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Materials for Math 315-Fa 19

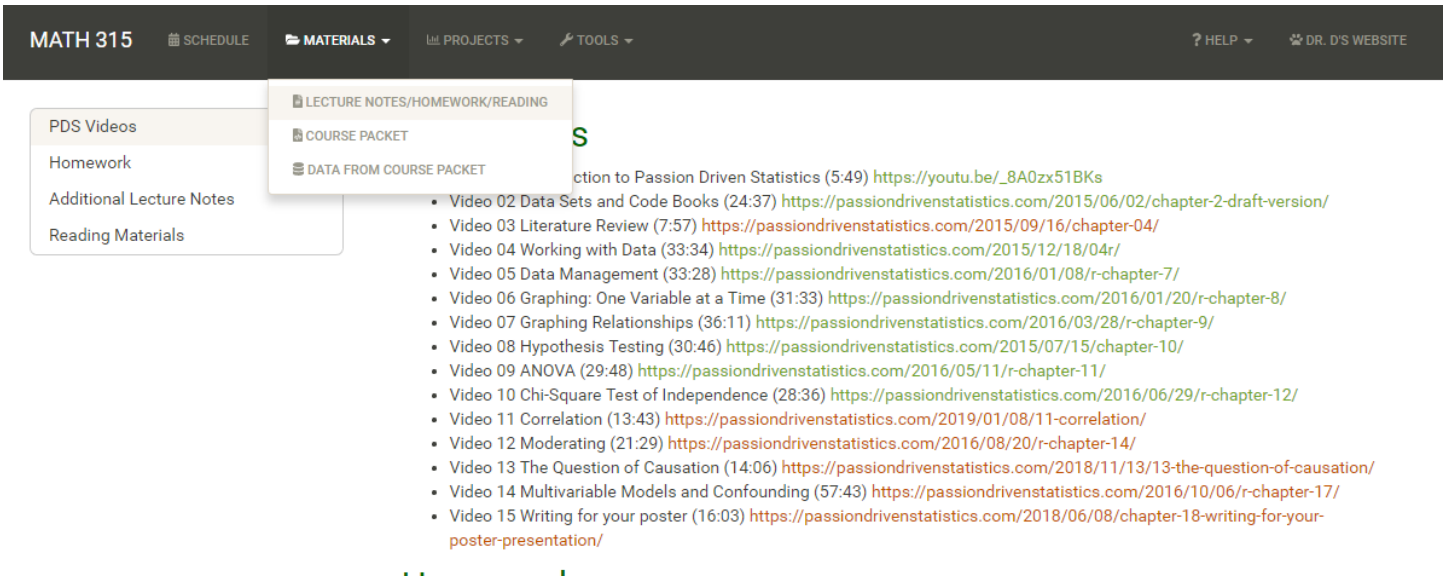
Video Version:

Learning happens before class.

Through videos, the course packet, and the textbook.

Lecture Video

These videos are the primary source of content for this class. They must be watched PRIOR to class. All links are found on the course website. Under MATERIALS → LECTURE NOTES / HOMEWORK / READING



The schedule (shown later) tells you which video corresponds with what section (so does the video titles)

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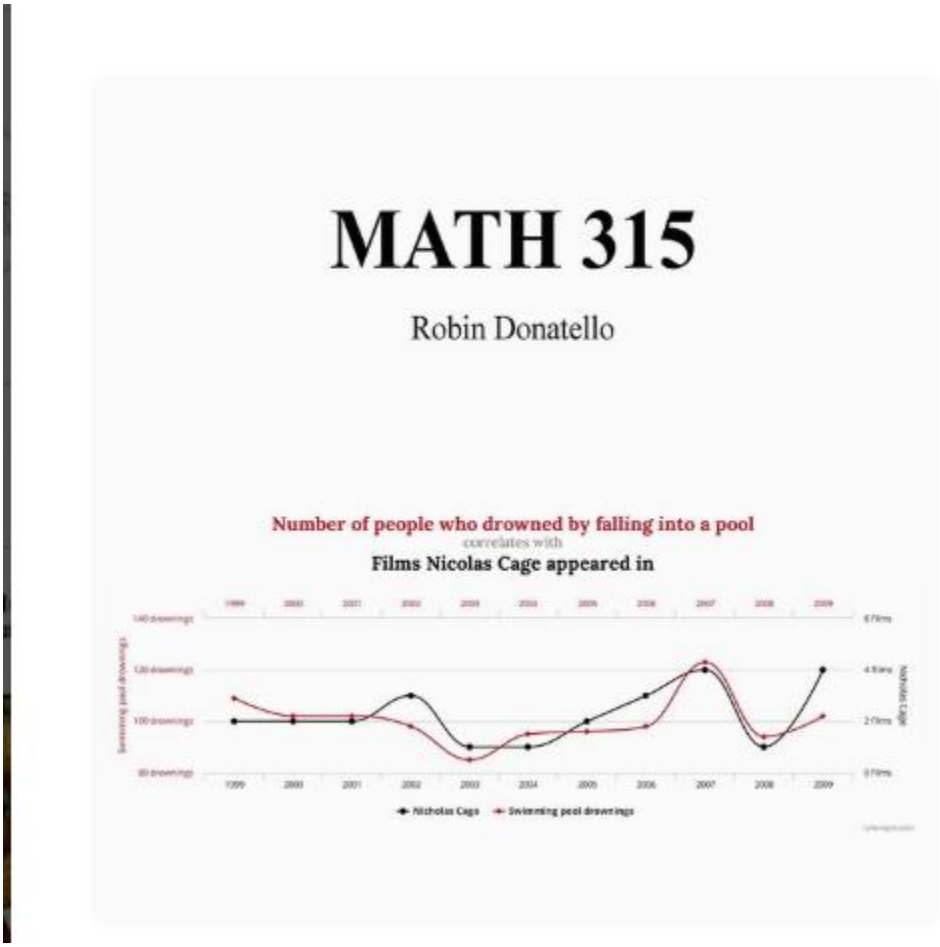
Course packet

