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TA office hours will be posted on the Resources page in Canvas.

Course Description
This course introduces the use of statistical methods from the points of views of both consumers and producers of statistics, with an emphasis on exploring and applying statistical methods to answer questions based on different types of sample data. We begin with definitions and examples to get you thinking about statistical reasoning and the concept of uncertainty. This is followed by introducing types of data, data collection methods, methods for data visualization and the use of descriptive statistics. The course then moves on to probability, probability distributions, and several inferential methods. Specific topics include graphical displays for qualitative and quantitative data; calculation and interpretation of summary statistics; elementary concepts of probability and sampling; random variables and probability distributions; basic concepts of hypothesis testing, estimation, and confidence intervals; z-tests, t-tests, and chi-square tests; and correlation and simple linear regression.

STAT 311 is intended as a first course in statistics for students in many different disciplines. This course is often appropriate for students who need a statistics course as a prerequisite for applying to graduate school, or for individuals who want a better command of elementary statistical methods for use at work.

Core Learning Objectives: by the end of the course, you will be able to

- summarize single variable data sets by computing summary statistics and by creating appropriate graphs such as histograms, stem-and-leaf plots, and boxplots;
- interpret summary statistics and visual displays created either by yourself or others;
- use computed means and standard deviations to apply normal approximation methods;
- relate data to a standard normal distribution or percentiles when appropriate;
- plot points and lines to look at relationships between two variables;
- use software to compute correlation coefficients and relate the correlation coefficient to the effect of regression;
- use software to perform simple linear regression analysis (and possibly some basic multiple regression), including finding the equation of the regression line, as well as conducting inference related to the regression slope parameter;
- distinguish between estimation and prediction with respect to linear regression and be able to create confidence and prediction intervals;
• explain elementary probability rules, and extend these concepts to setting up correct chance models to make a statistical inference;
• define the concept of uncertainty;
• use software to compute standard errors and confidence intervals as measures of reliability for parameter estimation;
• interpret confidence intervals;
• use software to set up and interpret hypothesis tests, using $z$-tests, and $t$-tests, in order to make inferences about populations based on information from samples;
• discuss the assumptions for the various tests and when it is appropriate to use each type of test;
• use software for an introduction to simulation and some basic nonparametric methods; and,
• collaborate with others to answer some questions based on the analysis of a data set.

Course Organization

The eight lessons in this course covers much of the material throughout Chapters 1 - 25 of the Introduction to Modern Statistics textbook. See the class schedule or Readings pages of each lesson for specific chapters. We will also introduce some material not covered in detail in the textbook.

There will be seven homework assignments (a mix of R and non-R problems), a midterm and a final group project. Lectures, as mp4 PowerPoint lectures, are part of Lessons 1 - 8. We cover approximately one lesson per week. Weeks 9 and 10 will be devoted finishing homework for Lesson 8 and your group projects (you will likely have started some parts of your group project before Week 9). Your final grade for this course will be determined from your overall weighted percentage from the homework, midterm, and final group project.

The first lecture in Lesson 1 will walk you through some key pages for navigating the course in Canvas.

About the Lessons

You can stop and start the online lecture presentations when you need to, and easily find where you left off if you need to close out and return at a later time. Each lesson includes mp4 PowerPoint online lectures recorded by your instructor. The lesson material is designed so that you apply new skills as you learn them to complete the homework and to prepare you for the exams. Some students may find it helpful to read the assigned pages from your text, then listen to the lecture.

The lessons emphasize understanding the material and the interpretation of results. Example problems are presented to illustrate concepts and problem-solving. Lessons generally follow the text; however, some chapters and sections are skipped and examples not in the text are presented. Also, for a few topics the lectures provide more detail than the text. A summary of the content of each lesson is posted on the Introduction page linked from the Getting Started on the Home page.

