JSGS 807 STATISTICS FOR PUBLIC SECTOR MANAGERS

May 2021	University of Regina		
Instructor:	Justin Longo, Associate Professor and Director, Digital Governance Lab		
Phone and Email:	306-450-5345 (sms preferred; phone only if necessary) justin.longo@uregina.ca		
Office Hours:	Slack direct message me to request a time. Drop in on class days, 12-1 pm		
Office Location:	All office hours & individual meetings will be held online via video or telephone		
Classroom:	Online		
Dates:	May 24 - 28, May 31- June 4 (1-5 pm; though no mandatory synchronous class times)		
Group Communications:	Twitter Class List	Google Drive folder	Class Recordings	Slack
Teaching Assistant:	tbd		

COURSE CONTENT AND APPROACH

Official Calendar Description: Administrative decision making and policy development often require the analysis of quantitative data. This course will introduce students to descriptive and inferential statistics often used in policy environments so that they will be effective data users and interpreters. Students will be taught how to use and present descriptive statistics.

Justin's Description: Get ready for a stats class like you've never had before! This is a course for future public sector leaders with limited background in (and even an aversion to) mathematics, statistics, or economics, providing an overview of statistical concepts, principles, and techniques that are relevant and useful in public administration and policymaking. The central aim of this course is to make you an intelligent consumer of statistical analysis, and a strategic user of statistics in policy and administrative processes, through critical assessment and working first-hand with datasets and spreadsheets. The core argument that this course advances is that policy analysts and public sector managers responsible for policy development and delivery have a special responsibility to manage and use data and statistics accurately and ethically. To exercise this responsibility requires a conceptual understanding of data and analysis beyond the techniques of statistical analysis. In response, this course offers an introduction to the language, techniques, and tools involved in the collection, analysis, interpretation, and presentation of data and statistical analysis in support of policy making and administration, an exploration of critical questions in the use of statistical analysis in the public sector, and an assessment of the best ways to support informed policy and administrative decisions using data and statistical analysis.

> *Nothing that you will learn in the course of your studies will be of the slightest possible use to you in after life – save only this – that if you work hard and diligently you should be able to detect* when [someone] is talking rot*, and that, in my view, is the main, if not the sole, purpose of education.*
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> - John Alexander Smith, 1914 (ref)

LEARNING OBJECTIVES

Following successful completion of this course, students should be able to:

- Analyze (with a focus on spreadsheet skills), interpret, and present policy-relevant data and statistics.
- Ask critical questions and be an informed consumer of statistical analysis as support for policy making and the administration of public programs and citizen services.
- Map the appropriate application of statistical analysis to specific policy and administration problems.
- Critically evaluate the public benefit of investments in data collection and analysis, and the value of publicly releasing public sector information (i.e., open data), and
- Articulate public service responsibilities surrounding the collection, interpretation, communication, and presentation of public sector data and statistics.

THIS IS AN ONLINE CLASS

In light of the rapid reconfiguration of UofR classes in light of the COVID-19 pandemic, JSGS 807 has been transformed into an online format. This entails a significant change in the course design and delivery, and will require patience and extra effort from all of us as we adapt to this new setting.

"Classes" will be conducted asynchronously, and the course will be entirely online this term. Though there will be a daily "class time" (1-5 pm), there is for your benefit as you see fit—there is no mandatory synchronous class.

However, the course is still organized in ten daily sessions (see the Course-at-a-Glance schedule). At the start of each day, I will typically post a short introduction to that day's content overviewing the online materials, review the previous day's lab, and respond to questions I received over the previous day.

You will then have until the start of the next day to review the course content consisting of online course notes, online readings, and links to other online resources like articles and videos.

Lab assignments are daily exercises (many of them spreadsheet based) that apply the issues discussed in the videos, readings, and class notes. I will frequently post short video "tutorials" to explain the lab assignments that are due each day.

Discussion / study groups will be formed where you can meet over video with some of your colleagues to discuss the course, assignments, etc. Questions for discussion will be provided, and the instructor will attend from time to time. These are not graded, but will be organized for your benefit. These groups also provide an opportunity to improve your skills in interacting with colleagues in a professional environment using an online platform.

Each class participant will meet by video (or telephone) with the course instructor 3 times throughout the course (for approximately 15 minutes) to discuss the course topics. These meetings will form part of your evaluation on a selection of the lab assignments (this will be indicated in the assignment).

There is one major assignment this term that involves analyzing a data set (part 1) and preparing an infographic based on your analysis (part 2).

