

Syllabus for MATH 315 - Applied Statistics I

Spring 2024

“Statistics in the service of research”

This course introduces you to modern statistical data analysis techniques so that you can make data-informed decisions. At the end of the semester you will present your research findings in a poster presentation format to your peers.

In this project-based course, you will have the opportunity to answer questions that you feel passionately about through independent research based on existing data. The course offers a lot of one-on-one support, directed opportunities to work with other students, and training in the skills required to complete a project of your own design. We will use collaborative tools and software that are common in many workplaces and research labs. These skills will prepare you for many different career types.

Logistics

About the Instructor **Instructor:** Dr. Robin Donatello (Dr. D, she/her/hers)

Office Location: Holt 202

E-mail: rdonatello@csuchico.edu

Office Hours: MF 2-3pm Holt 202, Wed 1:30-3 at Community Coding or by appointment

Zoom link: In Canvas.

Best method of contact? Discord!

About the Course **Meeting pattern & location:** MWF 12-1pm, Holt 291 **Prerequisites:** MATH 105, MATH 109, or MATH 120, or faculty permission.

Course Website: <https://math315.netlify.app/> **Mode of Instruction:** In Person

Use of Canvas: Due dates, assignment submission.

Learning Outcomes

Upon successful completion of this course, students will be able to:

- Develop a testable research question.
- Understand how to use a codebook to identify data relevant to that question.
- Process, screen, recode, transform, and clean data.
- Describe data using visualizations and words.
- Select and carry out an appropriate statistical analysis.
- Explain study results and limitations to a non-technical audience.
- Understand and implement a reproducible research pipeline.
- Become a data nerd (Optional, but recommended).

Tentative topic list

- Writing testable research questions
 - Preparing data for analysis
 - Describing distributions of data - in numbers, words and pictures
 - Bivariate statistical inference
 - Multiple regression modeling - linear and logistic
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Required Materials (the “stuff”)

- **Textbook:** Open Intro Statistics. Free PDF
- **Course Notes:** Purchase from Chico Packet Pro for ~\$27. Hours and locations in Hw1.
- **Lecture Videos:** This course uses lecture videos from a program called Passion Driven Statistics. These are essential part of your learning materials. Plan to bring headphones in case you need to watch these during class.
- **Reliable Laptop:** Expect to bring it daily. Contact me if this poses a problem or concern for you.
- **Reliable internet:** connection while on and off campus. ITSS can help you get this setup.
- **Computer Software:** R and R Studio through Posit Cloud. \$5/month. See note below about this cost.
- **Accounts:** (Free)
 - Campus Google account. This uses your (@mail.csuchico.edu) email.
 - Discord for class conversation. Sign up instructions are in HW1.
 - Posit Cloud

I try my absolute best to keep the cost of this course as low as possible, and recognize that this is an yet another additional cost. I wish, more than you know, that our campus would get their crap together and setup a campus owned R Studio server so that this would be free. If this cost is a burden please let me know and we'll find an alternative plan.

But I thought R was free?

Yes. R and R Studio are both free programs. Using the cloud is not a long-term solution. You may have already installed these programs for another class. If you are using R for another class after this, you are highly encouraged to *eventually* install these programs on your computer.

However...

- Not everyone has equal access to computers where this software can be installed
- The cloud provides additional benefits such as
 - shared projects and code within analysis teams
 - installation and setup has been done for you
 - less worry about poor file management systems (e.g. letting everything live in your downloads folder)

These are my reasons for why I would like us all to use the cloud this semester.

Class Format (how do we use that stuff?)

You've heard of a "flipped classroom" before right? Well this is kinda that. This course provides a series of lessons and assignments aimed at preparing students conceptually and technically for the various steps taken in completing their research project. You are expected to make marked progress each week and to come to class prepared with questions and planned next steps. It is important to note that to really learn the material and skills presented in this course, you will need to devote a substantial amount of out of class time working on this class.

Before class

- Watch the Passion Driven Statistics videos where assigned.
- Read through the course packet and fill in the blanks.
- Take the corresponding individual quiz.

