

SOC 402: Data Analysis and Research
Course Syllabus, WIN 2017 (79559)
University of Alberta

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Office Hours: W 2:00-4:00pm, and by appointment

Course Meeting: Rutherford S 205A, W 9:00AM – 11:50AM

Required Course Reading:

Wheelan, Charles. 2014. *Naked Statistics: Stripping the Dread from the Data*. W.W. Norton & Company. ISBN 978-0-393-34777-7. Available at the bookstore and through other sellers.

Dalgaard, Peter. 2008. *Introductory Statistics with R*. Springer. Available online via the University of Alberta library system: [*Dalgaard Link*](#).

Diez, David M., Christopher D. Barr, and Mine Cetinkaya-Rundel. 2015. *OpenIntro Statistics, 3rd Edition*. Available online at: <https://www.openintro.org/stat/>.

Strunk, William, and E.B. White. [1918]1999. *The Elements of Style, 4th Edition*. Allyn & Bacon. Available online and cheaply through many booksellers.

Additional supplemental readings are also available through the course website.

Prerequisite:

SOC 100 or consent of instructor.

Technology Requirements:

You will need access to the statistical program, R (<http://www.r-project.org/>), to complete homework assignments and the final research project. We will discuss how to download and set-up this program in class.

This course utilizes [eClass](#) for the posting of certain content. I will also make announcements via eClass, so please check the website regularly.

Policy about course outlines can be found in the section on [Course Requirements, Evaluation Procedures, and Grading](#) of the University Calendar.

Course Description

This course provides a hands-on introduction to data analysis for social science research with a focus on examples from sociology. It is designed to provide students with the necessary skills to analyze data, interpret results, and conduct research. This course covers topics that include the logic of scientific inquiry, introductory statistics, and common research techniques used in the social sciences. Students will gain experience with the practical side of statistics and research by learning to explore, analyze, interpret, and present data - tasks that permeate the social sciences and many other fields. Students will also have the opportunity to translate their general interests into a well-defined research topic, analyze data related to that topic, and communicate findings to a general audience. With a focus on developing research, writing, and presentation skills, the course provides instruction on how to use Excel and R to summarize and analyze data, opportunities to evaluate research and writing, and information on how best to share study findings with different audiences. Because this course focuses on statistics and research, prerequisites of SOC 210, 315, or equivalent are highly suggested.

Course Goals & Objectives

My aim in this course is to provide you with an opportunity to develop your skill set through applied data analysis and research. To facilitate this development, each class will be split into a lecture/seminar portion and an applied lab portion. Although we will specifically focus on skill development, you will also be able to extend your knowledge of a subject area through a semester-long project of your choice. I intend for all undergraduate and graduate students to leave this course with a stronger understanding of the research process and well on their way to having a solid research paper together.

Course Policies

Contacting Me:

If you have a question that can be answered with a couple sentences, please contact me through email. If your question requires a more detailed or lengthy response, I suggest that you attend my office hours or make an appointment. Please be aware that I check email most weekdays but not always on weekends. If you email me, you can expect a response within 24 hours, unless it arrives on Friday.

Email Etiquette:

Remember that email communication for all courses should be formal and professional. Make sure to use proper spelling, grammar, and punctuation.

Absences:

If you are going to be absent from lecture, you do not need to contact me unless you will be missing an exam. However, if you miss a lecture, I suggest contacting another student in the class to obtain a copy of the notes from that lecture.

As per §23.5.6 of the University of Alberta Calendar: *Excused absence for a missed exam is not automatic and is granted at the discretion of the instructor (in the case of term exams) or the student's Faculty (in the case of final exams). Instructors and Faculties are not required to grant excused absences for unacceptable reasons that include, but are not limited to personal events such as vacations, weddings, or travel arrangements. When a student is absent from a term or final exam without acceptable excuse, a final grade will be computed using a raw score of zero for the exam missed. Any student who applies for or obtains an excused absence by making false statements will be liable under the Code of Student Behaviour.*

If you miss an exam or are unable to complete assignments on the appropriate date because of an incapacitating illness, you must contact me within two business days or as soon as you are physically able to do so. You must also complete a Medical Declaration Form for students in Arts or a Statutory Declaration for students from other Faculties to be completed by your Faculty Office or the Registrar's Office. Supporting medical documentation, such as a University of Alberta Medical Statement signed by a doctor, is also helpful. You should submit appropriate documentation for other acceptable absences. This might include a copy of the death certificate for a death in the family, a letter from the church or pastor for a religious conflict, or a copy of the accident report for a car accident. For other reasons, please consult with me for appropriate documents.