Recommended/Reference Reading

The primary textbook for the class is OpenIntro Introduction to Modern Statistics, 1st Edition, by Çentinkaya-Rundel and Hardin. A free online version of the book can be found here.
Stat 311 B Autumn 2021: Elements of Statistical Methods

The textbook for Lesson 4 is *OpenIntro Statistics, 4th Edition, by Diez, Çentinkaya-Rundel and Barr*. A free pdf copy of the book can be found [here](#).

You may find the two books linked below useful for getting additional help with R.

- *Statistical Inference via Data Science: A ModernDive into R and the Tidyverse*. You can link to the online version [here](#).
- *R for Data Science*, which can be found [here](#).

All books listed above have freely available pdf or online versions. All books are available for purchase as well, but this is not necessary.

The textbooks are meant to supplement the lectures. For some topics, it may be important for you to carefully read the textbook to gain a more in-depth understanding. Many of the chapters contain examples other than those worked through in the lectures. Going through examples can help further your understanding of the various topics. Each lesson will outline the main points for each topic, providing further explanations and examples for more difficult topics. Each student will need to figure out what works best for their learning style. Some will find it better to listen to the lectures first and then go to the book. Others may find it better to go through the book and then listen to the lectures. To avoid undue frustration, listen to the lectures and at least scan through the chapters before attempting the assignments.

Lessons will generally follow the content in the texts; however, some chapters and sections will be skipped and examples not in the text will be presented. Readings other than from the textbooks may also be recommended.

**Homework**

You will have seven homework assignments. Check the posted pdf schedule or Canvas for the due dates.

- The assignments will lag the lessons, so you have time to watch the videos before doing the assignment.
- The assignments will be done in RStudio using a special assignment Rmd template. For problems that do not require R, you will simply type in your answers. We will give you a couple of tips if you want to include simple equations. For problems that require R code, you will put your R code in code chunks (to be explained elsewhere) and then you will type up answers/explanations.
- All answers must be written in complete sentences. We are looking for thoughtful answers/interpretations. More is not always better, so think about what you write.
- RStudio has a spell checker--use it!
- You will "knit" your Rmd file to HTML and upload the HTML file to Canvas.
- Each homework assignment will be worth a different number of points but will be counted equally by converting scores to percentages. We will drop your lowest (as a percentage) homework assignment.
- You can turn your assignments in up to one day late at no penalty. **After that, NO LATE HOMEWORK ASSIGNMENTS ACCEPTED!** If you miss a deadline, you can use that as your dropped assignment.
R/RStudio

We will be using R and RStudio this quarter to introduce the use of statistical software. OpenIntro includes R tutorials for you to work through to introduce the various functions that you will need to complete your R assignments. Recommended R tutorials will be referenced on the Readings page for each Lesson. Please refer to the Resources link in the top row of the Home Canvas page for more details about R and links for installing the software. Instructions/links are also provided under “Getting Started with R and RStudio on the Canvas Modules page.

R takes a bit of getting used to. The R tutorials will provide examples of the functions you need for the related assignments. You will, however, need to spend some time to learn how R works. You may find that looking at the output after each call helps you to better understand what the code is doing! We recognize that there will be a variety of programming backgrounds for students in this course, from never have used software to having used R or other languages. The TAs and I will help you with R--you just need to ask.

Midterm

There will be one in-person midterm that will cover material in Lessons 1 - 4. The midterm will be offered on one day, but at two different times to help mitigate scheduling conflicts with other classes you have. About a week before the midterm, we will post a survey for you to select your midterm time. Most of the problems will be based on definitions and require you to make interpretations. We will provide a formula sheet for the formulas in Lesson 4. While there may be some basic calculations, NO CALCULATORS WILL BE ALLOWED (and they will not be necessary).

Final Group Project

There will be a final group project that will allow you to demonstrate the many things you learn over the quarter. Students will be broken into groups (group size yet to be determined). Based on the results from an “Information to Assign Groups” survey, we will try to group friends together.

We will choose one to three data set options for the project. Each group will only work with one data set. You will use R/RStudio as part of the assignment. Your focus will be on determining what analyses to do and on interpretation of results. We will provide a project handout and guidelines for the write-up later in the quarter. One final write-up per group will be uploaded to Canvas by 11:30 PM on the last day of classes. Each student will also be required to complete a self-evaluation and peer review after their project is uploaded. More project information will be posted around the 4th week of the quarter.

