

**Math 211 Spring 2021**  
**Statistical Concepts and Methods**

**Instructor:** Dr. Kathy Temple

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**Office Hours:** MW 2 - 2:50 PM, TTh 10:00 - 10:50 AM, and by appointment.

**Meeting times:** Please plan on being on Zoom from 11 - 11:50 M - F. After the first week, there may be an option to attend class in-person - we'll talk about this at the beginning of the quarter. In-person meeting locations, if available, will be announced in class.

**Course Prerequisites:** Math 100B or equivalent, or permission of the instructor.

**Course Goals:** This course will introduce you to the basic ideas of descriptive and inferential statistics, and aims especially to make you a more intelligent consumer and evaluator of statistics. Since most of the statistics you will encounter will be generated by someone else, this is important! Topics include, but are not limited to: descriptive statistics, regression, inference, and analysis of two-way tables.

**Required Text:** Diez, et. al. *OpenIntro Statistics*, 4th edition. The text is available for free as a PDF download, or can be ordered as an inexpensive paperback if you would prefer a paper copy. Note that while there is a suggested price, you can set the price to zero using the slider and get the book for free.

**Calculator:** You will need a calculator that performs at least the standard scientific functions.

**Evaluation and Grading:** Grades will consist of the following components: weekly take-home quizzes (25%), weekly lab write-ups (20%), reading assignments from the text and in-class activities (10%), small projects (5%), two midterm exams (10% each), and a comprehensive final exam *or* final project (20%). Tentative midterm exam dates are Tuesday, April 27, and Tuesday, May 18. If you choose to do the final exam, a written portion will be given on Tuesday, June 8. Oral exams will be scheduled on Tuesday, June 8 or Wednesday, June 9. You will have the option of replacing the final exam with a final project; more information will be provided on that later. Grades will be assigned according to the following scale:

		A	100-93%	A-	92.99-90%
B+	89.99-87%	B	86.99-83%	B-	82.99-80%
C+	79.99-77%	C	76.99-73%	C-	72.99-70%
D+	69.99-67%	D	66.99-63%	D-	62.99-60%
		F	59.99%		and below

### Details concerning course components

**Lab Assignments:** Each Tuesday (aside from exam weeks) we'll be doing a lab assignment using statistical software. The lab will include questions to be answered, including relevant statistical analyses. Your lab write-ups must be submitted through Canvas by 5PM on Fridays. Lab write-ups must be typed, written in complete sentences, and follow the general guidelines for written work given below.

We will be making use of the statistical software R in class, and you will be using R for labs and exams. R is a free, open-source software package that is incredibly powerful. I strongly recommend the interface R Studio and this is what I will be using and demonstrating in class. R

has a bit of a learning curve, but it's well worth working through! We typically use R in the advanced statistics courses in this department, and it's becoming more and more of a standard in industry and other disciplines.

**Take-Home Quizzes:** Take-home quizzes will be assigned most weeks. These will *typically* be assigned on Fridays and due by 5PM on Tuesdays, but this schedule may shift for exam weeks. For these, you may use your text, notes, and other resources, and may collaborate with your colleagues. Please note that collaboration and copying are two different things!

A few times during the quarter, I will ask you to have a brief (10- or 15-minute) conversation with me about your quiz and your reasoning. These are designed to be practice for the oral components of the exams - and let us clarify concepts and reasoning along the way!

**Reading Assignments and In-Class Activities:** Periodically, I will be assigning sections from the book to be read before class. These assignments will include a few questions to be answered, posted as a graded discussion on Canvas. Your assignment is to answer these questions by the due date (generally 9AM of the day that I want to discuss that section in class). These assignments may be given with a turnaround time of a day or two. When we do in-class activities, there will also be credit given for being an active participant in those activities. You must be present for in-class activities, and reading assignments may not be submitted late. Because life happens, the lowest 5 scores in this category will be dropped (I expect this to be about a week's worth of reading assignments/in-class activities).