Disability Accommodations:

Students who require accommodations in this course due to a disability affecting mobility, vision, hearing, learning, mental, or physical health are advised to discuss their needs with [Student Accessibility Services](#), SUB 1-80, 492 · 3381 (phone) or 492 · 7269 (TTY). Students registered with SAS who will be using accommodations in the classroom or writing exams through SAS are required to provide a "Letter of Introduction."

Electronic Recording of Lectures:

As per §24.3 of the University Calendar: *Audio or video recording of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Recorded material is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the content author(s).*

Plagiarism and Cheating:

Per GFC 23.4(2): *The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (www.governance.ualberta.ca) and avoid any behaviour that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University. Please see the following website for more details: <http://www.governance.ualberta.ca/StudentAppeals/DontCheatsheet.aspx>.*

Course Requirements

Grade Breakdown:

Your grade in this course will be based upon three aspects, each worth a part of the grade:

- Discussion and Participation: 10%
- Homework Assignments: 20%
- Research Project: 70%
- **Total:** 100%

Discussion & Participation:

Student participation is essential to any seminar class. I therefore expect you to be mentally and physically present and to participate in each class. In-class participation includes speaking up in class, asking and answering questions, and completing group work. I expect you to come to class with the reading completed and ready to discuss the topics for that day. I also expect everyone in this class to be respectful and courteous. Disruptive and disrespectful behavior, such as talking out of turn, listening to music, using electronic devices for non-class purposes, sleeping through class, and leaving early without first notifying the instructor, will negatively affect your grade. Participation accounts for 10% of your total grade.

Homework Assignments:

You will have **two** R-based homework assignments to complete during the semester. These assignments will help to develop your skills with R, which will be important for your final project. Assignments should be typed and include all necessary R output. The first assignment is due during Week 4 and the second is due during Week 6. Assignments will be posted on the course website. The homework assignments are worth 20% of your final grade. Late assignments will be penalized.

Research Project:

The research project consists of three integrated research assignments: a Topic Proposal, Paper #1, and Paper #2. For the Topic Proposal, due during Week 3, you will outline your research idea, explain its importance, discuss options for datasets, and include 3-4 additional sources for the project. The Topic Proposal is worth 10% of your grade. Paper #1, due during Week 9, will consist of what sociologists often refer to as a “front end” of a paper. It will include your literature review, theoretical framework, and outline of your methods plan. This paper is worth 25% of your grade. Paper #2, due during Week 14, will then combine the first paper with some data analysis for a full final research project. The final paper is worth 35% of your grade.

I will provide you with feedback on each step of the project and I expect you to incorporate that feedback into the final paper. The research project, which is worth 70% of your final grade, is the largest component of your grade in this class. Further details for each portion of the project will be posted on the course website.

Grade Conversion Scale:

| Descriptor | Percentage Grade | Letter Grade | Grade Point Value |
|--------------|------------------|--------------|-------------------|
| Excellent | 96 - 100 | A+ | 4.0 |
| | 91 - 95 | A | 4.0 |
| | 86 - 90 | A- | 3.7 |
| Good | 81 - 85 | B+ | 3.3 |
| | 76 - 80 | B | 3.0 |
| | 71 - 75 | B- | 2.7 |
| Satisfactory | 66 - 70 | C+ | 2.3 |
| | 62 - 65 | C | 2.0 |
| | 58 - 61 | C- | 1.7 |
| Poor | 54 - 57 | D+ | 1.3 |
| Minimal Pass | 50 - 53 | D | 1.0 |
| Failure | 0 - 49 | F | 0.0 |

Course Schedule & Readings

(TENTATIVE)

Week 1: Welcome!

Weds. (Jan. 11th)

This first week will include introductions and an overview of the course. We will also review some of the basic concepts behind data analysis, research, and writing.

Week 2: Research in the Social Sciences

Weds. (Jan 18th)

What is social science research? What makes a good research question? And how do we go about finding answers to our questions? This week we will discuss the development of research topics and questions, as well as some of the basics behind study design. We will also discuss how to evaluate research and conduct literature reviews. The lab portion of this class will include an introduction to R and overview of Excel.

