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

Meeting times and locations

- Lecture: Smith Hall 120, Mon/Wed/Fri, 11:30am – 12:20pm
- Quiz sections
  - AA: Sieg Hall 228, Tues/Thur, 12:30pm – 1:20pm
  - AB: Sieg Hall 228, Tues/Thur, 1:30pm – 2:20pm
  - AC: Mechanical Engineering Building 250, Tues/Thur, 12:30pm – 1:20pm
  - AD: Mechanical Engineering Building 250, Tues/Thur, 1:30pm – 2:20pm
  - AE: Thomson Hall 335, Tues/Thur, 12:30pm – 1:20pm
  - AF: Thomson Hall 234, Tues/Thur, 1:30pm – 2:20pm

Teaching team  |  Contact        |  Days/times                |  Location       |
----------------|-----------------|---------------------------|----------------|
William Brown  | brownw@uw.edu   |  Mon 1:00-2:00pm, Fri 1:00-2:00pm (or by appointment) | Padelford Hall C-14D |
Yuan “Monica” Gao Rollinson | monicagr@uw.edu |  Tues 2:30-3:30pm, Thurs 9:30-10:30am | Savery Hall 319B |
Eva Tourangeau  | tourange@uw.edu |  Mon 1:30-2:20pm, Wed 1:30-2:20pm | Statistics Tutor & Study Center |
Kunhui Zhang    | zhangkh@uw.edu  |  Mon 4:30-5:30pm, Tues 4:30-5:30pm | Statistics Tutor & Study Center |

Course webpage: [https://canvas.uw.edu/courses/1318964](https://canvas.uw.edu/courses/1318964)

Course overview

Course description

The goal of this course is to develop statistical literacy, particularly regarding statistics applied in the social sciences. As a discipline, statistics focuses on describing and modeling variability in our world. It includes a vast assortment of theories and methods for summarizing the variability that we observe in all kinds of data, as well as the relationships that exist between different variables, for example:

- Crime rates by neighborhood, city, county, state, etc.;
- Incidence and prevalence of different diseases between different communities;
- Age at first consumption of alcohol;
- Life expectancy and fertility rates by county, state, country, etc.;
- Compositional differences between different communities or populations by age, sex, gender, ethnicity, socioeconomic status, etc.;
- 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;
• The relationship between different educational opportunities and resources on one hand, and variability in test outcomes of individual students, classrooms, schools, school districts, or states on the other;
• The relationship between (non)use of a particular substance on one hand, and health status on the other;
• The relationship between population size, GDP, and carbon emission by country.

We as voters, communities, organizations, and governments make decisions with important consequences based on our understanding of information such as these. Consequently, it is important that we understand the assumptions, objectives, and results of statistical methods that we use to collect and thoughtfully explore such information, as well as the pitfalls that arise when we fail to apply or interpret these methods correctly. This course will prepare you to be a more critical consumer of statistical analyses, whether you encounter them in the popular media or professional and academic publications. By the end of this course, you should be able to
• identify the strengths and limitations of different strategies that researchers apply to data-gathering, as well as how these relate to research questions and design;
• evaluate the ability of different statistics to adequately summarize datasets;
• determine whether claims presented in popular or professional publications have been validly drawn from data and applied to answering the research questions for which they are intended.

Course objectives
• Examine the distinction between nominal, ordered, discrete numerical, and continuous numerical variables;
• Explore different ways that data can be collected, as well as the strengths and limitations of these various approaches;
• Survey different numeric and visual ways of efficiently and effectively describing and summarizing data;
• Introduce the basic rules of probability theory;
• Survey widely used parametric models of probability distributions;
• Explore how probability distributions can be used to draw inferences from datasets about the populations from which they were sampled;
• Discover how regression analysis can be used to evaluate claims about relationships between variables, as well as how regression can be misused.

Expectations for excellent academic conduct in class and on assigned coursework

Collaborative learning and diversity statement
Acquiring new knowledge in a structured social setting is a very different experience from self-guided learning. Ideally, interacting with your teaching team and with your peers will improve your knowledge acquisition. 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 diversity, showing every student our utmost respect, and 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 excellence. We value and honor diverse experiences and perspectives, strive to create welcoming and respectful learning environments, and promote access, opportunity, and justice for all. 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 and work on section exercises and problem set assignments is not only accepted but encouraged, if you find such cooperation beneficial to your learning. However, for the problem set assignments, one unique submission per student per assignment is expected, written in your own words (see “Assignments and assessment” below for further discussion of problem set assignments). If you have worked on assignments with other students in the class, be sure to note this collaboration on submitted work, including your collaborators’ names. 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. Any form of plagiarism 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:


Access and Accommodations
In the case of planned absences, advance notice is expected. In the case of unexpected family, health, or other emergencies, notification of absence at your earliest convenience is also appreciated. Should an absence interfere with your ability to successfully complete assigned coursework on time, documentation to validate your absence may be requested by your instructor (William Brown).