During class

- We will briefly review the topic for the day
 - (Monday) Go over any quiz questions that were very low scoring as a group.
 - Then it's your turn to work on your research project with the support of me and peer mentors.
 - Work with others, seek additional support and clarification, and provide and receive help from peers.
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Assignments / graded items

Your final grade will be a weighted sum of 4 content areas as described below. You can check your grade and do a "what if" analysis at anytime in Canvas. I use a standard grade cutoff of 100-90%: A, 89-80%: B, 79-70%: C, 69-60%: D, 0-59%: F

Exams (20%)

- 2 Exams
- An Exam Error Assessment is available for Exam 1.

Research Project (20%)

- You will be working in pairs on a project throughout the term.
- Written assignments throughout the semester are specifically geared towards progressing your analysis project.
- You will present your work as a poster at the end of the semester.
- You will have two opportunities to provide feedback and critique of your research partner to ensure the contributions to work do not become imbalanced.
- I reserve the right to adjust your grade up or down based on your peer evals and my observations of your engagement in the project.

Assignments (20%)

- 10 Written assignments done in R/Quarto and submitted through Canvas.

Quizzes (20%)

- Near weekly Individual + Group quizzes for each module. Administered through Google Forms. Lowest score dropped.

Active Learning (20%)

- Various active or reflective learning activities during/outside of class.
- Peer reviews (PR) of assignments. Because helping others helps you learn.
- Working collaboratively with your classmates during class to solve problems and discuss topics.
- Attending Community Coding and/or Office Hours **2** times. This can be to check in on your grade, ask clarifying questions, or chat about life and graduate school.

Extra Credit Policy There will be opportunities for EC on occasion. Examples include attending seminars, job talks, and actively answering your peer's questions on Discord.

General Guidance on Homework

- Start early and do what you can. If you have any question about the length, or difficulty of my homework assignments and why you should procrastinate at your own peril, just ask any of my prior students.
 - Ask questions! It is essential to your learning.
 - Spell check your work, and for petes sake look at your work before you turn it in and imagine if you had to print it out.
 - No 100 page documents because you accidentally printed out the whole data set.
 - Make sure all code is showing and readable
 - Make sure all text is readable and not sucked into a table or wrapping off the page.
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Class Policies and statements

Everyone is welcome here

It is my intent that students from all diverse backgrounds and perspectives be well-served by this course, that students' learning needs be addressed both in and out of class, and that the diversity that the students bring to this class be viewed as a resource, strength and benefit. It is my intent to present materials and activities that are respectful of diversity: gender identity, sexuality, disability, age, socioeconomic status, ethnicity, race, nationality, religion, and culture. Your suggestions are encouraged and appreciated. Please let me know ways to improve the effectiveness of the course for you personally, or for other students or student groups.

I would like to create a learning environment that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.) To help accomplish this:

- Let me know if you have a name and/or set of pronouns that differ from those that appear in your official Chico records. I make it a point to call on people by name, so please make sure that I know what you want to be called. - I also want to try to pronounce your name as accurately as possible. The more you help and correct me the better I can do to honor your name.
- If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me. I want to be a resource for you. Remember that you can also submit anonymous feedback using the feedback button on the schedule and help pages of the website (which will lead to me making a general announcement to the class, if necessary to address your concerns).
- If you prefer to speak with someone outside of the course, the Office of Diversity and Inclusion is here to assist. Their number is 530-898-4764, and email diversityoffice@csuchico.edu
- I (like many people) am still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please talk to me about it. (Again, anonymous feedback is always an option).

Adapted from Monica Linden at Brown University.

Furthermore, I would like to acknowledge that Chico State stands on lands that were originally occupied by the first people of this area, the Mechoopda. I recognize their distinctive spiritual relationship with this land and the waters that run through campus. I am humbled that our campus resides upon sacred lands that once sustained the Mechoopda people for centuries.

Attendance

Class attendance is expected. Talk to me ahead of time if you need to miss a class for a planned reason. In the event of an unplanned reason, DM me in Discord when you can so that I know you are still alive.

COVID-19

- Like it or not, it's here to stay. We all have different levels of risk we are willing to take ourselves, and different risk management strategies.
- Masks will ALWAYS be welcome and respected in this classroom. No questions.
- Please keep up to date with available booster shots. You can't learn if you're ill.
- If you are just generally feeling unwell, please use a mask. I will always have some on hand.