**Exams:**

There will be two mid-term exams, with tentative dates Tuesday, April 27 and Tuesday, May 18. Each exam will have three parts: a written component, a lab component, and an oral component. For the written component, you will have a two-hour window in which you can take the exam (beginning 30 minutes before the scheduled class time and ending 30 minutes after the scheduled class time), and once you start you will have 60 minutes to complete it. The exam will be a pdf document that you can either print and write on or write on your own paper. For this component of the exam, you may use your text and any of your personal notes but *no other resources*. See course policies, below, for requirements for submitting handwritten work. For the written component, *provided that it is permitted by public health conditions*, you can take the exam in-person during the scheduled meeting time.

The lab component will require use of R and RStudio. It will become available after the end of the window for the written component and is due by 5PM on the day after the exam (Wednesday). This component will not have a time limitation beyond the time that it is due, but you should expect it to take you around an hour. For the lab portion of the exam, you may use written or online resources, but *may not consult with any other people, virtually or otherwise*. Each exam will also have an oral component. These will be scheduled in the couple days following the written exam. For the first exam, the oral component will be primarily (like the quizzes) discussing your solutions to problems you have already done. For the second exam, the oral component may ask you consider a new situation or problem, in addition to discussing your previous work. The oral component will be relatively small for the first exam (in terms of point value) and larger for the second exam. You will need to sign up for an oral exam time in advance of the exam. Failure to do so by the stated deadline may result in an automatic point deduction for that component of the exam.

**Projects:** There will be one or two smaller projects during the course of the quarter. All told, these will make up 5% of your course grade. Due dates will be announced at the time of the assignment, but expect to have at least a week to complete these. These projects are required (in contrast to the final project, which is an option to replace the final exam).

**Final Exam/Project:**

The final exam will be cumulative and in a similar format to the midterm exams. The written

portion will be given on Tuesday, June 8, between 8 and noon (tentatively, allow a 2-hour block within that span for completing the final). The lab portion will be released at noon on Tuesday, June 8 and due by 5PM on Wednesday, June 9. The oral component of the final exam will be given on Tuesday and Wednesday; note that this will be more significant than the oral component of the midterms (both in terms of point value and in terms of length). The oral component may ask you to synthesize material. *If you know that you will not be able to complete an exam during these dates/times, please talk to me early, but you may want to plan on doing the final project instead.* Guidelines for the various components will be similar to the midterms.

You will have the option of replacing the final exam with a final project. This will involve writing a proposal, conducting an experiment to gather data, and analyzing the data using the tools from this class. More details about this will be given as the quarter progresses, but expect some interim deadlines during the quarter (proposal, collection of data) and then the final project to be due by 5PM on Wednesday, June 9.

**General Course Policies:** Come to class. Do your own work. Work really hard; this is not going to be an easy course, but you will leave it with a useful set of skills, and a better understanding of statistics!

**Face Coverings and Social Distancing:** Due to COVID-19, and under the directive and mandate of public health officials and the president of Central Washington University, students must adopt face covering protocol before entering any classroom or building at CWU until further notice. Students must also follow the social distancing placement marks in buildings and classrooms. If you do not have a face covering Central Washington University can provide one for you. If you have not yet received your CWU-supplied facial covering, please go the SURC Information Desk. Please do so prior to the start of your first class. Face coverings must cover both the mouth and nose. Your mask protects me; my mask protects you. Masks with one-way valves for exhalation don't have the protective value for others - please don't use them as your face covering for any in-person components. Thank you for helping keep all of us safe!

**Class Recordings:** Lecture/discussion will be recorded and posted on Canvas for those who can't attend synchronously on a given day. Please plan on attending synchronously on an ongoing basis, however. We all benefit from the conversations in-class, and they will be richer for having you there! Also, please note that work done in breakout rooms will *not* be recorded. If you are attending virtually, please turn on your camera if that is reasonable given your situation, bandwidth issues, etc. If you cannot turn on your camera, please use a profile picture on Zoom that matches your profile picture on Canvas (and please put one up on Canvas) so that we don't have to look at a sea of names/initials!

