey project, one exam and a series of homework/lab assignments. Class participation grade will be based on both random attendance checks and class participation. Each unexcused absence will reduce your final grade by 1%.

GRADES will be assigned as follows:

Group Project: Student Attitude Survey	20 %
Mid-term EXAM	20 %
Lab Assignments	20 %
Homework Assignments	30 %
Participation/Attendance	12 %

**ASSIGNMENTS and PROJECTS:** In general, homework assignments are due at 11am on the due date unless noted otherwise. Lab assignments are generally due by 11am on the following Monday, but students will be able to complete most lab assignments during the lab on the same day. Late lab/homework assignments will be graded down by 10% per day up to 30%.

**RUBRIC:** The general grading rubric for assignments and projects is as follows:

A: Demonstrates original thought and synthesis of ideas and cogent analysis, and is clearly written and presented. Outstanding work.

B: Presents above average analysis with appropriate evidence to support ideas, and is clearly written or presented. Good work.

C: Shows a basic level of understanding, with analysis limited to obvious arguments. Writing is competent. Adequate work.

D: Misunderstands or misrepresents the material, or is so poorly written or presented as to obscure the analysis. Inadequate work.

Transformation of numerical grade to letter grade will be according to the schedule below:

A+	97-100		
A	93-96.9	C+	77-79.9
A-	90-92.9	C	73-76.9
B+	87-89.9	C-	70-72.9
B	83-86.9	D+	67-69.9
B-	80-82.9	D	60-66.9

## POLICIES

### ATTENDANCE POLICY

Your attendance at all scheduled classes (lecture, discussion and lab) is mandatory and essential for success in the course. If you need to miss class for a religious observance or some other legitimate reason, you must make arrangements to make up the missed work a minimum of one week before the absence occurs and provide a proper absence letter ([Request for Accommodation for Religious Observances](#)). If you are seriously ill or experiencing a family emergency, inform the instructor and TA via email.

### SPECIAL ACCOMMODATIONS

This course will accommodate students with documented disabilities. Please refer to <https://www.disability.illinois.edu/academic-accommodations-and->

[supports/academic-accommodations](#) for more information and provide the appropriate documentation at the beginning of the semester.

#### ACADEMIC INTEGRITY

This course follows the guidelines set forth by the University student code. See <https://studentcode.illinois.edu/article1/part4/1-401/> for specific guidelines, examples, and punishment associated with academic dishonesty.

#### PLAGIARISM

**Plagiarism** in this class is unacceptable. Any accidental or willful use of words, work, or ideas of another without attribution (e.g. quotation and citation) will be penalized by a failing grade on the paper and/or a failing grade in the course. Please see the definition of plagiarism here: <https://studentcode.illinois.edu/article1/part4/1-402/>. Be reminded that all your submissions to the Canvas will go through plagiarism checking.

#### CLASS CLIMATE

The Department of Urban and Regional Planning (DURP) is committed to creating an environment of inclusion and opportunity that is rooted in the very goals and responsibilities of practicing planners. Conduct that interferes with the rights of another or creates an atmosphere of intimidation or disrespect is inconsistent with the environment of learning and cooperation that the program requires. By enrolling in a course in the Department of Urban and Regional Planning, students agree to be responsible for maintaining a respectful environment in all DURP activities, including lectures, discussions, labs, projects, and extracurricular programs. We will be governed by the University Student Code. See Student Code Article 1—Student Rights and Responsibilities, Part 1. Student Rights: §1-102 In the Classroom.

#### EMERGENCY RESPONSE RECOMMENDATIONS

The Department of Homeland Security and the University of Illinois at Urbana-Champaign Office of Campus Emergency Planning recommend the following three responses to any emergency on campus: **RUN > HIDE > FIGHT**

For more information, <https://police.illinois.edu/em/run-hide-fight/>.

#### COUNSELING CENTER

The Counseling Center is committed to providing a range of services intended to help students develop improved coping skills in order to address emotional, interpersonal, and academic concerns. The Counseling Center provides individual, couples, and group counseling. All of these services are paid for through the health services fee. The Counseling Center offers primarily short term counseling, but they do also provide referrals to the community when students could benefit from longer term services.

<https://counselingcenter.illinois.edu/>

#### READING ASSIGNMENTS

Rea and Parker = Rea, Louis M. and Richard A. Parker.2014.*Designing and Conducting Survey Research: A Comprehensive Guide*, 4th edition.

Klosterman et al. = Klosterman, Richard, et al. 2018. *Planning Support Methods: Urban and Regional Analysis and Projection*. Lanham, MD: Rowman & Littlefield.