Required Reading:

- Research Resources and Article Search Tips (handout); Dalgaard Chs. 1-2, Appendix A

For Review:

- *OpenIntro Statistics* Ch. 1

Week 3: Statistics Review

Weds. (Jan 25th)

Week 3 begins our review of basic statistics. During the first part of class we will discuss basic descriptive statistics, including measures of central tendency and dispersion, as well as ways to visualize data. We will then begin working with R during the lab portion of the class. We will discuss the role of vectors, matrices, and functions in using R. We will also see how to calculate basic descriptive statistics with datasets.

Required Reading:

- Wheelan Chs. 1-3; Dalgaard Ch. 4

For Review:

- *OpenIntro Statistics* Ch. 1; Dalgaard Chs. 1-2

Assignment:

- Topic Proposal due Wednesday, Jan. 25th by 5:00pm
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Week 4: Statistics Review

Weds. (Feb. 1st)

Week 4 continues our statistics review. This week we will discuss probability, inference, hypothesis testing, and ANOVA. We will also continue to analyze data in R during the lab portion of class.

Required Reading:

- Wheelan Chs. 4, 8-10; Dalgaard Chs. 5-7

For Review:

- *OpenIntro Statistics* Chs. 4-6

Assignment:

- Homework Assignment #1 due Friday, Feb. 3rd by 5:00pm
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Week 5: Building Research

Weds. (Feb. 8th)

Week 5 takes us back to building research. In preparation for your first paper assignment, we will think more about data collection methods, relationships, evaluating studies, and summarizing data. We will also have a guest panel who will discuss research tips and mistakes during the lab portion of class.

Required Reading:

- Pearce, Lisa D. 2012. "Mixed Methods Inquiry in Sociology." *American Behavioral Scientist* 56(6): 829-848.

For Review:

- Conducting a Literature Review and Creating Annotated Bibliographies (handout)

Week 6: Linear Regression and Extensions

Weds. (Feb. 15th)

Week 6 focuses on expanding our knowledge of basic statistics. This week, we will delve into linear regression a bit more by discussing multivariate regression, along with its extensions. We will also see how to address these issues in R.

Required Reading:

- Wheelan Ch. 11; Dalgaard Chs. 11-12

For Review:

- *OpenIntro Statistics* Ch. 7

Assignment:

- Homework Assignment #2 due Friday, Feb. 17th by 5:00pm

Week 7: No Classes. Have a lovely Reading Week!

Weds. (Feb. 22nd)

No classes!

Week 8: Putting the Data in Data Analysis

Weds. (March 1st)

Where do data come from? How are data used in different areas? The week focuses on data and data sources. For the first part of class, we will have a panel discussion with several guest speakers who analyze data on a regular basis. We will also introduce you to a variety of data sources. You will also have some time to work on and ask questions about Paper #1 during the lab portion of class.

Required Reading:

- Wheelan Ch. 7; Datasets and Sources (handout)

For Review:

- Dalgaard Ch. 2

Week 9: Summarizing and Working with Data

Weds. (March 8th)

What do we do when data don't listen? This week we will discuss how to deal with more complicated data and then the many issues that arise when we're working with messy datasets. We will focus on missing data, coding problems, and sampling issues in the seminar and lab portions of the class. We will also learn about how to best summarize and present data for different audiences.

Required Reading:

- Dalgaard Ch. 10

For Review:

- *OpenIntro Statistics* Ch. 8.1-8.3

Assignment:

- Paper #1 due Friday, March 10th by 5:00pm

Week 10: Linear Regression Mistakes and Diagnostics

Weds. (March 15th)

During Week 10 we will focus on extending our knowledge of linear regression models. We will discuss common regression mistakes and problems that include issues of nonlinearity, collinearity, and model selection. We will then see how to apply these methods using R.

Required Reading:

- Wheelan Ch. 12; Dalgaard Chs. 11-12

For Review:

- *OpenIntro Statistics* Chs. 7-8

Week 11: Categorical Variables as Predictors and Outcomes

Weds. (March 22nd)

During Week 11 we will focus on extending our knowledge of linear models. We will discuss categorical variables as both predictor and outcome variables, along with logistic regression. We will then see how to apply these methods using R.

Required Reading:

- Dalgaard Ch. 13

For Review:

- *OpenIntro Statistics* Ch. 8.4

Week 12: Applied and Policy Research

Weds. (March 29th)

How do people conduct research and analyze data in the real world? Will we actually use what we've learned this semester? This week's panel of applied and policy researchers will help to answer some of these questions and give you an idea of how these skills could be relevant to your career. The panelists will also provide some advice on presenting data and findings, which should be helpful for future presentations. After the panel, you will also have time to continue working on the second paper during the lab portion of the class.

