CSSS/SOC/STAT 221 A: Statistical Concepts and Methods for the Social Sciences

Winter 2022

MEETING DAYS, TIMES, AND LOCATIONS

Winter 2022 dates

- UW Autumn 2021 quarter dates of instruction: Monday 3 January - Friday 11 March 2022
- Finals Week: 12-18 March 2022
- University holidays (no lecture, quiz section meetings, or office hours):
  - Monday 17 January 2022 - Martin Luther King Jr. Day
  - Monday 21 February 2022 - Presidents' Day
- Lectures: Mondays, Wednesdays, and Fridays 11:30 am -12:20 pm

Lectures

MWF Lecture Meetings:

- 3 - 28 January 2022 (online):
  [https://washington.zoom.us/j/96798292483?pwd=M29ZYzdvcm1MT29kR2ZDZXVnUndBQT09](https://washington.zoom.us/j/96798292483?pwd=M29ZYzdvcm1MT29kR2ZDZXVnUndBQT09)
- 31 January - 11 March 2022 (in person): Smith Hall 120

All Week 1 lectures will be recorded via Zoom and posted to the course website under the Zoom link ("Cloud Recordings" tab). All lectures during Weeks 2-10 will be recorded using Panopto and posted to the course website under the Panopto link. These recordings will be made available shortly after they have been recorded. **While I encourage students to attend lecture meetings in real time, I understand that many members of the UW community continue to be concerned with maintaining social distance during the COVID-19 pandemic. Consequently, those who would prefer to watch lecture recordings are allowed to do so.**

Quiz sections

*Note that all quiz sections during Week 1 will meet online via Zoom

Sections AA and AC (Tuesday and Thursday 12:30-1:20 pm)

- In person: **Thomson Hall 119** (TA: Alana McGovern)
Online: Zoom (TA: Andrea Boskovic)

Sections AB and AD (Tuesday and Thursday 1:30-2:20 pm)
- In person: Thomson Hall 119 (TA: Alana McGovern)
- Online: Zoom (TA: Andrea Boskovic)

Sections AE and AG (Tuesday and Thursday 12:30-1:20 pm)
- In person: Thomson Hall 202 (TA: Apara Venkat)
- Online: Zoom (TA: Jess Phillips)

Sections AF and AH (Tuesday and Thursday 1:30-2:20 pm)
- In person: Thomson Hall 334 (TA: Apara Venkat)
- Online: Zoom (TA: Jess Phillips)

TEACHING TEAM

Instructor: William A. Brown, PhD (preferred name: Will or Dr. Brown)
- Pronouns: he/him/his
- Email: brownw@uw.edu
- Office hours: Tuesday and Thursday 10:30-11:30am, or by appointment
- Office hour link: Zoom

TA: Andrea Boskovic (preferred name: Andrea)
- Pronouns: she/her/hers
- Email: abosko26@uw.edu
- Office hours: Thursday 11:00am-12:00pm, or by appointment
- Office hour location: Zoom

TA: Jessica E. Phillips (preferred name: Jess)
- Pronouns: she/her/hers
- Email: jephill@uw.edu
- Office hours: Monday 1:30-3:30pm
- Office hour location: Zoom

TA: Alana McGovern (preferred name: Alana)
- Pronouns: she/her/hers
- Email: amcgov@uw.edu
COURSE OVERVIEW

Course description

The goal of this course is to develop statistical literacy---the ability to comprehend and critically evaluate the results of statistical data analyses---especially in the social sciences. As a discipline, statistics focuses on describing and modeling variability in our world. It includes a wide assortment of theories and methods for summarizing variability in all kinds of data, as well as exploring relationships that exist between variables, for example:

- crime rates by neighborhood, city, or state;
- incidence and prevalence of different diseases between different communities;
- age at first consumption of alcohol;
- life expectancy and fertility rates by county, state, or country;
- differences in the age, sex, gender, and ethnic composition of different communities or populations;
- variability in unemployment rates over time;
- number of motorists on the roadway at different hours of the day;
- birth rates by date and day of the week;
- differences in educational outcomes based on access to different resources, class size, or attendance at different schools;
- different carbon emission levels by country relative to population size or GDP.

