

University of Louisville
School of Urban and Public Affairs
SUST 303 - Quantitative Research Methods in Sustainability and Urban Studies QR
Monday and Wednesday 12:30 pm to 1:45 pm
Belknap/Davidson 204

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Office Hours: Monday 3:30 pm to 5 pm
Tuesday, Wednesday and Thursday by appointment
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I want you to make extensive use of my office hours, especially if you have problems understanding the course material and/or working on the assignments. I do not believe that e-mail is always the appropriate medium for discussing statistical problems.

Course Description:

This course is designed to be an elementary introduction to statistics with an additional mixture of research methods fundamentals for sustainability and urban studies. Students will learn statistical techniques for quantitative data analysis as well as a basic understanding of how research is conducted. The statistics sections covers descriptive statistics, such as measures of central tendency and variation, some probability theory, and inferential statistics, such as hypothesis testing using t-tests. The focus of the research methods section is on quantitative research, such as sampling, measurement issues or experimental approaches, as they are relevant for sustainability and urban studies. This course is a requirement for the B.A. in Sustainability or the B.A. in Urban Studies, and it also satisfies the Cardinal Core in Quantitative Reasoning.

Methods of Teaching and Learning Objectives:

This course consists of formal lectures, in-class exercises (lab sessions), homework assignments in MindTap, a midterm and final exam as well as an applied research report. Upon completion of this class, students are expected to

- use statistical methods to analyze quantitative data;
- understand different quantitative research approaches and chose the appropriate one for a given research question;
- compute and interpret statistical measures and tests;
- be critical users of quantitative information and to think about real-live problems evidence-based;

- read and understand literature which uses quantitative research methods with statistical analysis; and
- be prepared for UBR5 504 Urban Data Analysis and other more advanced statistics courses.

I do encourage group work. It will be easier to understand the material if people talk about it with others. It is an established fact that both stronger and weaker students equally benefit from group work. In a group nobody will get so easily stuck on a problem, or go down the wrong path in solving it. It also makes learning more fun.

An average student should in general expect to spend at least twice the classroom time outside of the classroom (more is better). That would be about five hours a week additionally to the class meetings.

Warning: Statistics is not conducive to binge-working – you will get lost!!!

I am aware that everybody's time budget is limited, but at the same time, one makes choices concerning the use of one's time (including paid work). The amount of time spent on studying and group work will likely be reflected in the final grade, and as such, provide future employers with a sense of how important the class was to the student.

Cardinal Core and Learning Outcomes:

This course satisfies the Cardinal Core in Quantitative Reasoning (QR). Quantitative Reasoning is concerned with solving real-world problems through mathematical methods. Competency in each of five learning outcomes will be assessed through performance on homework assignments, a midterm and final exam as well as an applied research report.

Outcome 1: Interpret information presented in mathematical and/or statistical forms.

Assessment: Students will be required to understand measures of central tendency and variation, and interpret probability values from tables of common statistical distributions.

Outcome 2: Illustrate and communicate mathematical and/or statistical information symbolically, visually, and/or numerically.

Assessment: Students will be required to present and analyze quantitative data in tables, line graphs and scatter plots, and to interpret hypothesis tests and measures of association.

Outcome 3: Determine when computations are needed and execute the appropriate computations.

Assessment: Students will be required to determine which statistical method to use for a specific research question, and then analyze empirical data with the chosen statistical method by undertaking the appropriate computations in Microsoft Excel.

Outcome 4: Apply an appropriate model to the problem to be solved.

Assessment: Students will be required to determine and explain the appropriate modeling strategy and statistical approach to solve a specific research problem using empirical data, and explain why.

Outcome 5: Make inferences, evaluate assumptions, and assess limitations in estimation, modeling, and/or statistical analyses.

Assessment: Students will be required to prepare real empirical data for analysis and then use various methods of inferential statistics, present and analyze statistical estimations, as well as address assumptions and limitations in statistical modeling in the context of a specific research question.

Textbooks:

Healey, Joseph F. and Christopher Donoghue (2021). *Statistics: A Tool for Social Research and Data Analysis*. Cengage Learning (11th Edition). [Statistics]

Earl R. Babbie (2021). *Practice of Social Research*. Cengage Learning (15th Edition). [Practice]

Adler, Emily Stier and Roger Clark (2014). *An Invitation to Social Research: How It's Done*. Cengage Learning (5th Edition). [Invitation]

The textbook provides a foundational introduction to statistics. The ebook (digital edition) is integrated in MindTap, mainly to save you money. MindTap comes with a self-grading homework assignment software, which will enhance your learning significantly. Most students in the past had nothing but praise for it.

Do not buy any of the text books, since an electronic version is part of MindTap!!!

Additional required reading:

Ayres, Ian (2007). *Super Crunchers. Why Thinking-by-Numbers is the New Way to be Smart*. Bantam Books, New York. [Cruncher]

These are ideal companion readings for the statistics course, since it not only shows real-life statistical applications, but also discusses the benefits and limitations of statistical research.

Evaluation:

The final grade consists of the following (100 points total):

1. MindTap assignments (20 points)
2. Two Mini Case Study reports (20 points)

3. Midterm exam (20 points)
4. Final exam (20 points)
5. Best of above (20 points)

Grading:

A+: 100; A: 95 – 99; A-: 90 – 94;
B+: 85 – 89; B: 80 – 84; B-: 75 – 79;
C+: 70 – 74; C: 65 – 69, C-: 60 – 64,
D: 50 – 59; F < 50.

