SOC 456-A1 / POL S 528-A1 / SOC 503-A2:
Data Analysis and Research
Course Syllabus, FALL 2020
University of Alberta

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Office Hours: Weds. and Thurs. by appointment, see calendly.com/dr-maroto for bookings

Synchronous Course Meeting: Tues. 10:30-11:50am

Required Course Reading:

Fogarty, Brian J. 2019. *Quantitative Social Science Data with R: An Introduction*. Sage. ISBN 978-1-5264-1150-1. Available at the bookstore and through other sellers. eBook also available.

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.

Recommended Course Reading:

Wheelan, Charles. 2014. *Naked Statistics: Stripping the Dread from the Data*. W.W. Norton & Company.

Grolemund, Garrett and Hadley Wickham. 2019. *R for Data Science*. Available online: r4ds.had.co.nz.

Xie, Yihui, J.J. Allaire, and Garrett Grolemund. 2020. *R Markdown: The Definitive Guide.* Available online: bookdown.org/yihui/rmarkdown.

Diez, David M., Christopher D. Barr, and Mine Cetinkaya-Rundel. 2019. *OpenIntro Statistics, 4th Edition*. Available online: openintro.org/book/os.

Prerequisite:

SOC 100 or consent of instructor.

Technology Requirements:

You will need access to the statistical program, R (r-project.org) and RStudio (rstudio.com), to complete assignments. We will discuss how to download and set-up this program in class.

This course meets through Zoom and uses eClass for posting content and submitting assignments. I will also make announcements via eClass, so please check the website regularly.

Policy about course outlines can be found in Course Requirements, Evaluation Procedures, and Grading of the University Calendar.

Teaching & Learning in a Time of COVID-19

The COVID-19 global pandemic has greatly changed how we work, study, and interact. We are not living in normal times, whatever your definition of normal may be. None of us signed up for this. Simply put, this is not the course I planned to teach nor is it the course you planned to take. Yet, here we are. This is the course we have to have in order to keep people safe and alive. I know that many of you might be struggling with other responsibilities, anxieties, and hardships that can limit your course participation and performance. However, I also know that you are here to get an education and learn. I have, therefore, worked to create a balance in this course that allows for flexibility, while also creating an environment that supports my course goals and objectives for you.

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. However, it is not a statistics course. This course focuses on data analysis and research. 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 different audiences. With a focus on developing research, writing, and presentation skills, the course provides instruction on how to use the statistical software, 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. An understanding of introductory statistics through linear regression is a must.

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. 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 project together.

Course Structure

This course incorporates both weekly *asynchronous* (recorded) lectures and *synchronous* (live) course meetings.

Asynchronous material will be posted on eClass. Each week before Friday at 5:00pm I will post 1-3 recorded segments on the course material, along with lecture slides, R code, and R output. I expect you to view this material before class the following Tuesday. In addition to the asynchronous content, we will also have weekly synchronous meetings conducted via Zoom.

Weekly synchronous Zoom meetings (Tues., 10:30-11:50am) will comprise two parts – (1.) a full class meeting from 10:30-11:00am and (2.) a work session from 11:00-11:50am. I will begin by briefly reviewing the asynchronous material for the week, sharing any announcements, and discussing assignments. Please do your very best to attend the full class meeting each week. For those of you who are unable to attend, the full class meeting portion will be recorded and posted on eClass. After the full class meeting, you will have the option of going to work on your assignments offline or staying online to work through assignments in groups, ask questions, and discuss your projects. This part of the synchronous course meeting is optional, but I encourage attending. It is a good place to get extra help and build relationships with your classmates.

Viewing Asynchronous Material:
It can be really easy to fall behind in online courses with asynchronous material. I have some suggestions for how to stay on top of things and get the most out of watching the asynchronous material.

- Take notes as you watch the material. This will help you to remember what you've watched.
- Much of the asynchronous material involves working through R code, which will also be shared on eClass. Once you've watched the lectures, take a try at the R code yourself. Or, better yet, work through the R code as you watch the lectures.
- Use the weekly eClass forums to ask questions about the material.

Attending Synchronous Zoom Meetings:
We're getting more used to it, but meeting online can still be a challenging experience. I have some suggestions for improving that experience and getting the most out of these meetings.