#### INTRODUCTION

##### Week 1

1/18

Introduction to UP316; Rea and Parker, Chapter 1: *An Overview of the Sample*

Lab: 1/20 *Survey Process*  
Excel 101

### DEVELOPING AND ADMINISTERING SURVEY

**Week 2** 1/23 Rea and Parker, Chapter 1: *An Overview of the Sample Survey Process*  
(Project 1 handout) 1/25 Rea and Parker, Chapter 2: *Designing Effective Questionnaires: Basic Guidelines*

Lab: 1/27 Introduction to R and R-Studio: Overview, data import & export

**Week 3** 1/30 Rea and Parker, Chapter 3: *Developing Survey Questions*  
2/1 Administering efficient surveys (Rea and Parker, Chapters 1 - 3)  
Lab: 2/3 **Must attend!** Survey team building and team discussion on the survey topic and design  
**Assignment:** 2/2 Five Likert scale questions (submit a pdf file to the Canvas by **midnight** of 2/3 AND bring a hard copy to the Friday lab session on 2/4)

### ANALYSING SURVEY RESULTS

**Week 4** 2/6 Rea and Parker, Chapter 5: *Descriptive Statistics: Measures of Central tendency and Dispersion* and Chapter 6: *The Theoretical Basis of Sampling*  
2/8 Rea and Parker, Chapter 7: *Confidence Intervals and Basic Hypothesis Testing*  
Lab: 2/10 Data analysis with R: Descriptive statistics, confidence intervals  
**Assignment:** 2/10 Group survey draft due

**Week 5** 2/13 Rea and Parker, Chapter 10: *Analyzing Cross-Tabulated Data*  
2/15 Rea and Parker, Chapter 11: *Testing the Difference Between Means*  
Lab: 2/17 Data Analysis with R: Cross-Tab, t-test, and ANOVA  
**Assignment:** 2/17 Finalized survey & pre-test report due

**Week 6** 2/20 Rea and Parker, Chapter 12: *Regression and Correlation*  
2/22 Rea and Parker, Chapter 12: *Regression and Correlation, Continued*  
Lab: 2/24 Data Entry (Coding) and Data Analysis with R: Correlation & Regression

### SURVEY SAMPLING

**Week 7** 2/27 Rea and Parker, Chapter 8: *Determining Sample Size*  
3/1 Rea and Parker, Chapter 9: *Selecting a Representative Sample*  
Lab: 3/3 Group work—Survey data analysis  
**Assignment:** 3/3 Bring completed survey for data coding and analysis

### MID-TERM EXAM

**Week 8** 3/6 **EXAM**

### CENSUS GEOGRAPHY AND CENSUS DATA

3/8 OMB (2021) 2020 Standards for delineating Core Based Statistical Areas: Notice. *Federal Register* 86 (134)  
<https://www.federalregister.gov/documents/2021/07/16/2021-15159/2020-standards-for-delineating-core-based-statistical-areas>  
Lab 3/10 Data Visualization: Graphs and Charts with Excel and R

**DEMOGRAPHIC ANALYSIS AND POPULATION PROJECTION**

<b>Week 9</b>	3/20	Klosterman et al. Chapter 1 Foundations (pp. 1-10); Chapter 2 Welcome to Decatur (pp. 13-33)
	3/22	Klosterman et al. Chapter 3 Trend Projection Methods (pp. 35-48)
Lab	3/24	Downloading Census Data & Population Pyramid
<b>Assignment:</b>	<b>3/24</b>	Project 1: Group Survey Research Final Report Due
<b>Week 10</b>	3/27	Klosterman et al. Chapter 3 Trend Projection Methods (pp. 35-48)
	3/29	Klosterman et al. Chapter 5 Cohort-Component Methods (pp. 79-117)
Lab:	3/31	Trend Extrapolation Exercise
<b>Week 11</b>	4/3	Klosterman et al. Chapter 5 Cohort-Component Methods (pp. 79-117)
	4/5	Klosterman et al. Chapter 5 Cohort-Component Methods (pp. 79-117)
Lab:	4/7	Cohort Component Method Exercise

**REGIONAL ECONOMIC ANALYSIS**

<b>Week 12</b>	4/10	Klosterman et al. Chapter 6 Economic Analysis Methods (pp. 125-159)
	4/12	Klosterman et al. Chapter 6 Economic Analysis Methods (pp. 125-159)
Lab:	4/14	Economic Base Analysis Exercise
<b>Assignment:</b>	<b>4/14</b>	Assignment 1 due: Population Analysis and Projection
<b>Week 13</b>	4/17	Klosterman et al. Chapter 6 Economic Analysis Methods (pp. 125-159)
	4/19	Klosterman et al. Chapter 6 Economic Analysis Methods (pp. 125-159)
Lab:	4/21	Shift-Share Analysis Exercise
<b>Week 14</b>	4/24	Klosterman et al. Chapter 6 Economic Analysis Methods (pp. 125-159)

**PROJECT EVALUATION: COST BENEFIT ANALYSIS**

	4/26	Gupta, Dipak K. 2001. Chapter 14: Choosing the Best Alternative: Cost-Benefit Analysis from <i>Analyzing Public Policy: Concepts, Tools and Techniques</i> .
Lab:	4/28	Cost Benefit Analysis Exercise
<b>Assignment:</b>	<b>4/28</b>	Assignment 2: Regional Economic Analysis
<b>Week 15</b>	5/1	<i>Cost-Benefit analysis</i> , Continued.
	5/3	<i>Cost-Benefit analysis</i> , Continued.
<b>Assignment:</b>	<b>5/8</b>	Assignment 3: Cost Benefit Analysis of an LRT project due by <b>Noon</b> .