For students who have established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to me (William Brown) at your earliest convenience so we can discuss your needs in this course.

For students who have not yet established services through DRS but have a temporary health condition or permanent disability that requires accommodations (conditions include but are not limited to mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or uwdrs@uw.edu or disability@uw.edu. 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/).

Prerequisites
There are no formal course prerequisites; however, proficiency with basic arithmetic and algebra will be helpful for quickly grasping technical aspects of various statistical methods.

Course readings
Required textbook
This book may be downloaded as a free PDF at https://www.openintro.org/stat/textbook.php

In general, students should aim to have read the chapter of the course textbook prior to the first day that we cover it in quiz sections or lecture (see calendar below).

Assignments and assessment (grading)
- Participation 10%
- Nine quizzes 10%
- Nine take-home problem sets 20%
- Three exams (two mid-term exams and one final exam) 60%

Participation points will be assessed based on participation in group work and discussion during the Tuesday and Thursday quiz sections. Quiz sections are intended to reinforce your understanding of the technical aspects of statistical methods by providing active, hands-on opportunities to apply them, usually in the context of small-group exercises. Participation will be assessed based on your participation in these group exercises. Groups will submit solutions to exercise problems and questions as a group at the end of quiz sections, so be sure to sign your name to each group exercise. You may miss up to three quiz sections. Your participation points will decrease by 1% for each section beyond the third that you miss.
The nine quizzes will be conducted during the quiz sections noted on the course calendar (below). These quizzes will focus on the key vocabulary introduced in each of the nine chapters of the textbook. Because this course aims to improve your statistical literacy, it is necessary that you understand not only the technical aspects of statistical methods but also the key concepts and terms that support and limit these methods.

Take-home problem sets are intended to give you an opportunity to apply the statistical concepts and methods you have learned about in your reading, lectures, and quiz sections. With the exception of the first problem set, problem sets will be assigned electronically, and your solutions to problem sets will be collected as hard copies at the beginning of lecture on the days they are due (see course calendar below). The first problem set (PS1) will be an anonymous online survey, intended to generate data that we may use to illustrate various statistical concepts and methods throughout the quarter. The second through ninth problem sets (PS2 through PS9) will focus on the content of Chapters 1 through 8 of the textbook. Late problem set solutions may be submitted to the course instructor (William Brown) but will be discounted by 10% of the Problem Set’s total points for each 24-hour period. See ‘Expectations for excellent academic conduct …’ above for discussion of collaborative work on problem sets.

The three exams are intended to assess how well you have mastered the concepts and methods introduced in class. All exams will be administered in class unless alternative accommodations have been made. Exams will include matching, multiple-choice, fill-in-the-blank, and true/false questions. Some basic calculation will be required, so please bring a basic calculator with you to exams. (See rules about electronic devices below for further detail.) Exams are noncumulative; each exam focuses on the content introduced after the preceding test.

Your grades will be posted to a gradebook on the course website. Final grades will be based on the total percentage score of the four course components outlined above. Grade percentages will be converted to grade points according to the standard UW scale below. Curving may only be applied to the final grade point distribution, and only if deemed appropriate by the instructor.

<table>
<thead>
<tr>
<th>%</th>
<th>Grade points</th>
<th>%</th>
<th>Grade points</th>
</tr>
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<tbody>
<tr>
<td>10</td>
<td>0.0</td>
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<tr>
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<td>2.0</td>
<td>&gt;98</td>
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**Course policies**
- Cell phone policy: During lecture and quiz sections, cell phones should not be visible unless expressly permitted. Cell phones should not be used during class to talk, text, play games, browse the web, etc. If you receive a call or message that you absolutely must take, please step outside to do so. Additionally, make sure to set your cell phones to silent during class, to avoid unintended disruptions in class.
• Laptop/notebook/surface/tablet policy: Laptops or similar electronic devices may be used only to take notes or complete in-class activities, when appropriate. Please refrain from using such devices for any activity that is not related to the course (e.g., social networking, shopping, playing games, etc.). **Use of such devices for purposes other than coursework can be distracting not only for you but for those sitting near you, so refrain from doing so as a common courtesy. (See “Collaborative learning and diversity statement” above.)**

• If the teaching team observes a student misusing their cell phone or other electronic device per the above policies, you will be asked to put the device away the first time. If it happens a second time, you will be asked to leave the class for the day.

• Grading is based on demonstrated understanding of statistical concepts and procedures. For problem sets, group exercises, or exam questions involving calculation, you may still receive partial or full credit for your solutions even if you have made mathematical errors, provided that you have demonstrated a clear understanding of the logic of the method you are applying. Consequently, it is in your best interest to show your mathematical work, so that the teaching team can diagnose the source of any mathematical errors you have made.

• Many calculation problems can be completely solved by hand, but you will be allowed to use a calculator in this class, including during exams, for faster calculation. A simple calculator that can take square roots should be sufficient. For exams, you cannot use a calculator that communicates with other devices or has internet access (e.g., a the calculator app on your cell phone). For in-class exercises, calculators on cell phones or computers may be used, but see the above policies on cell phone and other digital device usage for guidelines of such use.

