

# CS&SS 221, SOC 221, and STAT 221

Winter 2024

## COURSE MOTIVATION, GOAL, AND OBJECTIVES

### *Course Motivation*

The discipline of statistics constitutes tools for describing and explaining variability in our world, as well as the for quantifying uncertainty that arises from such variability. In the social and behavioral sciences, variability includes:

- crime rates by geopolitical unit (neighborhood, city, state, country);
- incidence and prevalence of particular diseases by community;
- life expectancy and fertility rates by city, county, state, or country;
- age, sex, gender, ethnic, or SES composition by neighborhood, city, state, region, or country;
- unemployment rates by geographic unit and over time;
- election victories by incumbency of candidates;
- number of motorists on the roadway at different hours of the day;
- birth rates by date and day of the week;
- high school or college graduation rates between socially distinct communities, e.g. defined by race/ethnicity, gender, socioeconomic status, etc.;
- carbon emission levels by country.

As voters and as members of various interest groups, communities, organizations, and institutions, we need to make important decisions based on our understanding of such variables. However, our access to information about such phenomena depends on the data collection, analysis, and reporting of professional researchers working in academic, government, non-profit, industrial, and other sectors. If we are to make the most of such information, we need to understand the objectives, built-in assumptions, results, and limitations of the statistical methods applied by researchers to collect and explore such data. It is also also important to understand the pitfalls that arise when these methods are applied incorrectly.

### *Course Goal*

This course is intended to help you develop your statistical literacy—the ability to comprehend and evaluate the results of statistical data analyses—so that you are well prepared to be a critical consumer of statistical analyses whenever you encounter them in academic or professional literature, the news, and social media. While you will learn a bit about how to apply basic methods of statistical data analysis, the main emphasis of this course is on becoming a more knowledgeable and critical consumer of statistical products prepared by others. Students who intend to go into fields where data-analytic skills, including computational statistics, are necessary are encouraged to consider STAT 311 instead.

## *Course Objectives*

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

- Distinguish between binary, nominal, ordinal, and different kinds of numerical variables;
- Distinguish between sample statistics and population parameters and understand the relationship between these two concepts;
- Identify the strengths and limitations of different strategies social researchers use to collect data, as well as how these relate to research goals and statistical inference;
- Identify which statistics are best-suited for summarizing different kinds of data, both numerically and graphically;
- Use the rules of probability theory to model population variability, understand the long-term patterns that emerge from random processes, and explicitly quantify our uncertainty about the claims we or others make;
- Identify common probability distributions that researchers use as models of different data generating processes;
- Understand how statisticians use sampling distributions both to estimate unknown population parameters and to conduct statistical hypothesis tests about such parameters.

## **MEETING TIMES & LOCATIONS**

- Lecture meetings
  - Time: Mondays, Wednesdays, and Fridays @ 11:30am-12:20pm
  - Location: [Kane Hall 220](#)
- Section meetings
  - AA (Section TA: Adam)
    - Time: Tuesdays and Thursdays @ 12:30-1:20pm
    - Location: [Art Building 317](#)
  - AB (Section TA: Matthew)
    - Time: Tuesdays and Thursdays @ 1:30-2:20pm
    - Location: [Thomson Hall 335](#)
  - AC (Section TA: England)
    - Time: Tuesdays and Thursdays @ 12:30-1:20pm
    - Location: [Communications Building 228](#)
  - AD (Section TA: Ramin)
    - Time: Tuesdays and Thursdays @ 1:30-2:20pm
    - Location: [Thomson Hall 334](#)
  - AE (Section TA: Matthew)
    - Time: Tuesdays and Thursdays @ 12:30-1:20pm
    - Location: [Thomson Hall 335](#)
  - AF (Section TA: Adam)
    - Time: Tuesdays and Thursdays @ 1:30-2:20pm
    - Location: [Thomson Hall 235](#)
  - AG (Section TA: Ramin)

- Time: Tuesdays and Thursdays @ 12:30-1:20pm
    - Location: [Thomson Hall 334](#)
  - AH (Section TA: England)
    - Time: Tuesdays and Thursdays @ 1:30-2:20pm
    - Location: [Thomson Hall 211](#)
- University holidays: No lecture, sections, or office hours
  - Monday 15 January: Martin Luther King Jr. Day
  - Monday 19 February: Presidents' Day
- Final exam: Wednesday 13 March @ 2:30-4:20pm