Purchase B&W copy at Chico Packet Pro. ($24+tax) - http://www.chicopacketpro.com/

A color copy PDF copy will be available from the course website that you can access, but it does not replace the hard copy. You must have a hard copy and bring it with you every day.

We will be writing in these throughout the semester. You can have this on exam. Prepare answers to examples prior to the discussion in class.



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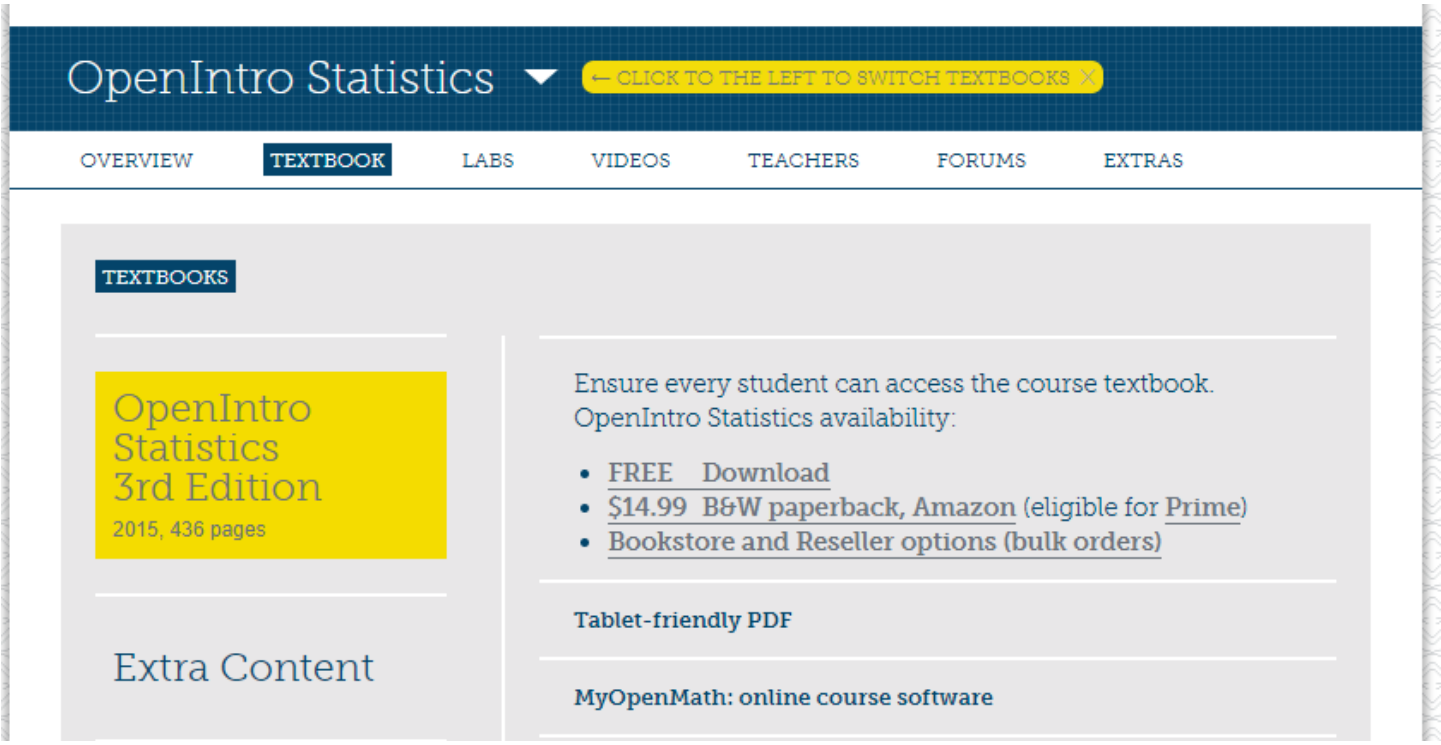
Backup Textbook

https://www.openintro.org/stat/textbook.php?stat_book=os

Free PDF, or $15 for a really nice soft cover version. Excellent resource for more details and examples if you need more info on a particular topic. The red “Reading” Boxes in the course packet tell you which sections of this textbook correspond to the topic in the packet.