• If you disagree with the interpretation of your score, submit a request to your instructor (William Brown) via email for re-grading. You must submit this request within one week of receiving the assignment grade and include a written explanation of your case.

**Email policy**

• Please direct electronic correspondence to the relevant member(s) of the teaching team via email at the email addresses given above.

• Please allow up to 48 hours for a response. Please also be sure to do the following in all messages: (a) provide context for the email (e.g., “I am a student in SOC 221 and I have a brief question about a concept discussed in class today”), and (b) close your email with a signature (e.g., “Best regards, Maria”).

• Please limit electronic communications to questions that can be answered quickly. Questions that require a more detailed response (e.g., explaining a confidence interval and how to calculate one) should be addressed during class or office hours.

**Course schedule and outline** (The course schedule below is tentative and subject to change, e.g. due to inclement weather leading to suspension of university operations. You will be notified of any such changes.)
<table>
<thead>
<tr>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
<th>Week 7</th>
<th>Week 8</th>
<th>Week 9</th>
<th>Week 10</th>
<th>Week 11</th>
<th>Finals Week</th>
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</thead>
<tbody>
<tr>
<td>No Class: Autumn Break</td>
<td>Chapter 1; PS1 due</td>
<td>Chapter 2; PS2 due; PS3 assigned</td>
<td>Chapter 3</td>
<td>Chapter 4</td>
<td>Chapter 5; PS5 due</td>
<td>Chapter 5; PS6 due</td>
<td>No Class: Veterans' Day</td>
<td>Chapter 7</td>
<td>Chapter 8; PS8 due</td>
<td>Chapter 8</td>
<td>10-Dec-19</td>
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<td>No Class: Autumn Break</td>
<td>Chapter 1; Chap 1 Quiz</td>
<td>Chapter 2; Chap 2 Quiz</td>
<td>Chapter 3; Chap 3 Quiz</td>
<td>Chapter 4; Chap 4 Quiz</td>
<td>Chapter 5; Chap 5 Quiz</td>
<td>Chapter 6; Chap 6 Quiz</td>
<td>Chapter 6</td>
<td>Chapter 7</td>
<td>Chapter 8; Chap 8 Quiz</td>
<td>Chapter 9; Chap 9 Quiz</td>
<td>11-Dec-19</td>
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<tr>
<td>Course overview</td>
<td>Chapter 1; PS2 assigned</td>
<td>Chapter 2</td>
<td>Chapter 3; PS4 due</td>
<td>Chapter 4; PS5 assigned</td>
<td>Chapter 5; PS6 assigned</td>
<td>Chapter 6; PS 7 assigned</td>
<td>Chapter 6</td>
<td>Chapter 7</td>
<td>No Class: Thanksgiving Break</td>
<td>Chapter 9; PS9 assigned</td>
<td>13-Dec-19</td>
</tr>
<tr>
<td>Preview of big statistical concepts</td>
<td>Chapter 1</td>
<td>Chapter 2</td>
<td>Exam review</td>
<td>Chapter 4</td>
<td>Chapter 5</td>
<td>Chapter 6</td>
<td>Exam review</td>
<td>Chapter 7</td>
<td>No Class: Thanksgiving Break</td>
<td>Exam review</td>
<td>13-Dec-19</td>
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<tr>
<td>Chapter 2</td>
<td>Chapter 3; PS3 due; PS4 assigned</td>
<td>Chapter 2</td>
<td>MIDTERM EXAM 1 (CHAPS 1-3)</td>
<td>Chapter 4</td>
<td>Chapter 5</td>
<td>Chapter 6</td>
<td>MIDTERM EXAM 2 (CHAPS 4-6)</td>
<td>Chapter 7</td>
<td>No Class: Thanksgiving Break</td>
<td>Chapter 9; Student evaluations</td>
<td>1-Dec-19</td>
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<tr>
<td>PS1 due;</td>
<td>PS2 due</td>
<td>PS 7 assigned</td>
<td>Chapter 6</td>
<td>PS8 assigned</td>
<td>No Class: Thanksgiving Break</td>
<td>PS9 assigned</td>
<td>FINAL EXAM (CHAPS. 7-9) 2:30-4:20 PM Location: TBD</td>
<td>Chapter 7</td>
<td>Chapter 8; PS8 due</td>
<td>Chapter 8</td>
<td>10-Dec-19</td>
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<tr>
<td>PS5 due</td>
<td>PS 7 assigned</td>
<td>Chapter 6</td>
<td>Exam review</td>
<td>Chapter 7</td>
<td>No Class: Thanksgiving Break</td>
<td>Exam review</td>
<td>Chapter 9; PS9 assigned</td>
<td>Chapter 7</td>
<td>Chapter 8; PS8 due</td>
<td>Chapter 9</td>
<td>11-Dec-19</td>
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