## TEACHING TEAM

- Instructor: William Brown, PhD
  - Preferred name: Will or Dr. Brown
  - Pronouns: He/him/his
  - Electronic communication:
    - For course-related communication, please communicate with me using Canvas's "Inbox" messaging function
    - For other communications, feel free to contact me at [brownw@uw.edu](mailto:brownw@uw.edu)
  - Office time: Thursdays 10:00-11:00am, or by appointment
  - Office location: Zoom (or in person by appointment at [Hans Rosling Center 361](#))
- Teaching assistant: England Can
  - Preferred name: England
  - Pronouns: he/him/his
  - Electronic communication: [englandr@uw.edu](mailto:englandr@uw.edu) (please include "STAT221" in the subject line)
  - Office time: Thursdays 3:00-4:00pm
  - Office location: SAV 319C or [zoom](#)
- Teaching assistant: Ramin Jabbarli
  - Preferred name: Ramin
  - Pronouns: he/him/his
  - Electronic communication: [raminj@uw.edu](mailto:raminj@uw.edu) (please include "STAT221" in the subject line)
  - Office time: Tuesdays 11:00am-12:00pm
  - Virtual Office: <https://washington.zoom.us/j/9810997848>
- Teaching assistant: Matthew Toro
  - Preferred name: Matthew
  - Pronouns: he/him/his
  - Electronic communication: [mtoro@uw.edu](mailto:mtoro@uw.edu) (please include "STAT221" in the subject line)
  - Office time: Savery 250
  - Office location: Fridays 2:00-3:00pm
- Teaching assistant: Adam Visokay
  - Preferred name: Adam

- Pronouns: he/him/his
- Electronic communication: [avisokay@uw.edu](mailto:avisokay@uw.edu) (Please include "STAT221" in the subject line)
- Office time: Savery 251
- Office location: Tuesdays 11:00am-12:00pm

## ASSIGNED WORK AND STUDENT EVALUATION

### *Attendance*

The lectures and section exercises are all intended to help students achieve the course goals described above. Consequently, under ordinary circumstances, your presence in lecture and section meetings is strongly encouraged, with four main exceptions:

- Absences relating to accommodations established for students through the UW's Disability Resources for Students (DRS).
- Absences relating to communicable illness (e.g., COVID-19, colds, flus, RSV, etc.)
- Absences relating to health, family, or occupational emergencies
- Absences covered under the UW's [Religious Accommodations Policy](#).

Every lecture will be recorded using Panopto and can be viewed by students after each lecture has concluded, available under the "Panopto Recordings" link on the course Canvas webpage. If the classroom audiovisual technology fails and undermines the quality of a lecture recording, students are responsible to coordinate with their peers to get lecture notes for missed lectures. Note that the TAs do not record Tu/Th section meetings owing to classroom technology constraints, so students are also expected to coordinate with their peers to get notes for missed sections.

### *Main course text*

Diez, D.M., M. Cetinkaya-Rundel, and C.D. Barr. 2019. *OpenIntro Statistics*, 4th ed. Available as a free download from the publisher [here](#) or from the course files here. Hardcopies of this textbook may also be available at the UW Bookstore for those who would prefer to purchase a hardcopy.

### *Assigned work*

- Participation: 10%
- Reading quizzes (approximately 6): 15%
- Problem Sets (approximately 3 to 4): 35%
- Exams (3 noncumulative): 40%

All assignments will be submitted or completed online, using the course's Canvas webpage.

### *Percentage-to-grade point conversion*

Percentage grades ( $P$ ) will be converted to grade points ( $G$ ) on the 4-point scale based on the following equations:

- If  $P < 57\%$ , then  $G = 0.0$
- If  $57\% \leq P < 81\%$ , then  $G = -5 + 0.1P$
- If  $81\% \leq P < 99\%$ , then  $G = -0.95 + 0.05P$
- If  $99\% \leq P$ , then  $G = 4.0$

Grades will be rounded to the nearest tenth.

### *Late Work Policy*

As a matter of fairness to every student in class, most coursework may be submitted late, with a penalty of 25% for each 24-hour period beyond the assignment due date. This excludes exams, which cannot be completed if they are missed.