I just saw today that the 4th edition is out. Cool! But my course packet references sections in the 3rd edition. I can send you a copy of the PDF for the 3rd edition if you can’t find it.

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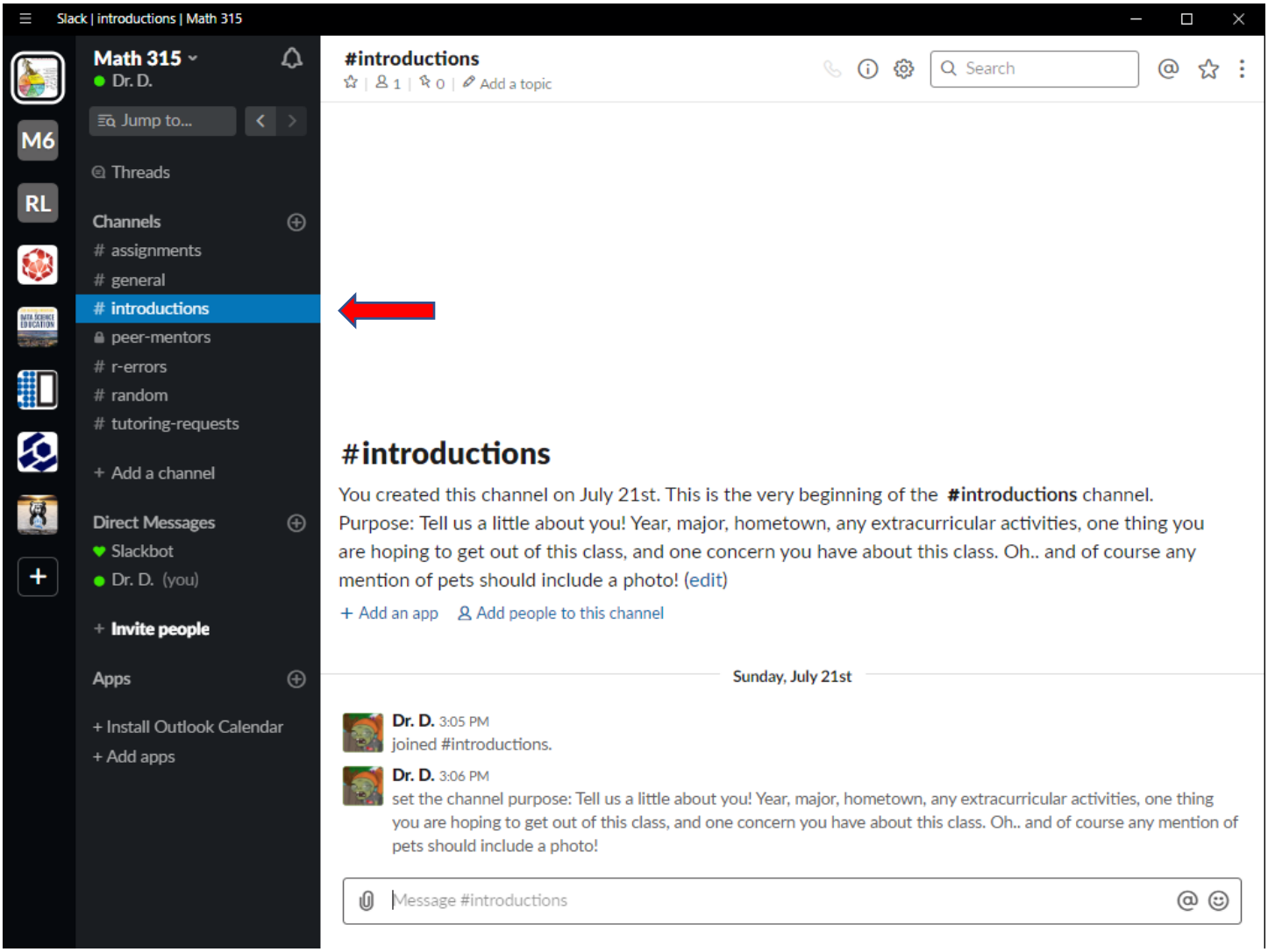
Asynchronous discussion happens on Slack.