Course Announcement/Discussion Forum

Use the Ed Discussion board to post questions or comments about the course, including but not limited to questions from readings in the textbook, course materials, learning objectives, or other course content. We have populated the Ed Discussion board with categories--please try to use the most appropriate category based on the content of your post. For guidelines about effective posting on discussion forums, please see the Netiquette information.
On occasion, the TAs or I will post announcements that are pertinent for all students under the “Announcements” category in Ed Discussion. It is important for you to read all these postings—you are responsible for all information posted in the announcements category.

Grades

Your final course grade will be determined by your overall weighted percentage based on the following categories and weights:

<table>
<thead>
<tr>
<th>Category</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>40%</td>
</tr>
<tr>
<td>Midterm</td>
<td>20%</td>
</tr>
<tr>
<td>Final Group Project</td>
<td>40%</td>
</tr>
</tbody>
</table>

You need an overall weighted percentage of 70% and you need to take the midterm and participate in the final group project to receive a 2.0 in the course. Final grades may be based on curved weighted percentages where the curve depends on how the class does overall.

Statistics Tutor and Study Center

The Statistics Tutor and Study Center (STATUS) will be offering in-person and online drop-in tutoring. When the schedule has been set, we will post an announcement. The current schedule, once set, can be found here.

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/).

Mental Health Resources

Any member of the UW community can call SafeCampus anytime to anonymously discuss safety and well-being concerns for yourself or others. Caring, trained professionals will talk you through options and connect you with additional resources if you want them. Available 24/7 by phone at 206-685-7233, or M-F, 8am-5pm at safecampus@uw.edu. Crisis Connections provides immediate help to individuals, families, and friends of people in emotional crisis, dealing with addiction, or struggling to meet basic needs. Anyone in Washington State can receive support and resource referrals 24/7 through their crisis line at 866-4CRISIS (866-427-4747 or TTY 206-461-3219).

Disability Services for Students (http://hr.uw.edu/dso/)

To request disability accommodation, contact the Disability Services Office at: 206.543.6450 (voice), 206.543.6452 (TTY), 206.685.7264 (fax), or email at dso@u.washington.edu. The University of Washington makes every effort to honor disability accommodation requests.
Requests can be responded to most effectively if received as far in advance of the event as possible, preferably at least 10 days.

**UW Diversity Statement**

Diverse backgrounds, embodiments, and experiences are essential to the critical thinking endeavor at the heart of university education. Therefore, I expect you to follow the UW Student Conduct Code in your interactions with your colleagues and me in this course by respecting the many social and cultural differences among us, which may include, but are not limited to age, cultural background, disability, ethnicity, family status, gender identity and presentation, citizenship and immigration status, national origin, race, religious and political beliefs, sex, sexual orientation, socioeconomic status, and veteran status.

**Academic Integrity**

The University takes academic integrity very seriously. Behaving with integrity is part of our responsibility to our shared learning community. If you are uncertain about if something is academic misconduct, ask me. I am willing to discuss questions you might have.

Acts of academic misconduct may include but are not limited to:

- Cheating (working collaboratively on quizzes/exams and discussion submissions, sharing answers and previewing quizzes/exams)
- Plagiarism (representing the work of others as your own without giving appropriate credit to the original author(s))
- Unauthorized collaboration (working with each other on assignments)

Concerns about these or other behaviors prohibited by the Student Conduct Code will be referred for investigation and adjudication by (include information for specific campus office).

Students found to have engaged in academic misconduct may receive a zero on the assignment (or another possible outcome).

The University of Washington Student Conduct Code (WAC 478-121) defines prohibited academic and behavioral conduct and describes how the University holds students accountable as they pursue their academic goals. Allegations of misconduct by students may be referred to the appropriate campus office for investigation and resolution. More information can be found online [here](#).