
PANDEMIC CHANGES

The University of British Columbia has directed UBC programs to redesign courses to be delivered online given the COVID-19 pandemic. As a result this course has been redesigned to be delivered online. From the Provost's Office: "During this pandemic, the shift to online learning has greatly altered teaching and studying at UBC, including changes to health and safety considerations. Keep in mind that some UBC courses might cover topics that are censored or considered illegal by non-Canadian governments. This may include, but is not limited to, human rights, representative government, defamation, obscenity, gender or sexuality, and historical or current geopolitical controversies. If you are a student living abroad you will be subject to the laws of your local jurisdiction and your local authorities might limit your access to course material or take punitive action against you. UBC is strongly committed to academic freedom but has no control over foreign authorities (please visit <http://www.calendar.ubc.ca/vancouver/index.cfm?tree=3,33,86,0> for an articulation of the values of the University conveyed in the Senate Statement on Academic Freedom). We recognize that students will have legitimate reason to exercise caution in studying certain subjects. If you have concerns regarding your personal situation, consider postponing taking a course with manifest risks until you are back on campus or reach out to your academic advisor to find substitute courses. For further information and support, please visit: <http://academic.ubc.ca/support-resources/freedom-expression>"

COURSE INFORMATION

Course Title	Course Code - Section	Credit Value
SOCI 502 Research Design and Techniques (Quantitative)	SOCI 502 - 101	3

Class Time	Class Location	Session Term
Mon 1:00–4:00 pm	Canvas	2020W1

Course Description

This course focuses on first principles for analyzing quantitative survey data. It addresses causal relationships, research design, descriptive statistics, statistical inference, scales and indices, missing data and multiple regression. A practical outcome of the course is a research proposal based upon a proposed multivariate analysis of secondary survey data that can be implemented in SOCI 514 Analyzing Quantitative Data in Sociology the following semester.

Learning Materials

Agresti, Alan. 2018. *Statistical Methods for the Social Sciences. Fifth Edition*. Prentice Hall. This is also the required textbook for SOCI 514.

Stata is available at www.statacorp.com for USD48 for a 6-month subscription, USD94 for a 12-month subscription and USD225 for a perpetual licence (Stata/IC will do unless you intend to work with an extremely large dataset). Stata (the SE version) is also available for free (for one year) at the UBC Web Store.

This course uses Canvas for lectures and videos, exercises, assignments and office hours. The following materials are also available in Canvas:

- Lecture slides and videos
- Stata resources

- GSS and Country datasets
- Descriptions of variables in the GSS and Country datasets

INSTRUCTOR INFORMATION

Course Instructor	Email	Office Hours
Gerry Veenstra, PhD	gerry.veenstra@ubc.ca	TBD

ASSESSMENTS FOR LEARNING

Summary

#	Component	Weight
1	Exercises	35%
2	Assignments	35%
3	Research proposal	30%
	Total	100%

Exercises

The exercises are located in the Assignments section of Canvas and are comprised of multiple choice and short answer questions based on the lecture videos and textbook readings.

Assignments

The assignments are located in the Assignments section of Canvas and require the completion of short reports based on applying statistical techniques to real data. The submission deadlines for the assignments are provided in Canvas.

Research Proposal

The research proposal should include the following sections:

- Introduction: State the objectives of the proposed research and give a brief overview of the topic. Provide an overview of theories and concepts that are relevant to the topic and research problem and (briefly) review past research.
- Research problem: Clearly describe the main research problem(s).
- Research design and unit of analysis: Identify the research design of the study (experimental, longitudinal, cross-sectional). Identify the unit of analysis for the study (individuals, businesses, neighbourhoods, etc.).
- Sampling: Describe the population being studied and the details of the sampling strategy. Briefly describe the data collection technique. What is the response rate, if applicable? What is the size of the working sample?
- Operationalization of variables: Identify the key variables for addressing the research problem. How are they coded? Describe composite variables (indices or scales) if applicable. Describe control variables if applicable. Describe the distributions of these variables in the dataset.
- Missing data: Describe the nature and extent of missing data in the survey sample. Outline a plan for analytically dealing with these missing data.
- Proposed analysis: Describe your plans for analyzing the data (e.g., specified sequences of regression models).

- Limitations: Describe some of the more important limitations of the proposed research. Suggest how future research might potentially overcome these limitations.

The text of the proposal should be between 10 and 20 double-spaced pages in length (Times New Roman 12-point font), excluding tables, references and appendices.