Required Reading:

- Browse the *Sociology at Work* website: <http://www.sociologyatwork.org>

Week 13: Writing and Editing

Weds. (April 5th)

What makes for good writing? This week we will discuss writing techniques, along with Strunk and White's ideas for good writing. You will also have time to continue working on the second paper during the lab portion of the class. In particular, we will focus on the introductions for each of your papers.

Required Reading:

- Strunk and White Parts I and II

Assignment:

- Bring two double-spaced printed copies of the Introduction to Paper #2 to class on April 5th.

Week 14: Course Wrap-up

Weds. (April 12th)

Week 14 marks the end of our time together. This week we will work on wrapping up our writing discussion and the course as a whole.

Required Reading:

- Strunk and White Parts III, IV, and V
- "Happy Birthday, Strunk and White!" *The New York Times*, April 24, 2009. [*Link*](#)

Assignment:

- Paper #2 due Wednesday, April 12th by 5:00pm

SOC 402: Course Schedule WIN 2017

| Week (Mon. - Sun.) | General Topic | Subtopics and Guest Speakers | Readings | Lab Component | Assignments |
|---------------------------------------|--|---|---|--|--|
| Week 1 01.09 - 01.15 | Welcome! | Course overview, introductions, and discussion of data analysis | | | |
| Week 2 01.16 - 01.22 | Research in the social sciences | Developing research questions, study design | Article Search Tips; Dalgaard Chs. 1-2, Appendix A; OpenIntro Ch. 1 | Searching for articles, Intro to R, and Excel overview | |
| Week 3 01.23 - 01.29 | Descriptive statistics review | Stats basics - describing data; Tables and data presentation | Wheelan Ch. 1-3; Dalgaard Ch. 4 (also review Chs. 1-2); OpenIntro Ch. 1 | Working with R, vectors, matrices, and functions | Topic Proposal Due Wednesday |
| Week 4 01.30 - 02.05 | Inferential statistics review | Stats basics - probability and inference | Wheelan Ch. 4, 8-10; Dalgaard Chs. 5-7; OpenIntro Chs. 4-6 | Working with R | R HW #1 Due Friday |
| Week 5 02.06 - 02.12 | Building research | Data collection methods and guest panel to discuss research tips and mistakes | Pearce 2012; Article Search Tips (review) | Evaluating studies and summarizing data | |
| Week 6 02.13 - 02.19 | Linear regression and extensions | Multiple variables, dummy variables, and interactions | Wheelan Ch. 11; Dalgaard Chs. 11-12; OpenIntro Ch. 7 | Recoding variables, creating interactions | R HW #2 Due Friday |
| READING WEEK - NO CLASS | | | | | |
| Week 7 02.20 - 02.26 | | | | | |
| Week 8 02.27 - 03.05 | Putting the data in data analysis | Guest panel to discuss data | Wheelan Ch. 7 ; Dalgaard Ch. 2 (review) | Working on Paper #1 | |
| Week 9 03.06 - 03.12 | Summarizing and working with data | Missing data, coding problems, and sampling issues | Dalgaard Ch. 10; OpenIntro Ch. 8.1-8.3 | Summarizing data in R and in Excel | Paper #1 Due Friday |
| Week 10 03.13 - 03.19 | Linear regression mistakes and diagnostics | Common regression mistakes, checking regression assumptions | Wheelan Ch. 12; Dalgaard Chs. 11-12; OpenIntro Ch. 7 | Regression and other models in R; Working on Paper #2 | |
| Week 11 03.20 - 03.26 | Categorical variables | Categorical variables as predictors and outcomes | Dalgaard Ch. 13; OpenIntro Ch. 8.4 | Logistic regression and other models in R; Working on Paper #2 | |
| Week 12 03.27 - 04.02 | Applied and policy research | Guest panel to discuss research work | www.sociologyatwork.org | Working on Paper #2 | |
| Week 13 04.03 - 04.09 | Writing and editing | Discussion of writing techniques | Strunk & White Parts I and II | Working on Paper #2 | Paper #2 Introduction Due Wednesday |
| Week 14 04.10 - 14.16 | Course wrap-up and discussion of projects | Course debrief, more writing discussion | Strunk & White Parts III, IV, and V; NYT Article | | Paper #2 Due Wednesday |
| Finals Weeks 04.17 - 04.30 | Good Luck with Finals! | | | | |