There is no participation grade for this class.

Course-at-a-Glance

Week	Date	Topics
0	May 10	Preview of the syllabus and tech overview
1	May 24	Course Overview: Frameworks and Concepts
2	May 25	Foundations: Descriptive Statistics
3	May 26	Foundations: Inferential Statistics
4	May 27	Data Collection by Listening to People: Polling, Surveys, and Social Listening
5	May 28	Data Collection by Other Means: Sensors, Devices, Open Data, and Big Data
6	May 31	Models, Simulations, and Scenario Tools
7	June 1	Indices and Indicators
8	June 2	Probabilities and Predictive Analytics
9	June 3	In Graphic Detail: Information Visualization and Infographics
10	June 4	Can Government Play Moneyball, and Ethical Statistics

Due Date Schedule

Item	Value	Due
Web Safari 1	1%	1pm May 24
Web Safari 2	1%	1pm May 25
Web Safari 3	1%	1pm May 26
Web Safari 4	1%	1pm May 27
Web Safari 5	1%	1pm May 28
Web Safari 6	1%	1pm May 31
Web Safari 7	1%	1pm June 1
Web Safari 8	1%	1pm June 2
Web Safari 9	1%	1pm June 3
Web Safari 10	1%	1pm June 4
Day 1 Lab	5%	1pm May 25
Day 2 Lab	5%	1pm May 26
Day 3 Lab	5%	1pm May 27
Day 4 Lab	5%	1pm May 28
Day 5 Lab	5%	1pm May 31
Day 6 Lab	5%	1pm June 1
Day 7 Lab	5%	1pm June 2
Day 8 Lab	5%	1pm June 3
Day 9 Lab	5%	1pm June 4
Day 10 Lab	5%	1pm June 5
Statistical Analysis Assignment Part 1	20%	1pm June 11
Statistical Analysis Assignment Part 2	20%	1 pm June 18

COURSE WEEKS

Day 1 - Course Overview: Frameworks and Concepts
In this first full week, we will discuss the framework for the course stressing the need for policy analysts and public sector managers to use data and statistics accurately and ethically. And since much of the work done in this course (and a lot of statistical analysis done in the public sector) uses spreadsheets, we'll get started with some basic spreadsheet software exercises and techniques.

Day 2 - Foundations: Descriptive Statistics
Descriptive statistics involves the analysis of data that *describe* or summarize a sample or population. Descriptive statistics can be presented using tables, graphs and charts, and a narrative discussion of the results. Descriptive statistics will be the most frequent type of statistical analysis that you will produce or consume as a public servant.

Day 3 - Foundations: Inferential Statistics
Descriptive statistics are calculated on a population where you have data on every entity in a group. Often, however, you do not have access to the whole population you're interested in, but only a limited "sample" which is then used to make *inferences* about the whole population.

Day 4 - Data Collection by Listening to People: Polling, Surveys, and Social Listening
In these two related weeks, we'll consider how to source the data necessary for undertaking statistical analysis. In this first week, we'll focus on data that can be collected by asking people what they think, observing what they do, accessing information that they've recorded, or by listening to what they're saying in public.

Day 5 - Data Collection by Other Means: Sensors, Devices, Open Data, and Big Data
Governments collect, generate, and continually compile vast amounts of data from collecting vital statistics, to administering the tax system, recording government operations activity, managing public infrastructure and natural resources, surveying and recording public and private lands, processing regulatory requirements, managing social service delivery, and the census and survey work conducted by public statistics agencies. Now, with the emergence of new technological mechanisms for collecting "big data", and with vast sources of open data available to us, a whole new range of data sources are beginning to influence government policy making and public administration. "Open Data" refers to initiatives by governments to make publicly available the vast stores of data they hold in filing cabinets and isolated computer hard drives. In this second part of our look at "data collection", we'll look at the vast range of data and the risks of the problem of too much data.

Day 6 - Models, Simulations, and Scenario Tools
Models are used in the decision-making process to provide insight into the consequences of different courses of action. Spreadsheets are a simple tool for the development of business decision models, allowing us to ask "what-if?" questions in the face of different quantitative inputs and probabilities. Simulations model how markets, societies, organizations, and natural systems dynamically interact and

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react to changing assumptions, allowing users to consider different possible courses of action. And scenario tools represent a computerized version of scenario planning, using intuitive, game-like user interfaces that allow non-experts to explore the possible consequences of different policy choices. This week we will explore how to build and work with spreadsheet models, simulations, and scenario tools.