- Treat this like an in-person class. Come to class prepared, ready to take notes and pay attention.
- Create a quiet study space for class time with limited distractions. I recognize that personal circumstances and living situations might not allow for this, but please do the best that you can.
- Please use your chosen name (what you would like to be called) on-screen. This will make it easier to call on you and develop relationships throughout the semester.
- Be respectful of your classmates. Mute yourself when you're not speaking and use the "hand raise" and chat functions to ask questions.

Course Policies

Be respectful. Be honest. Be kind.

Contacting Me:
I highly recommend either bringing any questions you have to our weekly synchronous meeting or posting them on the weekly eClass forums. However, if you have a question that can be answered with a couple sentences and this question has not already been answered on the syllabus or course website, you may contact me through email. If your question requires a more detailed or lengthy response, I suggest that you raise the question in class, attend my office hours, or make an appointment to meet with me. Please be aware that I check email from 9:00-5:00 on weekdays but not on weekends.

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

Absences and Missed Assignments:
You are not required to contact me if you miss our weekly synchronous meeting. I understand that extenuating circumstances may limit your ability to attend these meetings. However, please contact me as soon as possible if you are unable to complete an assignment on-time so that we can discuss arrangements for submitting the assignment. I would like to avoid late penalties this semester if possible and I will work with you to set up a plan for turning in assignments if you fall behind. I do recognize, though, that late penalties may be necessary in some situations.

Accessibility Resources:
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 Resources, SUB 1-80, 492 · 3381 (phone) or 492 · 7269 (TTY).

Electronic Recording of Lectures:
As per the University Calendar: *Audio or video recording, digital or otherwise, of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as apart of an approved accommodation plan. Student or instructor content, digital or otherwise,created and/or used within the context of the course 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).*

Academic Integrity:
Per GFC 24.3(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.* All students should consult the academic integrity website.

Basic Needs Security:
If you have difficulty affording groceries or accessing sufficient food to eat every day, or if you lack a safe and stable place to live, and you believe this many affect your performance in this course, please contact the Office of the Student Ombuds or the Dean of Students for support. The Campus Food Bank also offers multiple programs to help with food insecurity. Additionally, please talk to me if you are comfortable in doing so. This will enable me to provide any resources that I might possess.

Children and Caregiving Responsibilities:
Children are always welcome within our synchronous meetings. I understand that students have a variety of caregiving responsibilities, which have only increased due to the pandemic. Please let me know if this is something that will affect your coursework.

Pet Visits:
Pets are always welcome within our synchronous meetings. In fact, I will be pretty disappointed if you have a pet and I don't get to meet them this semester.

Treaty 6 Territory:
The University of Alberta acknowledges that we are located on Treaty 6 territory, and respects the histories, languages, and cultures of the First Nations, Métis, Inuit, and all First Peoples of Canada, whose presence continues to enrich our vibrant community.

Learning and Working Environment:
The Faculty of Arts is committed to ensuring that all students, faculty, and staff are able to work and study in an environment that is safe and free from discrimination and harassment. It does not tolerate behavior that undermines that environment.

Course Requirements

Grade Breakdown:
Your grade in this course will be based upon seven assignments, divided into two R-homework assignments and five project-related assignments. These are summarized in the table below in chronological order by due date.

Due	Assignment	Weight
Week 3	Topic Proposal	10%
Week 4	R Homework Assignment #1	15%
Week 6	Literature Summary	15%
Week 7	R Homework Assignment #2	15%
Week 9	Data Brief #1	15%
Week 12	Data Brief #2	15%
Week 14	Research Findings Assignment	15%

R 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 course project. Assignments (R Markdown files and HTML output) will be submitted on eClass. The first assignment is due during Week 4 and the second is due during Week 7. Assignments will be posted on the course website. The homework assignments are worth 15% each.

Project-related Assignments:
One goal of this course is to provide you with an opportunity to gain expertise in an area, learn more about a topic, and answer a research question through a broader research project. Instead of writing one big research paper, you will do this through **five** integrated research assignments: Topic Proposal, Literature Summary, Data Brief #1, Data Brief #2, and Research Findings Assignment.

There are two potential paths for the research project. You can either (1.) choose your own topic and dataset or (2.) conduct research in one of my areas of interest using the Alberta Viewpoint 2019/2020 surveys or the 2020 Disability COVID-19 survey. Assignments will be the same for both paths.