**Written Work:** All work handed in for the course must be written neatly, legibly, clearly, using correct mathematical notation, and with sufficient explanation. A good rule of thumb is to write your solution so that a classmate who knows roughly what's going on in the course but doesn't know how to do this particular problem can understand your solution. As a side benefit, this makes it much more likely that you will be able to understand your solution when you go back to study for exams! The bottom line: for any written work handed in for the course, including lab write-ups, exams, and take-home quizzes, *you must show your work.*

**Late Work:** Lab assignments and take-home quizzes can be submitted late with a 20% penalty per 24-hour period, up until the time that graded work is returned to the rest of the class. Labs/quizzes submitted after graded work is returned to the rest of the class will not receive credit, however, the lowest lab score and the lowest take-home quiz score will be dropped. If you have extenuating circumstances around the exams or final, I encourage you to communicate with me as soon as possible; see the section on communication, below. In cases where a make-up midterm exam is warranted and cannot be completed before graded work is returned to the rest of the class, I reserve the right to replace that portion of your final grade with the final exam.

**Submitting Work Electronically:** All work for this course will be submitted electronically through Canvas.

- Labs write-ups and the lab components of exams are required to be typed and may be in .doc, .docx, or .pdf formats only. If you are using an alternate word processing program, please make sure that you know how to generate one of these formats.
- R scripts (labs, lab components, and projects) are to be submitted as either RStudio scripts (.r files) or RMarkdown files (.rmd). They may not be submitted as text files.
- If you choose to type your take-home quizzes, they should be in one of the formats for lab write-ups, above.
- If you choose to hand-write your take-home quizzes and written exams, you have a couple of options for submission:
  - You can scan it to a PDF document using a cell phone camera. Some apps that do this (there are many others if you don't like these): Adobe (free) or CamScanner (free version) for Android phones; the Notes App (built-in) or CamScanner (free version) for iPhone.
  - You can take a well-lit, easy-to-read photograph, insert it into a Microsoft Word or OpenOffice Writer document, make sure that the photo is oriented correctly and easy to read, and then save the document as a .doc, .docx, or .pdf file for upload to Canvas.
  - For any handwritten work (homework, quizzes, or exams), if your work is multiple pages, please upload as a SINGLE file.

Whichever method you choose, please double-check that your image is oriented correctly. Images not oriented correctly or images that are not easy to read will lead to the assignment being returned without being graded.

**Academic Honesty:** Consult university policies (CWUP 5-90-040(22), CWUR 2-90-040(22), and WAC 106-125-020) for student conduct, cheating, plagiarism, and other academic expectations. CWU's policies and recommendations for academic misconduct will be followed, leading to disciplinary action up to and including failing the course.

**Inclusivity Statement:** As a member of a peer learning community, a high degree of professionalism is necessary. **CWU expects every member of the university community to contribute to an inclusive and respectful classroom culture.**

**Classroom Conduct:** Students in this class are expected to interact with students and the professor professionally. Instances of disruptive conduct, obstructive conduct, or harassment (see definitions below from the Washington Administrative Code: WAC 106-125-020) will be referred to the Dean of Student Success.

**Disability Support Services:** Central Washington University is committed to creating a learning environment that meets the needs of its diverse student body. Students with disabilities should contact Disability Services to discuss a range of options to removing barriers, including accommodations: Hogue Hall 126, 509.963.2214, DS@cwu.edu

**Is my absence excused?** Excused absences will not lower your overall grade in this class and are determined on a case-by-case basis. Excused absences include illness, bereavement, and school-related activities. With the exception of illness, documentation is required. Excused absences do not include travel for holiday breaks, work, or non-emergency travel delays. In compliance with RCW 28B.137.010, Central Washington University makes every effort to deal reasonably and fairly with students who, because of religious obligations, have conflicts with

scheduled exams, assignments or required attendance. Students must present written notice to their instructor within the first two weeks of class listing the specific dates on which accommodations are required. Contact the Dean of Student Success at (509) 963-1515 for further information or questions.

**Communication:** This is going to be an unusual quarter in many ways. Some of you are completely remote. Some of us may need to quarantine in the middle of the quarter. Even if you are attending some course meetings in person, we all may need to shift entirely remote on short notice (and it may be worth thinking in advance about how you would make that work, both in terms of technology and in terms of being able to attend class and complete work remotely). In all things, communication is going to be key. If you have something going on, please let me know (no details you don't feel comfortable sharing, of course, just a general heads-up). As things need to change during the quarter, I will do my best to let you know as soon as I can. In all things, please extend grace to me and your classmates, and I will do my best to do the same.

I reserve the right to change the policies contained in this syllabus as dictated by developments during the quarter.