COURSE SCHEDULE

Week 1 (Sep 14): Introduction

- Introduction to the course; brief tutorial on Stata

Week 2 (Sep 21): Epistemology and causality

- Epistemological standpoints; conditions for causality; research designs (experimental, longitudinal, cross-sectional); multivariate causal relationships
- Michalski, J.H. 2016. The epistemological diversity of Canadian sociology. *Canadian Journal of Sociology* 41, 4, 525-556.
- Agresti 10.1-10.3

Week 3 (Sep 28): Variables and sampling

- Descriptive and inferential statistics; populations and samples; parameters and statistics; variables; levels of measurement; sampling error; types of bias; sampling strategies; survey weights
- Agresti Chapters 1 & 2

Week 4 (Oct 5): Descriptive statistics (summarizing variables)

- Frequency tables; pie charts and bar charts; central tendency (mean, median, mode); dispersion (range, standard deviation, interquartile range); shape (histograms, stemplots, boxplots); outliers; recoding and transforming variables
- Agresti 3.1-3.4, 3.6

Week 5 (Oct 12): Thanksgiving – no class

Week 6 (Oct 19): Descriptive statistics (bivariate associations)

- Cross-tabulations; Cramer's V; Kendall's tau-b; scatterplots; Pearson's r ; OLS regression; Spearman's rho; comparing central tendencies, dispersions and shapes
- Agresti 3.5, 8.1, 8.4, 8.5, 9.1-9.4

Week 7 (Oct 26): Workshop (obtaining survey data)

Week 8 (Nov 2): Probability models and confidence intervals

- Rules of probability; random variables; discrete and continuous probability distributions; normal distributions; sampling distributions; Central Limit Theorem; confidence intervals for means and proportions
- Agresti Chapter 4, 5.1-5.3

Week 9 (Nov 9): Tests of significance

- Null and alternative hypotheses; test statistics; p-values; alpha levels; Type I and Type II errors; Chi-squared, t-test and oneway ANOVA tests of significance; statistical significance versus practical significance
- Agresti 6.1, 6.4, 6.5, 7.3, 8.2, 9.5, 12.3

Week 10 (Nov 16): Scales and indices

- Validity and reliability; indices and scales; Cronbach's alpha
- Neuman, W.L. & Robson, K. 2015. *Basics of Social Research: Qualitative and Quantitative Approaches. Third Canadian Edition*. Toronto: Pearson, pp. 104-132.

Week 11 (Nov 23): Missing data and multiplicity

- Types of missingness; strategies for addressing missing data; multiplicity; garden of forking paths
- Agresti 16.1
- Gelman, A. & Loken, E. 2014. The statistical crisis in science: Data-dependent analysis – a “garden of forking paths” – explains why many statistically significant comparisons don't hold up. *American Scientist* 140, 460-465.

Week 12 (Nov 30): Multiple regression

- Introduction to multiple regression and logistic regression; multivariate causal relationships and regression
- Agresti 11.1-11.3, 11.7, 15.1, 15.2

UNIVERSITY POLICIES

UBC provides resources to support student learning and to maintain healthy lifestyles but recognizes that sometimes crises arise and as such there are additional resources to access including those for survivors of sexual violence. UBC values respect for the person and ideas of all members of the academic community. Harassment and discrimination are not tolerated nor is suppression of academic freedom. UBC provides appropriate accommodation for students with disabilities and for religious observances. UBC values academic honesty and students are expected to acknowledge the ideas generated by others and to uphold the highest academic standards in all of their actions. Details of the policies and how to access support are available on [the UBC Senate website](#).

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The academic enterprise is founded on honesty, civility, and integrity. As members of this enterprise, all students are expected to know, understand, and follow the codes of conduct regarding academic integrity. At the most basic level, this means submitting only original work done by you and acknowledging all sources of information or ideas and attributing them to others as required. This also means you should not cheat, copy, or mislead others about what is your work. Violations of academic integrity (i.e., misconduct) lead to the breakdown of the academic enterprise, and therefore serious consequences arise and harsh sanctions are imposed. For example, incidences of plagiarism or cheating may result in a mark of zero on the assignment or exam and more serious consequences may apply when the matter is referred to the Office of the Dean. Careful records are kept in order to monitor and prevent recurrences. A more detailed description of academic integrity, including the University's policies and procedures, can be found in the [UBC Calendar: Student Conduct and Discipline](#).

Academic Accommodation for Student with Disabilities

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ACKNOWLEDGEMENT

UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the $xwm\text{ə}θkw\text{ə}y\text{əm}$ (Musqueam) people. The land it is situated on has always been a place of learning for the Musqueam people who for millennia have passed on their culture, history, and traditions from one generation to the next on this site.