For the ***Topic Proposal***, due during Week 3, you will identify your research path, 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.

The ***Literature Summary***, due during Week 6, will comprise a condensed literature review, written for a general audience. It will require reviewing key literature and synthesizing research findings into a brief summary. The Literature Summary is worth 15% of your grade.

Data Brief #1, due during Week 9, will include an overview of your dataset and application of descriptive statistics using your chosen data. Data Brief #1 is worth 15% of your grade.

Data Brief #2, due during Week 12, will focus on relationships between variables and inferential statistics using your chosen dataset. Data Brief #2 is worth 15% of your grade.

For the ***Research Findings Assignment***, due during Week 14, you will submit either a draft Op-Ed, series of Tweets, podcast, or video that summarizes the key research findings from your project. This is an opportunity to be creative and think beyond the typical ways that we present research. I am also open to ideas beyond those listed here, but you must discuss them with me first. You will also be asked to write a short reflection on what you learned this semester as part of this assignment. The Research Findings Assignment is worth 15% of your grade.

All assignments are due on the Thursday of their assigned week. Assignments must be submitted via eClass and uploaded before 11:59pm on Thursdays. Further details for each assignment will be posted on the course website and reviewed in class.

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!

Tues. (Sept. 1st)

This first synchronous meeting will include introductions and an overview of the course. The asynchronous lectures will review some of the basic concepts behind data analysis, research, and writing.

Week 2: Research in the Social Sciences / R Intro and R Basics

Tues. (Sept. 8th)

What is social science research? What makes a good research question? And how do we go about finding answers to our questions? Week 2 will cover the development of research topics and questions, as well as some of the basics behind study design. This week will also include an introduction to R, RStudio, and R Markdown. We will discuss how to download and use these programs. We will also briefly review the role of vectors, matrices, and functions in using R.

Required Reading:

- Fogarty Chs. 1-2
- Dale, Angela, Jo Wathan, and Vanessa Higgins. 2008. "Secondary Analysis of Quantitative Data Sources." Ch. 31 in P. Alasuutari, L. Bickman, and J. Brannen (eds.), *SAGE Handbook of Social Research Methods*. SAGE. *Link*

Week 3: Data, Data, Data

Tues. (Sept. 15th)

Where do data come from? How are data used in different areas? The week focuses on data and data sources. Week 3 will introduce you to a variety of data sources and show you how to input these data into R. We will also discuss cleaning data, including issues around missing data, coding problems, and sampling.

Required Reading:

- Fogarty Chs. 3-5

Assignment:

- Topic Proposal due Thursday, Sept. 17th, by 11:59pm (upload to eClass)

Week 4: Descriptive Statistics Review

Tues. (Sept. 22nd)

Week 4 begins our review of basic statistics and application in R. During this lecture we will discuss basic descriptive statistics, including frequency tables and measures of central tendency and dispersion, and how to calculate theses measures in R. We will also address issues around working with sample data.

Required Reading:

- Fogarty Chs. 6-7

Assignment:

- R Homework #1 due Thursday, Sept. 24th, by 11:59pm (upload to eClass)

Week 5: Visualizing and Presenting Data

Tues. (Sept. 29th)

Week 5 continues our statistics review with a focus on data visualization and presentation. We will discuss best practices for presenting findings in tables and graphs, looking at the different plots available through the R package, ggplot2.

Required Reading:

- Fogarty Ch. 8

Week 6: Inferential Statistics Review

Tues. (Oct. 6th)

Week 6 reviews inferential statistics. This week we will discuss probability, inference, hypothesis testing, and ANOVA. We will also continue to analyze data in R using these methods.

Required Reading:

- Fogarty Ch. 9

Assignment:

- Literature Summary due Thursday, Oct. 8th, by 11:59pm (upload to eClass)

Week 7: Bivariate Analysis Review

Tues. (Oct. 13th)

During Week 7 reviews relationships between variables. We will discuss association, cross-tabs, measures of association, and correlation. We will then see how to apply these methods using R.

Required Reading:

- Fogarty Ch. 10

Assignment:

- R Homework #2 due Thursday, Oct. 15th, by 11:59pm (upload to eClass)

Week 8: Linear Regression Review

Tues. (Oct. 20th)

Week 8 focuses on expanding our knowledge of basic statistics. This week, we will delve into linear regression a bit more by discussing bivariate and multivariate regression, along with its extensions. We will also see how to address these issues in R.