As voters and members of multiple communities, organizations, and institutions, we make decisions with important consequences based on our understanding of information like these, so it is important that we understand the objectives, built-in assumptions, results, and limitations of statistical methods used by social scientists to collect and thoughtfully explore such data. It is also important to understand the pitfalls that arise when these methods have been applied incorrectly. This course will prepare you to be a more critical consumer of the statistical analyses that you might encounter in popular media as well as in professional and academic publications. While you will learn a bit about how to apply statistical methods, the emphasis will be on cultivating your understanding of the logic underlying these methods, the "why" rather than the "how."
Course objectives

By the end of this course, you should be able to

- Distinguish between nominal, ordinal, and different kinds of numerical variables;
- Distinguish between sample statistics and population parameters;
- Identify the strengths and limitations of different strategies that researchers use to collect data, as well as how these relate to research questions and goals;
- Evaluate the ability of different statistics to summarize different kinds of data, both numerically and graphically;
- Use the rules of probability theory to explore relationships between variables in different ways;
- Identify parametric probability distributions that we can use as models of different patterns of variability;
- Understand how statisticians use sampling distributions to calculate interval estimates of or perform statistical hypothesis tests about unknown population parameters;
- Understand the results of regression analyses exploring relationships between two numerical variables.

STUDENT CONDUCT

COVID-19 safety

During in-person instructions in Smith Hall 120, students are expected to wear a mask at all times outlined in the University of Washington's COVID-19 Face Covering Policy:

"In order to ensure the health and safety of the University campus community and the public, face coverings are required to be worn at the University of Washington, regardless of vaccination status ... [i]ndoors when other people are present, and in all public and common areas, such as lobbies, hallways, stairways, restrooms, elevators, and in shared vehicles."

Any student who knowingly violates this policy will be instructed to depart the class room for the duration of the day's lecture.

Collaborative learning and diversity statement

Acquiring new knowledge in a structured social setting is a very different experience from independent, self-guided learning. Interacting with your teaching team and with your peers presents a unique opportunity for knowledge acquisition, but to enjoy the full rewards of collaborative learning and the free exchange of ideas, mutual respect is indispensable between all
parties involved. Your teaching team is committed to encouraging and valuing diverse student perspectives, showing every student our utmost respect, and investing ourselves in cultivating your mastery of the course content. We also expect that you will show each other and the teaching team a similarly high and sustained level of respect. We understand that diversity is integral to academic excellence and strive to create welcoming and respectful learning environments, promoting equal access and opportunity for everyone enrolled in the course. Actions on the part of students that contradict these goals are expressly in violation of the University of Washington’s Student Conduct Code and are not tolerated. As a condition of enrollment, all students assume responsibility to observe high standards of conduct that will contribute to their own and their peers’ academic goals, as well as to the welfare of the academic community more generally. For more information on this and other policies related to diversity, please visit the following website:  
http://www.washington.edu/diversity/

Academic integrity statement

Collaborative study is not only accepted but encouraged, if you find cooperation beneficial to your learning. However, for submitted course assignments (problem sets), one unique submission per student is required, written in your own words. If you have worked on submitted assignments with other students in the class, be sure to note this collaboration on your work, including your collaborators’ names. You cannot collaborate in any way with your peers or anyone else while completing the reading quizzes and exams. All submitted coursework should adhere to the University of Washington’s Student Conduct Code. Plagiarism is not tolerated. Plagiarism includes but is not limited to copying phrases, sentences, or paragraphs without proper citation; paraphrasing another person’s ideas or words without attribution; etc. Sharing answers to questions on quizzes and exams with your peers is also not tolerated. Academic misconduct of any kind is grounds for failure in the class and removal from the University of Washington. Lack of familiarity with the rules of academic conduct does not excuse misconduct. For more information please visit the following websites:


EQUAL ACCESS, ACCOMMODATIONS, AND OTHER USEFUL RESOURCES

All lectures will be recorded either via Zoom (Week 1) or Panopto (Weeks 2-10). Attending lectures in real time allows students to ask questions of the instructor. If you are not able to attend, you are still expected to watch the recorded lecture once it becomes available on the course website, available shortly after each lecture has concluded.
In the case of unexpected family, health, or other emergencies that interfere with your ability to complete assigned coursework on time, notification of absence at your earliest convenience is expected. Documentation to validate your absence may be requested by your instructor.

For students who have established accommodations with Disability Resources for Students (DRS, http://depts.washington.edu/uwdrs/), please communicate your approved accommodations to your instructor (William Brown) at your earliest convenience so we can discuss your needs in this course. For students who have not yet established accommodations through DRS but have a temporary health condition or permanent disability that requires accommodations, you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu or disability@uw.edu. Such conditions include but are not limited to mental health, attention-related, learning, vision, hearing, physical or health impacts. DRS offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s), and DRS. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law.

