

Syllabus MATH 615 - Fall 22

July 25, 2022

Course Information

This course provides a hands-on introduction to using data to rigorously answer research questions. Students practice cleaning and manipulating data, creating data visualizations, and conducting introductory level statistical analysis using real-world data sets that are relevant to their field. Analysis topics include single and two-sample inference, analysis of variance, multiple regression, analysis of co-variance, experimental design, repeated measures, nonparametric procedures, and categorical data analysis. Reproducible research is strongly emphasized through the use of statistical computing software (e.g. SPSS, Stata, SAS, R, Python). Recommended for all majors that use data for research. 3 hours discussion.

Instructor

- **Name & pronouns** Dr. Robin Donatello (Dr. D, she/her)
- **Office Location:** Holt 202
- **E-mail:** rdonatello@csuchico.edu
- **Best Contact Method:** Discord
- **Student Office Hours** Holt 202: MW 3-4pm and during community coding

Logistics

- **Meeting Pattern:** MW 4-5:30, Holt 291
- **Class Website** <https://norcalbiostat.github.io/MATH615/>
- **Prerequisites:** Basic computer literacy. Recent statistics course such as Math 105, MATH 315, or MATH 350.
- **Mode of Instruction:** In Person. *The mode of instruction for this course is classified as a “In Person”; this means all students are expected to attend class in person each session. At this time there is no specific plan for habitual synchronous hybrid zoom session.*

What are we going to learn? (Course Learning Outcomes)

By the end of the course, students will be able to...

- Import data into a statistical analysis software program in a format that is ready to analyze.
- Process, screen, recode, transform, and clean data.
- Describe distributions and patterns of 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).
-

Required materials and accounts

Homework 0 provides a checklist for you to make sure you have everything.

- **Class website:** <https://norcalbiostat.github.io/MATH615/>
 - **Textbook (Required):** *Practical Multivariate Analysis, 6th ed* by Afifi, May, Donatello, Clark. [Link]
 - **Textbook (Optional):** Open Intro Statistics 3rd edition. If you need a refresher on your basic statistics. Free PDF available at https://www.openintro.org/stat/textbook.php?stat_book=os
 - **Laptop & Internet:** Expect to bring your laptop to class every day. Contact me if this poses a problem or concern for you. Refer to ITSS for help with internet. * **Data Analysis software:** R recommended but not required. Common statistical programs include SAS, STATA, Python and SPSS.
 - **Blackboard Learn (BBL):** Used for recording grades via grading rubric only.
 - **Google Drive:** Through your campus email.
 - **Discord:** <https://discord.gg/tzcB4MJadW>: A free discussion platform with a lot of collaborative functionality. The defacto method of communication for the class. Download either the phone app or the desktop app (I use both). This is mandatory. Do not rely on remembering to log in via the web browser. You will miss important notifications.
 - **Hack MD:** <https://hackmd.io/>. Interactive collaborative notes. No account needed to view, but account needed for editing (which you will be doing). I recommend you sign up with your campus email (@csuchico.edu)
 - **Poll Everywhere:** I will add you to my class using your campus email.
-

How is learning measured? (What are you graded on?)

- Your final grade will be a straight sum of points earned and will be displayed as a running total in Blackboard Learn.
- The approximate contributions per category are:
 - Participation 20%: Peer reviews
 - Written Assignments 30%: Submitted in Google Drive, graded using a rubric in Blackboard Learn.
 - Quizzes: 10%
 - Take home Final exam: 15%
 - Project related assignments: 30%
- I use a standard grade cutoff of 100-90%: A, 89-80%: B, 79-70%: C, 69-60%. Plusses and minuses will be as displayed on Blackboard Learn.

Schedule of Topics

The general ordering of topics is:

- Data Collection and recording
- Preparing data for analysis
- Data Visualization
- Foundations for Inference: probability distributions, point and interval estimation, Hypothesis Testing

- Inference comparing multiple samples (t-tests, ANOVA, χ^2 tests)
 - Study design, confounding, causation
 - Linear regression analysis (Simple and Multiple, Categorical predictors, variable selection)
 - Logistic regression analysis
 - Model building techniques and comparing model fit
 - Special analysis topics - how to identify when linear regression models won't work.
-

How do you get help?

- See the help page on the course website.
-

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, PM me in Discord when you can so that I know you are still alive.

- If you are not feeling well or are experiencing Covid symptoms **DO NOT COME TO CLASS**. DM me in Discord we'll make a backup plan.
-

Campus Resources

This campus website contains a lot of information and resources specific to our COVID-19 situation. Specifically this page contains links to resources to help you keep learning, and engaging, and lots of links to student support services such as emergency grants, basic need such as healthy food and housing, tutoring, health center, financial aid and a lot more.

You can also check out the resources on the Help page.

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

COVID-19

The CSU requires students to be fully vaccinated and boosted against COVID-19 by February 28th, 2022, unless you have an approved exemption. While Chico State has relaxed its stance on mask mandates, for your and my health and safety I *request* that everyone wear an appropriate face mask covering the nose and mouth while in class.

Please note that dishonesty relating to the vaccination policy and/or your failure to comply with any other COVID-19 related safety policy or mandate may result in disciplinary action against you through the office of Student Conduct, Rights and Responsibilities, which can include suspension or expulsion from the California State University system.

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/srr/integrity.shtml> if you have questions about the meaning of these terms or the consequences of violating academic integrity.