

Math 130: Introduction to R - Fall 20

[Download this syllabus as a PDF]

Course Description

This course is designed as a primer to get the complete novice up and running with the basic knowledge of how to use the statistical programming language R in an environment that emphasizes reproducible research and literate programming for data analysis. The target audience is anyone who wants to do their own data analysis. The course will cumulate with an peer-evaluated exploratory data analysis on either a pre-specified data set or your data set of choice.

Logistics

- **Course Website:** <https://norcalbiostat.github.io/MATH130/>
- **Prerequisites:** Basic computer literacy
- **Workshop style:** This workshop style class runs for 5 weeks only. See expectations for time commitment during these 5 weeks below.

	Section 01	Section 02
Meeting Days	8/24/20 - 9/25/20	Not Offered
Meeting Times	MWF 9:00-9:50	
Meeting Location	Online	
Instructor	Nicholas Lytal	
Office Location	N/A	
Office Phone	N/A	
E-mail	nyltal@csuchico.edu	

Additional Support

- The Data Science Initiative offers year-round training workshops and seminars on data-science related topics including R. See <http://datascience.csuchico.edu> for more information and a schedule of events.
- Community Coding: Times TBD. [flyer]
 - Students, staff, faculty, and the public are invited to join our Community Coding sessions. Bring your computer, coding projects, and your questions to this open working environment.

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:

- If you have a name and/or set of pronouns that differ from those that appear in your official Chico records, please let me know!
- 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 (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 we are meeting on the traditional lands of the Mechoopda people. Without them, we would not have access to this campus or our education.

Learning Outcomes

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

- Import data into R from external files such as text files and spreadsheets.
- Calculate summary statistics.
- Create new variables using different data types.
- Perform data management techniques such as subsetting, grouping, summarizing.
- Create informative data visualizations and tables.
- Create a reproducible research document.
- Conduct an exploratory data analysis in a reproducible manner.

Required Materials

- A reliable laptop, chromebook, tablet that can use a browser to access the internet.
- Reliable internet connection while on and off campus.

Software If you have your own PC/Mac/*nix computer, you are advised to install R and R Studio on your personal computer. That way you can take what you've learned in this class and

apply it to other classes. Both are free. Walk through installation instructions can be found here: <https://norcalbiostat.netlify.com/post/software-overview/>

- R version 4.0.0 or later. Download from <https://cran.r-project.org/>
- R Studio version 1.39 or later. Download the desktop version from <https://www.rstudio.com/products/rstudio/download/#download>

If you are unable to obtain a laptop that has the ability to install program (i.e. a iPad or Chromebook) then a cloud version of R and R Studio is available to you at no charge. Learn more and make an account here: <https://rstudio.cloud/>.

This is pending

Time Commitment

For all CSU degree programs and courses bearing academic credit, the “credit hour” is defined as . . . not less than one hour of classroom or direct faculty instruction and a minimum of two hours of out-of-class student work each week for approximately fifteen weeks for one semester or trimester hour of credit.

This adds up to 15 hours in class, and 30 hours outside of class during these 5 weeks. That’s 3 hours in class, and 10 hours of homework per week. If you are new to programming and unfamiliar with computers, you may end up taking the entire time. Be sure to schedule sufficient time during week 5 to work on the project.

You will get out of this class what you put into it. Recall this is just a co-curricular or supplemental basic introductory class. You will not learn everything there is to know about R, nor likely not feel proficient by the time you are done. But you will be solidly on the path where you can continue to learn and improve.

Grading

Credit / No Credit. There are 100 points available in this course. You must earn 70 points to receive credit for the course.

- Daily attendance: (10 pts)
- Assignments:
 - HW 1 (15 pts)
 - HW 2 (15 pts)
 - HW 3 (15 pts)
 - HW 4 (15 pts)
- Project:
 - Exploratory Data Analysis (25 pts)
 - Peer Review (5 pts)

Schedule of Topics

The general outline of topics is listed below. A detailed most up to date schedule can be found on the course website.

- Week 1
 - Intro to the R language and the R Studio Integrated Development Environment
 - Conducting reproducible research with R Markdown
 - Week 2
 - How to use functions to get things done
 - Introduction to data processing
 - Week 3
 - Univariate Data Visualization using base, and `ggplot2` graphics
 - Streamlined Data processing and Aggregation with `dplyr`
 - Week 4
 - Bivariate and Multivariate Data Visualization using `ggplot2`
 - Importing data into R from external files
 - Week 5: Exploratory Data Analysis (individual project)
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University Policies and Campus Resources

Adding and Dropping the course

This course only runs for a few weeks and all materials are available on the course website. It will be difficult to get caught up if you add the class after the first week. The last day to add or drop classes without special permission by the instructor is 9/4/20. No adds or drops are allowed after 9/18/20 without a serious and compelling reason approved by the instructor, department chair, and college dean.

Academic Integrity

Students are expected to be familiar with the University's Academic Integrity Policy. Your own commitment to learning, as evidenced by your enrollment at California State University, Chico, and the University's Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Student Judicial Affairs. The policy on academic integrity and other resources related to student conduct can be found on the Student Judicial Affairs web site at <http://www.csuchico.edu/sjd/integrity.shtml>.

IT Support Services

During the COVID-19 pandemic, the physical office for ITSS is closed until further notice. However, most services are still available via phone, online, or in a Zoom Lobby during business hours. See the ITSS webpage for further details.

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.

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

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, 11am-4pm or call 530-898-4098.

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

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.