Washington state law requires that UW develop a policy for accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. The UW’s policy, including more information about how to request an accommodation, is available at Religious Accommodations Policy (https://registrar.washington.edu/staffandfaculty/religious-accommodations-policy/).

Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form (https://registrar.washington.edu/students/religious-accommodations-request/).

For facts and resources about the COVID-19 pandemic, see the University of Washington's page here: https://www.washington.edu/coronavirus/

For resources and points of contact to promote a safer UW community, see https://www.washington.edu/safecampus/

REQUIRED MATERIALS


Note: you are strongly encouraged to read the chapter assigned for every lecture unit before that unit has begun. We will focus on the readings. You might find the exercises at the end of every section and chapter useful, but these will not be used for assigned coursework.
A simple calculator capable of addition, subtract, multiplication, division, squaring, and taking square roots. (Graphing calculators and calculator apps on electronic devices with access to the internet such as smartphones, laptops, and tablets do not qualify as "simple calculators.")

ASSIGNMENTS AND ASSESSMENT (GRADING)

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<thead>
<tr>
<th>Assignment</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Eight reading quizzes</td>
<td>12.5%</td>
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<tr>
<td>Five participation reports</td>
<td>12.5%</td>
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<tr>
<td>Six problem sets</td>
<td>50%</td>
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<tr>
<td>Two non-cumulative exams</td>
<td>25%</td>
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Reading quizzes (QZ1 through QZ8): The reading quizzes are intended to motivate students to keep up on assigned reading, as well as to evaluate your comprehension of the material presented in the textbook. Quizzes will be 5 questions long, completed online. All quizzes will be open-book, but do not collaborate with any of your classmates to complete them.

Participation reports (PR1 through PR5): The five participation reports will require you to reflect on what you learn during some in-class discussion exercises. These will consist of brief, relatively low-stakes summaries of these exercises, focusing on the take-home points of each exercise.

Problem sets (PS1 through PS6): There will be six problem sets throughout the quarter. These are intended to give you an opportunity to practice the statistical concepts and methods you learn about in your reading, lectures, and quiz sections. The problems sets will be assigned and submitted electronically. Some of these assignments will involve doing simple calculations, so you are encouraged to show your work, e.g. as scanned pdf documents or high-quality photographs. The first assignment will be participation in an anonymous online survey, to generate data that we can use throughout the quarter.

Exams (EX1 through EX2): Two non-cumulative exams will be given throughout the quarter, the first covering Chapters 1-4 of the textbook, the second covering Chapters 5-8. These are high-stakes assessments, intended to evaluate your acquisition of knowledge about statistical concepts and methods covered in lecture, readings, and quiz section exercises.

Late work policy: Due dates for all graded assignments are clearly posted on the course website, so there are few good reasons not to submit them on time. As a matter of fairness to your fellow students and to the graders, late work will be accepted but reduced by 25% of the original assignment point value for each full or partial day beyond the due date that the assignment is submitted. Exceptions to this policy may be considered in the case of documented emergencies or other extenuating circumstances, but you must communicate with your instructor (Will Brown) if you believe such exceptions are warranted.
Percent grade to grade point translation: The table below identifies the grade points corresponding with every tenth percent grade. Your grades will be posted to the grade book on the course website

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<thead>
<tr>
<th>Percentage</th>
<th>Grade point</th>
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<tbody>
<tr>
<td>10%</td>
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<tr>
<td>20%</td>
<td>0.8</td>
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<tr>
<td>30%</td>
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<tr>
<td>40%</td>
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<tr>
<td>80%</td>
<td>3.2</td>
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<tr>
<td>90%</td>
<td>3.6</td>
</tr>
<tr>
<td>&gt;98%</td>
<td>4.0</td>
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**EMAIL POLICY**

When you contact any member of the teaching team by email, please present yourself in a professional manner. **Be sure to do the following:**