### *Appealing Grades*

If a student wishes to appeal scores they have received for graded coursework, the following requirements will be strictly enforced:

- All appeals must be submitted to Dr. Brown, not to the TAs or graders.
- All appeals must be submitted using Canvas's "inbox" messaging function.
- All appeals must be submitted within 7 days of receipt of the assignment grade in question. It may take several days for Dr. Brown to review an appeal, but he will respond to every appeal.
- All appeals must attempt to make a case focusing on substantive issues. For example, if an assignment question is ambiguously worded and the student has provided a valid and correct answer to the question as they understood the question based on course material, the student needs to clearly make an argument to this effect. Please note that if an assignment is clearly worded but the student has misread it, this is not a valid reason to appeal a score.
- Submitting an appeal for reevaluation does not guarantee a grade adjustment. In many cases, Dr. Brown will treat an appeal as a further opportunity to clarify course concepts. However, very compelling cases may result in the return of partial or full points for the score in question.
- Appeals focusing only on a desire for a higher grade and requests for a global rather than question-specific reevaluation of an assignment will result in a sternly worded response from Dr. Brown reminding the student of the above policies.

### *Tentative Course Schedule*

- 5 - 18 Jan: Data structures, variables, study designs, and the research cycle (Chapter 1)
- 17 - 25 Jan: Statistical description (Chapter 2)

- 26 Jan: Exam 1
- 29 Jan - 6 Feb: Probability theory (Chapter 3)
- 7 - 15 Feb: Probability distribution models (Chapter 4)
- 16 Feb: Exam 2
- 21 - 27 Feb: Intro to inferential statistics (Chapter 5)
- 28 Feb - 8 March: Inferential statistics for categorical and numerical variables (Chapters 6-7)
- 13 March: Exam 3

## **STUDENT ACCOMMODATIONS AND SUPPORT**

### *Planned Absences*

If you know that you will be absent for certain days of the quarter, contact Dr. Brown at your earliest convenience, particularly if your absence creates a need to mitigate missed assignments. Accommodations will be made by Dr. Brown's discretion.

### *Emergencies*

In the case of unexpected family, health, or other valid emergencies that interfere with your ability to complete assigned coursework on time, notify Dr. Brown of your missed work at your earliest convenience. Documentation to validate your absence may be requested by Dr. Brown, particularly for missed exams. Please note that if you must be absent for medical reasons, doctors and other health care providers and institutions routinely prepare permission notes that validate your care while protecting your medical privacy.

### *Disability Resources for Students (DRS)*

For students who have established accommodations with Disability Resources for Students (DRS) requiring agreements to be made with the instructor, please communicate with Dr. Brown at your earliest convenience. In most cases, DRS contacts your instructors and Quiz Section TAs regarding your accommodations prior to the beginning of the quarter or as soon as such accommodations have been established, but you may find it helpful to reach out to your instructor and TA so that we understand your needs better.

For students who do not have accommodations through DRS but experience either a temporary health condition or permanent disability that may interfere with your ability to succeed academically, you are encouraged to explore the resources they make available at their website [here](#). 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 academic 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.

### *Religious Accommodations*

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/>).

### *Health and Safety*

For a central place to find resources for student well-being, please consult the UW's wellbeing website here: <https://wellbeing.uw.edu/>. Resources provided include links for physical and mental health resources and services. If you have nonurgent safety concerns, please consult the resources and services here: <https://www.washington.edu/safecampus/>. For mental health safety/crisis situations, please consult the resources and services here: <https://wellbeing.uw.edu/mental-health/urgent-help/>.

### *Resources for Addressing and Resolving Conflicts Between UW Community Members*

If you believe you are being harassed, or have observed harassment, several resources are available at the UW, including [SafeCampus](#), the [Office of the Ombud](#), [Title IX Investigation Office](#), and [University Complaint Investigation and Resolution Office](#).

## **COURSE STANDARDS**

### *Electronic Communication with the Teaching Team*

- If you communicate via email, be sure to include "STAT 221" in the subject line.
- To comply with FERPA, the teaching team will not discuss individual students' grades via email. If you wish to discuss individual grades with members of the teaching team, please use Canvas's "inbox" messaging function instead.
- Be sure to address the teaching team members by their preferred names, stated above.
- Likewise, be sure to sign your communication with your preferred name, so that the teaching team can address you in a manner that is respectful to you.
- When you communicate with the teaching team electronically, please be concise: clearly identify the topic(s) you wish us to address or clarify, so that our response is beneficial to you.
- If the topic you wish to discuss is too big or complex to be discussed via electronic communication, we may recommend that you visit us during our office hours instead.
- While members of the teaching team hope to respond to your communication quickly, we are not always able to do so depending on our own schedules or workloads. Please allow up to 48 hours for a response. Only if you have not received a response by then should you follow up with a reminder.