MindTap:

MindTap is a software product which will help you to get a deeper understanding of statistics and will provide you with plenty of opportunity to practice what you have learnt in class. The due date for the material is stated in MindTap. It will typically be on the Saturday at midnight (so that you have Sunday to prepare the next topic). You have repeated trials, however, you lose some portion of the points with each additional attempt. When you submit MindTap late, half the points are deducted. MindTap will be 20 percent of your grade, so please take the MindTap assignments seriously. Homework assignments are always due the day before as indicated in the syllabus at 11:45 pm. There will be a late penalty.

Mini Case Study Report:

I grade only with full points: 10 (perfect work), 9 (very good work), 8 (average work), 7 (sufficient work), 6 (just passing/minimal work), 5 (handed in, but failed work), and 0 (no work).

Exams:

I grade each question with full points: 10 (perfect work), 9 (very good work), 8 (average work), 7 (sufficient work), 6 (just passing/minimal work), 5 (attempted to answer with some but insufficient work), and 0 (no work).

Classroom etiquette:

1. Do not come late.
2. Turn off your cell phone.
3. Do not use your computer unless you take notes or during lab time. No emails, internet, facebook, googling, shoe shopping, video games, etc.

4. Every violent and/or (verbally) threatening behavior toward other students or myself will be immediately reported to the Dean's office (no exceptions!).

Communication:

I typically respond to emails within 48 hours, however, not always on weekends. Also, you are responsible to make sure that I have received the email. The best way to do so is, to ask me for a confirmation, especially if you send me something with a deadline. I do not accept the excuse that you have sent an email to me, when I cannot find the email in my in-folder.

Academic Integrity:

It is expected that a student in the Graduate School will refrain from plagiarism and cheating. Plagiarism and cheating are serious breaches of academic conduct and may result in permanent dismissal. Each student is advised to become familiar with the various forms of academic dishonesty as explained in the Code of Student Rights and Responsibilities. A plea of ignorance is not acceptable as a defense against the charge of academic dishonesty. Any proven plagiarism will result in failure of the course and will be reported to the committee on student discipline for further action, including notice in the permanent record, dismissal or expulsion.

Disability Statement:

All students with a disability who require special accommodations to participate in and complete this course must contact the Disability Resource Center (852-6938) for verification of eligibility and for determination of specific accommodation.

Title IX Notification:

Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain confidential support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111).

Disclosure to University faculty or instructors of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is not confidential under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer. For more information, see the Sexual Misconduct Resource Guide.

<http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure>

Tentative Course Schedule:

<u>Date</u>	<u>Topic/Homework Assignments</u>	<u>Readings</u>
Monday, August 22	Introduction	
Wednesday, August 24	Foundation of Social Science	Invitation, Chapter 1
Monday, August 29	Theory of Social Research	Invitation, Chapter 2
Wednesday, August 31	Introduction to Statistics	Statistics, Chapter 1
<i>Monday, September 5</i>	<i>Labor Day – No Class!!!</i>	
Wednesday, September 7	Descriptive Statistics HW: Statistics MindTap 1	Statistics, Chapter 2
Monday, September 12	Excel Lab 1: Descriptive Statistics	Cruncher, Introduction & Chapter 1
Wednesday, September 14	Measures of Central Tendency HW: Statistics MindTap 2	Statistics: Chapter 3
Monday, September 19	Excel Lab 2: Mean	Cruncher, Chapters 2 & 3
Wednesday, September 21	Measures of Variation HW: Statistics MindTap 3	Statistics: Chapter 4
Monday, September 26	Excel Lab 3: Standard Deviation	Cruncher, Chapters 4 & 5
Wednesday, September 28	The Normal Curve HW: Statistics MindTap 4	Statistics: Chapter 5
<i>Monday, October 3</i>	<i>Fall Break – No Class!!!</i>	
Wednesday, October 5	Sampling HW: Mini Case Study 1 Statistics MindTap 5	Statistics: Chapter 6
Monday, October 10	Review HW: Statistics MindTap 6	

Wednesday, October 12	Midterm Exam	
Monday, October 17	Estimation Procedures	Statistics: Chapter 7
Wednesday, October 19	Excel Lab 4: Sampling & Estimation HW: Statistics MindTap 7	Cruncher, Chapters 6
Monday, October 24	Hypothesis Testing with One Sample	Statistics: Chapter 8
Wednesday, October 26	Hypothesis Testing with Two Samples HW: Statistics MindTap 8	Statistics: Chapter 9
Monday, October 31	Excel Lab 5: Hypothesis Testing	Cruncher, Chapters 7
Wednesday, November 4	Experimental Research HW: Statistics MindTap 9	Practice, Chapter 8
Monday, November 7	Social Dilemma Experiments in Sustainability	TBA
Wednesday, November 9	Regression, Correlation and Causality	Statistics: Chapter 13
Monday, November 14	Excel Lab 6: Correlation & Regression	Super Cruncher, Chapters 8
Wednesday, November 16	Research Design HW: Statistics MindTap 13	Practice, Chapter 4
Monday, November 21	Measurement	Practice, Chapter 5
Wednesday, November 23	Thanksgiving – No Class!!!	
Monday, November 28	Using Existing Data and Writing a Research Report	Invitation, Chapter 12 Invitation, Appendix 3
Wednesday, November 30	Urban Statistics	Article: TBA
Monday, December 5	Final Exam Mini Case Study 2	

I reserve the right to change the syllabus when necessary.