Required Reading:

- Fogarty Ch. 11

Week 9: Linear Regression Mistakes and Diagnostics

Tues. (Oct. 27th)

During Week 9 we will focus on extending our knowledge of linear 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:

- Fogarty Ch. 12

Assignment:

- Data Brief #1 due Thursday, Oct. 29th, by 11:59pm (upload to eClass)

Week 10: Categorical Variables

Tues. (Nov. 3rd)

During Week 10 we will further extend our knowledge of regression models to incorporate categorical variables. 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:

- Fogarty Ch. 13

Week 11: No Classes. Have a lovely Reading Week!

Tues. (Nov. 10th)

No classes!

Week 12: Writing and Editing

Tues. (Nov. 17th)

What makes for good writing? This week we will discuss writing techniques, along with Strunk and White's ideas for good writing.

Required Reading:

- Strunk and White Parts I-V
- "Happy Birthday, Strunk and White!" *The New York Times*, April 24, 2009. *Link*

Assignment:

- Data Brief #2 due Thursday, Nov. 19th, by 11:59pm (upload to eClass)

Week 13: Writing and Editing

Tues. (Nov. 24th)

What makes for good writing? This week we will continue to discuss writing techniques with an emphasis on writing beyond academic and the typical research paper.

Required Reading:

- The Op-Ed Project. 2020. Op-ed Writing: Tips and Tricks. *Link*
- Iber, Patrick. 2016. A Defense of Academic Twitter. Inside Higher Ed. *Link*

Week 14: Course Wrap-up

Tues. (Dec. 1st)

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.

Assignment:

- Research Findings Assignment due Thursday, Dec. 3rd, by 11:59pm (upload to eClass)

SOC 456-A1 / POL S 528-A1 / SOC 503-A2: Course Schedule FALL 2020				
Week (Mon. - Sun.)	**General Topic**	**Subtopics**	**Readings**	**Assignments (Due Thursday 11:59pm)**
Week 1 08.31 - 09.06	Welcome!	Course overview, introductions, and discussion of data analysis	----------	----------
Week 2 09.07 - 09.13	Research in the social sciences / R Intro and R Basics	Developing research questions, study design, searching for articles / Intro to R, RStudio, and R Markdown	Dale, Wathan & Higgins (2008); Fogarty Chs. 1-2	----------
Week 3 09.14 - 09.20	Data, data, data	Finding data sources / Working with data in R / Recoding variables and cleaning data	Fogarty Chs. 3-5	Topic Proposal
Week 4 09.21 - 09.27	Descriptive statistics review	Frequency distributions, measures of central tendency and dispersion / Working with sample data	Fogarty Chs. 6-7	R HW #1
Week 5 09.28 - 10.04	Visualizing data	Tables, graphs, and data presentation	Fogarty Ch. 8	----------
Week 6 10.05 - 10.11	Inferential statistics review	Probability, inference, and hypothesis testing	Fogarty Ch. 9	Literature Summary
Week 7 10.12 - 10. 18	Bivariate analysis review	Multiple variables, association, and correlation	Fogarty Ch. 10	R HW #2
Week 8 10.19 - 10.25	Linear regression review	LR basics / Dummy variables and interactions	Fogarty Ch. 11	----------
Week 9 10.26 - 11.01	Linear regression mistakes and diagnostics	Common regression mistakes, checking regression assumptions	Fogarty Ch. 12	Data Brief #1
Week 10 11.02 - 11.08	Categorical variables	Categorical variables as predictors and outcomes / Bringing everything together	Fogarty Ch. 13	----------
Week 11 11.09 - 11.15	**READING WEEK - NO CLASS**			
Week 12 11.16 - 11.22	Writing and editing	Discussion of writing techniques	Strunk & White Parts I-V	Data Brief #2
Week 13 11.23 - 11.29	Writing and editing	Writing beyond academia	The Op-Ed Project (2020); Iber (2016)	----------
Week 14 11.30 - 12.06	Course wrap-up and discussion of projects	Course debrief, more writing discussion	----------	Research Findings Assignment
Finals Weeks 12.10 - 12.22	**Good Luck with Finals!**			