### *Illness Policy*

Students are strongly encouraged to stay home if they are ill, both to tend to their own health and to protect the health of other students, members of the teaching team, and other members of the community.

### *Collaborative Learning and Diversity Statement*

Learning in a structured social setting is very different from independent, self-guided learning. Interacting with your teaching team and your peers presents a unique learning opportunity, but to fully enjoy the benefits of such 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. Diversity is integral to academic excellence, and the teaching team will strive to create welcoming and respectful learning environments, promoting equal access and opportunity for everyone enrolled in the course. Students are also expected to help maintain a welcoming and respectful learning environment. Actions on the part of any student that contradict these goals are expressly in violation of the University of Washington's Student Conduct Code and are not tolerated, without exception. As a condition of their enrollment, all students assume responsibility to observe high standards of interpersonal conduct that will contribute to their own and their peers' academic goals, as well as to the safety and welfare of the UW's academic community more generally. For more information on this and other policies related to diversity, please visit <http://www.washington.edu/diversity/>.

### *Academic Integrity Statement*

- All submitted coursework should adhere to the UW's [Student Conduct Code](#). 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.
- Collaborative study is not only accepted but encouraged in this course. However, for submitted course assignments that can be completed collaboratively, one unique submission per student is required. Similarly, short-answer or essay-style questions on submitted assignments should be written in the student's own words. If you have worked on submitted assignments with other students in the class, you are encouraged to note your collaborators on your submitted work.
- Note that you cannot collaborate in any way with your peers or anyone else while completing Exams. You will be asked to acknowledge this standard at the beginning of every exam. Failure to acknowledge this standard or especially proof of its breach may result in an exam score of 0 and possible referral of the student to the UW's [Community Standards & Student Conduct](#).



- Plagiarism is not tolerated. Plagiarism includes but is not limited to copying phrases, sentences, or paragraphs from the work of other people without proper citation; paraphrasing another person's ideas or words without citing them; etc.

### *Use of Generative Artificial Intelligence in Coursework*

While generative artificial intelligence (AI), including large language models (LLMs) such as ChatGPT, will likely serve increasingly important roles in our professional, academic, and personal lives in the future, its use is presently at odds with the purposes of this course, for several reasons:

1. The material used to train LLMs, as well as the parameters that govern how generative AI produces novel expressions from this training material and from user instructions, are often non-transparent. This limits the user's ability to assert quality control over the AI-generated output, to a serious degree. As a consequence, the texts produced by LLMs often include factually incorrect content, including inaccurate or logically invalid syntheses of aggregated training data.
2. For a course such as CS&SS/SOC/STAT 221, which focuses on teaching students technical rather than common-speech definitions of key terms and concepts, there is also absolutely no guarantee that the AI will produce text that conforms to these unique, discipline-specific technical understandings. Similarly, some statistical terms and concepts are contested even by statisticians, and there is no guarantee that LLMs will apply such concepts as they are taught in this course.
3. Because the training material used by LLMs is often nontransparent, there is an unknown risk of plagiarism (whether verbatim repetition of others' work without citation or presentation of others' ideas without proper attribution).
4. There is also a possibility that LLMs will clearly cite but misrepresent the work of others.
5. This course focuses heavily on teaching the logic underlying statistical data analysis. Your ability to express your understanding of statistical reasoning will depend on your continuing development and demonstration of your own critical thinking skills more generally. This includes clearly and successfully framing valid or sound arguments by explicitly presenting claims and premises offered in support of them, as well as clear demonstration of why these premises support these conclusions. It takes practice to develop critical thinking and argumentation skills, including how to clearly express them. LLM-generated texts often demonstrate no clear argument structure, despite the superficial appearance of grammatical and semantic coherence.

For these reasons, students in CS&SS/SOC/STAT 221 are not allowed to use generative AI (including but not limited to ChatGPT) as an aid in writing responses for problem sets, prompts for participation exercises, short-answer questions on exams, or any other assignment involving novel written expression. From the perspective of the instructor, such usage falls under the heading of academic misconduct described above.