Day 7 - Indices and Indicators

Index numbers (or indices) are among the most commonly used techniques in the area of economic statistics, used to combine large amounts of data about a given variable into a single number. Changes in this index number can then be compared over time. Some common statistics measured using index numbers include inflation, stock market prices, and volumes of production. And an indicator is a summary statistic or combination of statistics that explains system conditions from a high-level view. A good indicator highlights a problem early and identifies what needs to be done to solve it.

Day 8 - Probabilities and Predictive Analytics

Probability is a way of expressing how likely it is that a future event will happen. For public sector managers, understanding the probability of future events can help with planning, regulatory compliance, and policy analysis. But it is equally important to understand that a high probability of something happening also means the event might not happen. Predictive analytics, as a "big data" form or forecasting, can serve as an input into framing a policy problem before it appears, indicating where a need is being unmet or where an emerging problem might be countered early.

Day 9 - In Graphic Detail: Information Visualization and Infographics

Visualization is a category of techniques used for data analysis and the communication of quantitative findings using informative graphics. Good visualization should help the viewer understand the underlying data, appreciate the information contained in the analysis, and grasp the complexity of the system. Infographics are visual representations of information and data, combining visual summaries and explanatory text, for presenting information quickly to a generalist audience and in an appealing way. You can think of an infographic as a visual briefing note.

Day 10 - Can Government Play Moneyball, and Ethical Statistics

In 2003, Michael Lewis published the book Moneyball: The Art of Winning an Unfair Game (later to become the movie Moneyball), that told the story of how the Oakland A's became a high performing Major League Baseball team despite having about a third of the financial resources as the league's wealthiest teams. The central point of Moneyball was that deep statistical analysis, and not intuition nor superficial statistics, could be used to make better decisions. Here, we take a step back from the techniques of data analysis to ask if we should increase the resources devoted to statistically evaluating the effectiveness of government programs? Or do decision makers care about statistical analysis? Effective data analysis in support of public policy making is about more than just technical competency. It also requires ethical integrity in analysis and presentation. We conclude with a consideration of the requirements of public servants to use data and statistical analysis ethically.

Evaluation

Web Safari (10 @ 1%)	10%
Daily Labs (10 @ 5%)	50%
Statistical Analysis Assignment Part 1	20%
Statistical Analysis Assignment Part 2	20%

Web Safari (10%): We are going to collectively build a repository of news stories, articles, videos, blog posts, and other web-accessible resources related to the course themes and content. You can contribute 10 unique posts related to the 10 daily themes (1% each). Instructions and a link to the form for posting are available in the notes for each day (scroll down to "Web Safari" at the bottom of the daily course notes). Due at 1 pm on each day (see the Due Date Schedule). No late submissions accepted. Only one submission per daily theme will count (though you can submit these in advance of each deadline if you wish). For more information on the learning objectives behind this exercise, see "The Web Safari: Connecting Theory to Practice Through Student-Led Discovery of Contemporary Material".

Daily Labs (10 * 5%): Ten labs completed individually demonstrating competency in the concepts covered in the video introductions, the course notes, readings, and other material for each day. Worth 5% each. Due at 1 pm on the day following the session (see the Due Date Schedule). An answer key (if applicable) will be posted after the lab is due and the lab questions will be discussed in the video introduction uploaded on the day they are due (for that reason, late submissions cannot be accepted). Three of the daily labs will involve a one-on-one video conversation with the course instructor (this will be indicated in the lab), and your demonstrated understanding of the course material in that conversation will form part of the basis for your grade on that lab.

Statistical Analysis Assignment Part 1 (20%): Due June 11 2021 at 1 pm. Late submissions = 0.
- See detailed instructions here.

Statistical Analysis Assignment Part 2 (20%): Due June 18 at 1 pm. Late submissions = 0.
- See detailed instructions here.