- You are strongly encouraged to use Canvas's email function to communication with members of the teaching team. If you prefer to communicate via email, you are strongly encouraged to use your UW email accounts rather than personal email accounts (gmail, hotmail, outlook, yahoo, etc.) when emailing the teaching team.
- Address your instructor or TA by their preferred names and titles.
- Include a subject with "CSSS 221", "SOC 221", or "STAT 221" somewhere in the email title.
- Be sure to write a clear email, identifying the questions or topics for which you desire a response.
- If your question cannot be easily answered in a short email, consider meeting us during our office hours instead or requesting a one-on-one appointment.
- Don't forget to sign off with your name as you would prefer to be addressed.
- Be sure to acknowledge our response if appropriate, for example by responding to any follow-up questions we may have for you.
- Please allow up to 48 hours for a response.
- If you disagree with the interpretation of any scored assignment, please submit a request for a re-evaluation to your instructor (Will Brown) via email. You must submit this request **within one week of receiving the grade** and include a written explanation of your case. Note that not all re-evaluations will result in a changed grade or may even result in a reduced grade if (and only if) further problems are identified upon review, but I will respond to your request in either case.
- The teaching team will not accept any graded coursework submitted via email.
COURSE SCHEDULE

Week 1

Monday 3 Jan: Course Overview

Tuesday 4 Jan: No Quiz Sections

Wednesday 5 Jan: Chapter 1

Thursday 6 Jan: Introductions and an overview of big concepts in statistics

Friday 7 Jan: Chapter 1; Reading Quiz 1 due

Week 2

Monday 10 Jan: Chapter 1; Problem Set 1 due

Tuesday 11 Jan: Research ethics in the social sciences

Wednesday 12 Jan: Chapter 2; Reading Quiz 2 due

Thursday 13 Jan: WEIRD samples, convenience, and over-generalization in the social sciences

Friday 14 Jan: Chapter 2

Week 3

Monday 17 Jan: NO CLASS - MARTIN LUTHER KING JR. DAY

Tuesday 18 Jan: Drug epidemiology from the perspective of municipal wastewater

Wednesday 19 Jan: Chapter 2

Thursday 20 Jan: Cleaning and summarizing data (prep. for Problem Set 2); Participation Report 1 due

Friday 21 Jan: Chapter 2
Week 4

Monday 24 Jan: Chapter 3; Reading Quiz 3 due

Tuesday 25 Jan: Probability experiments with dice; Participation Report 2 completed as a part of the quiz section exercise

Wednesday 26 Jan: Chapter 3; Problem Set 2 due

Thursday 27 Jan: Thinking about false-positive and false-negative clinical tests (prep. for Problem Set 3)

Friday 28 Jan: Chapter 3; Participation Report 3 due

Week 5

Monday 31 Jan: Chapter 3

Tuesday 1 Feb: Exam study session; Problem Set 3 due

Wednesday 2 Feb: Exam 1

Thursday 3 Feb: No Quiz Sections

Friday 4 Feb: Chapter 4

Week 6

Monday 7 Feb: Chapter 4; Reading Quiz 4 due

Tuesday 8 Feb: The Poisson distribution

Wednesday 9 Feb: Chapter 4

Thursday 10 Feb: Building intuitions about sampling distributions

Friday 11 Feb: Chapter 5

Week 7
Monday 14 Feb: Chapter 5; **Reading Quiz 5 due**
Tuesday 15 Feb: Confidence intervals for one proportion
Wednesday 16 Feb: Chapter 5
Thursday 17 Feb: Hypothesis tests for one proportion
Friday 18 Feb: Chapter 6

**Week 8**
Monday 21 Feb: **NO CLASS - PRESIDENTS' DAY**
Tuesday 22 Feb: Hypothesis tests comparing proportions between two groups/levels
Wednesday 23 Feb: Chapter 6; **Reading Quiz 6 due**
Thursday 24 Feb: Hypothesis tests comparing proportions between multiple groups/levels
Friday 25 Feb: Chapter 6; **Participation Report 4 due**

**Week 9**
Monday 28 Feb: Chapter 7; **Reading Quiz 7 due; Problem Set 4 due**
Tuesday 1 Mar: Problem Set 5 work-through
Wednesday 2 Mar: Chapter 7
Thursday 3 Mar: Hypothesis tests for one mean; Hypothesis tests comparing means between two groups/levels
Friday 4 Mar: Chapter 7; **Participation Report 5 due**

**Week 10**
Monday 7 Mar: Chapter 8; **Reading Quiz 8 due; Problem Set 5 due**
Tuesday 8 Mar: Problem Set 6 work-through
Wednesday 9 Mar: Chapter 8

Thursday 10 Mar: Exam study session

Friday 11 Mar: Chapter 8; **Problem Set 6 due**

**Finals Week**

Wednesday 16 Mar: **Exam 2**