If you are not feeling well or are experiencing Covid symptoms DM me in Discord we'll make a backup plan so you can rest while protecting your classmates.

Late work

In general, work isn't considered 'Late' until someone is waiting for you. This means there is little grace period for draft assignments. Do you want your reviews back in a timely manner? You should show them the same courtesy and professionalism.

If I have to pester you several times to submit your work, or you submit your work after I'm done grading the rest of the class, not only will it take longer for me to get feedback to you, it will receive a 10% penalty.

Collaboration

Collaboration on assignments is encouraged. People learn better when they have someone else to talk through concepts with.

Collaboration on exams is not allowed.

Peer Reviews

If you consistently do not turn in draft assignments that is complete enough for a review, or consistently provide sub-par reviews to your classmates, I reserve the right to stop assigning you work to review and stop having your work reviewed. You will not have the ability to make up these points.

Use of AI

As an instructor I recognize there are a variety of AI programs available to assist in creating text and writing code. However, I want to stress that, AI programs are not a replacement for human creativity, originality, and critical thinking. Writing (text and code) is a skill that you must nurture over time in order to develop your own individual voice, style, and view.

The use of chat GPT is allowed/encouraged **to help you learn how to code** but all code used must be fully explained in text. We will cover what this means and how to do this when we start data management. How ChatGPT can help you write code

You are responsible for fact checking the accuracy of statements composed by AI language models.

Be up front! When presenting text written by Artificial intelligence (AI) language models, such as ChatGPT, you must include an appropriate citation. <https://apastyle.apa.org/blog/how-to-cite-chatgpt>

This also goes for when you have it write code for you. You need to indicate when and where you used it.

Student Resources

Chico State Basic Needs Project

The **Hungry Wildcat Food Pantry** provides supplemental food, fresh produce, CalFresh application assistance and basic needs referral services for students experiencing food and housing insecurity.

All students are welcomed to visit the Pantry located in the Student Service Center 196, open Monday-Friday

Please visit the Chico State Basic Needs website <http://www.csuchico.edu/basic-needs> for more information.

Wildcat Computing Support

Everyone's journey through education is different and varied. Part of your journey is learning to engage and leverage academic technology. It is extremely important to your success, and at the same time requires patience to learn how it can benefit you. While learning various technologies, they change and adapt quickly. Wildcat Computing Support is curated by students to better support you and enhance your experiences with technology. We provide information to support your success in using academic technology in and out of the classroom.

<https://www.csuchico.edu/wcs/>

Americans with Disabilities Act

If you need course adaptations or accommodations because of a disability or chronic illness, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Please also contact Accessibility Resource Center (ARC) as they are the designated department responsible for approving and coordinating reasonable accommodations and services for students with disabilities. ARC will help you understand your rights and responsibilities under the Americans with Disabilities Act and provide you further assistance with requesting and arranging accommodations. We try our best to ensure equal access to materials in accessible formats. Reach out to your me if there is some aspect of the course materials that are inaccessible to you.

Accessibility Resource Center 530-898-5959 Student Services Center 170 arcdept@csuchico.edu
<http://www.csuchico.edu/arc>

University Policies

Adding and Dropping the course

You are responsible for understanding the policies and procedures about add/drops, academic renewal, etc., found in the CSU Chico University Catalog. You should be aware of the new deadlines and penalties for adding and dropping classes.

Confidentiality and Mandatory Reporting

As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. I also have a mandatory reporting responsibility related to my role as a your instructor. I am required to share information regarding sexual misconduct with the University. Students may speak to someone confidentially by contacting the Counseling and Wellness Center (898-6345) or Safe Place (898-3030). Information on campus reporting obligations and other Title IX related resources are available here: www.csuchico.edu/title-ix.

Academic Integrity

Academic integrity is defined as “a commitment, even in the face of adversity, to five fundamental values: honesty, trust, fairness, respect, and responsibility”. From these values flow principles of behavior that enable academic communities to translate ideals to action. Academic integrity is expected and required. No forms of cheating or plagiarism will be tolerated. Please see your student handbook at <https://www.csuchico.edu/scrr/integrity.shtml> if you have questions about the meaning of these terms or the consequences of violating academic integrity.

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