STUDENT RESOURCES

UNIVERSITY OF REGINA	UNIVERSITY OF SASKATCHEWAN
Student Success Centre: Academic advising, learning skills, writing, math, and stats tutoring!	**Student Learning Services**: Academic advising, learning skills, writing, math, and stats tutoring!
Students with Special Needs Any student with a disability, injury or illness who feels they may need academic accommodation should discuss this with the course instructor after contacting the Centre for Student Accessibility at 306-585-4631	**Students with Special Needs** Students in this course who, because of a disability, may have a need for accommodations are encouraged to discuss this need with the instructor and to contact Access and Equity Services at (306) 966-7273
Students Experiencing Stress Students in this course who are experiencing stress can seek assistance from Counselling Services, or call (306) 585-4491. Additional information is available here.	**Students Experiencing Stress** Students in this course who are experiencing stress can seek assistance from the Student Wellness Centre or call (306) 966-4920.
Other Supports for Students ● Sexual Violence Prevention and Response ● ta-tawâw Student Centre ● UR International ● JSGS (UofR) Student Handbook ● Being a Not-Rich Student	**Other Supports for Students** ● UofS Sexual Assault Information ● UofS Aboriginal Students' Centre ● UofS International Student Centre ● JSGS (UofS) Student Handbook ● Being a Not-Rich Student
Academic Integrity and Conduct Ensuring that you understand and follow the principles of academic integrity and conduct as set out by the University of Regina is vital to your success in graduate school. Ensuring that your work is your own and reflects both your own ideas and those of others incorporated in your work is important: ensuring that you acknowledge the ideas, words, and phrases of others that you use is a vital part of the scholarly endeavour. If you have any questions at all about academic integrity in general or about specific issues, contact your course instructor to discuss your questions.	**Academic Integrity and Conduct** Ensuring that you understand and follow the Regulations on Student Academic Misconduct is vital to your success in graduate school. Ensuring that your work is your own and reflects both your own ideas and those of others incorporated in your work is important: ensuring that you acknowledge the ideas, words, and phrases of others that you use is a vital part of the scholarly endeavour. If you have any questions at all about academic integrity in general or about specific issues, contact any faculty member and we can discuss your questions.

COURSE POLICIES

Grading: JSGS has recently re-confirmed its grading policy, one that this course is required to strictly adhere to. **_See this additional note about my philosophy of grading_**:
https://jlphd.wordpress.com/2018/02/04/a-note-about-grading/

Course Materials: All readings are accessible through the UofR / UofS library systems,[1] or free online. Since you already pay tuition, and part of your tuition goes to funding the materials available through the library, it does not seem fair to ask you to pay extra for a textbook. I've also not found a decent textbook for this course. However, if you like stats textbooks …

Some free online textbooks you may find useful:
- Bounegru, L., Chambers, L., Gray, J. (2018). _The Data Journalism Handbook._ 2nd edition. EJC.
- Black, Ken. (2013). _Business Statistics: For Contemporary Decision Making_, 8th Edition. John Wiley & Sons
- Mahbobi, M., Tiemann, T. (2010). _Introductory Business Statistics with Interactive Spreadsheets_. BCcampus.
- Diez, D.M., Barr, C.D., Cetinkaya-Rundel, M. (2015). _OpenIntro Statistics._ Open Intro.
- Illowsky, B., Dean, S. et al. (2016). _Introductory Statistics_. OpenStax.
- Shafer, D., Zhang, Z. (2012). _Introductory Statistics._ Saylor Foundation.

Technology Requirements:
- To view the course materials, a standard Internet-connected device and web browser will work.
- All software used in this course is available for use for free from a standard current computer configuration (e.g., laptop computer) with access to the Internet.
- While Excel is the standard spreadsheet software in most organizations, we use Google Sheets when working with spreadsheets in this class as the operation of Sheets is similar to Excel. This also avoids problems with file transfers. While you will not be learning the particular features of Excel, learning how spreadsheets can be used in the sourcing, organizing, analysis, and presentation of data is transferable between programs.
- Some assignments may require the downloading and installing of free programs, which requires a computer that you have administrator privileges on (n.b., most workplace computers will not let you install software). There is no penalty for not being able to install this software, and alternative assignments will be available.
- Some governments (particularly the Government of Saskatchewan) have restricted access to Zoom meetings when using corporate equipment. If you are using a computer provided to you by an organization that restricts access to Zoom, you will likely not be able to use that computer to engage in any Zoom sessions.

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[1] Links are active for on-campus use at the University of Regina. If you are a UofR student connecting from off-campus, use these instructions. If you are a UofS student connecting from off-campus, use these instructions.

- Not a problem, though. If you do not have access to a computer that can access Zoom sessions, alternative options are available.
- Students who are unable to participate due to a technology barrier should contact the instructor as soon as possible to discuss alternative arrangements.

Non-registered Students: This course was developed and deployed for the benefit of graduate students registered in the Johnson Shoyama Graduate School of Public Policy (JSGS). It is made freely available as a learning resource for anyone interested in the course content. However, access to the JSGS student community, the resources of either university, or the course instructor is only available to formally registered students.