Use this link to join the workspace: https://math315-f19.slack.com/signup
You must use your @mail.csuchico.edu email address to sign up.

This is for all outside of class communication. **I do not answer questions about coding over email.** We have an **#r-errors** channel specifically for debugging.

Part of Homework 01 is to post an introduction in the #introductions channel.



Once you join the workspace you can access the *web browser version* from the TOOLS menu on the course webpage (shown later).

But you must either download the desktop application, OR the phone application. Do not rely on remembering to log into the web version every day. You will miss important information and updates. This is where I send class-wide information and reminders.

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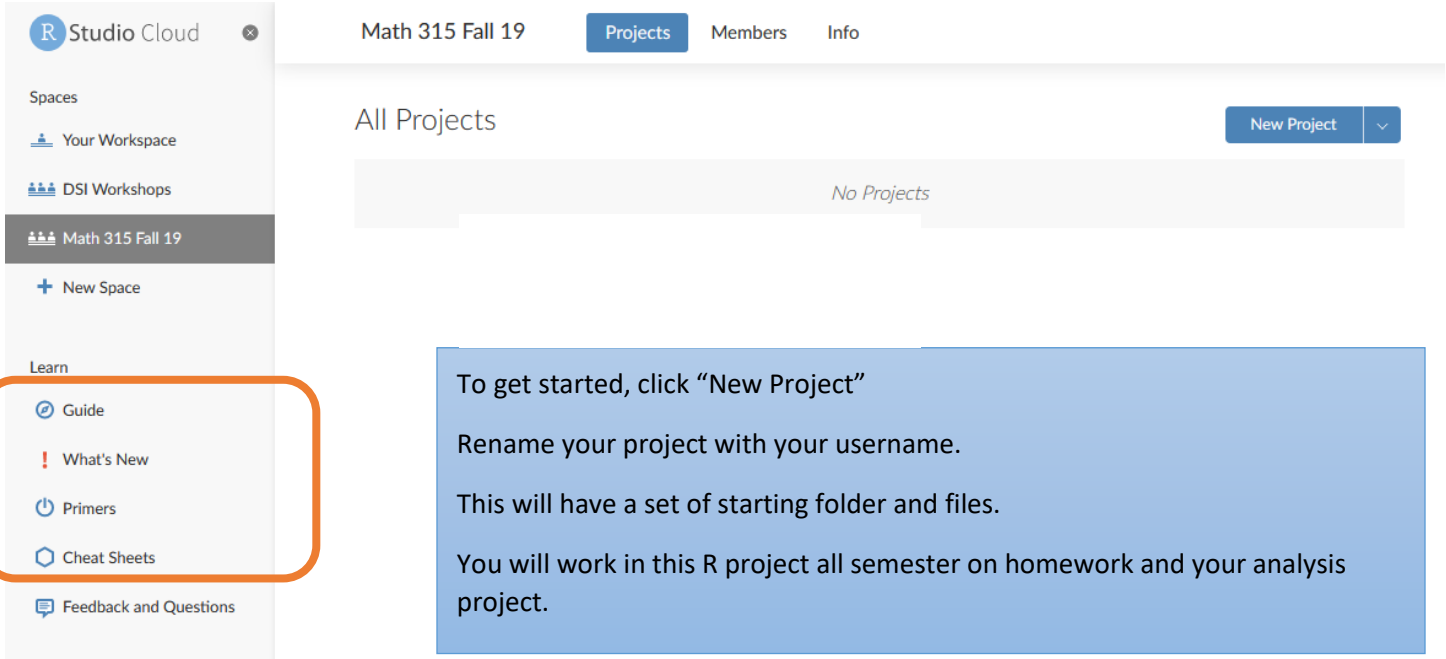
Statistical Software Analysis Program R – with R Studio Interface

Option 1: R Studio Cloud

A preloaded, pre setup R & R Studio instance in the cloud! All ready and prepared just for you.

The disadvantage of this option is that this workspace is only available to you for the semester. R Studio cloud is in alpha stage and so *currently* free for all, but I have no idea when (or if) they will change their policy. You are also limited in the size of data sets you can analyze in the cloud.

Join the Math 315 Fall 19 workspace by using this link:
https://rstudio.cloud/spaces/21783/join?access_code=HuGvuAuNnijUPNs74gIsqDFDj4IOG0W7k2COL3vd
Once you join the workspace you can access from the TOOLS menu on the course webpage (shown later).



To get started, click "New Project"

Rename your project with your username.

This will have a set of starting folder and files.

You will work in this R project all semester on homework and your analysis project.

Check out these resources!

Primers == walk through tutorials on how to do various things like graphing in R.

Cheat sheets == when you just can't quite remember what that one function to do that thing was.

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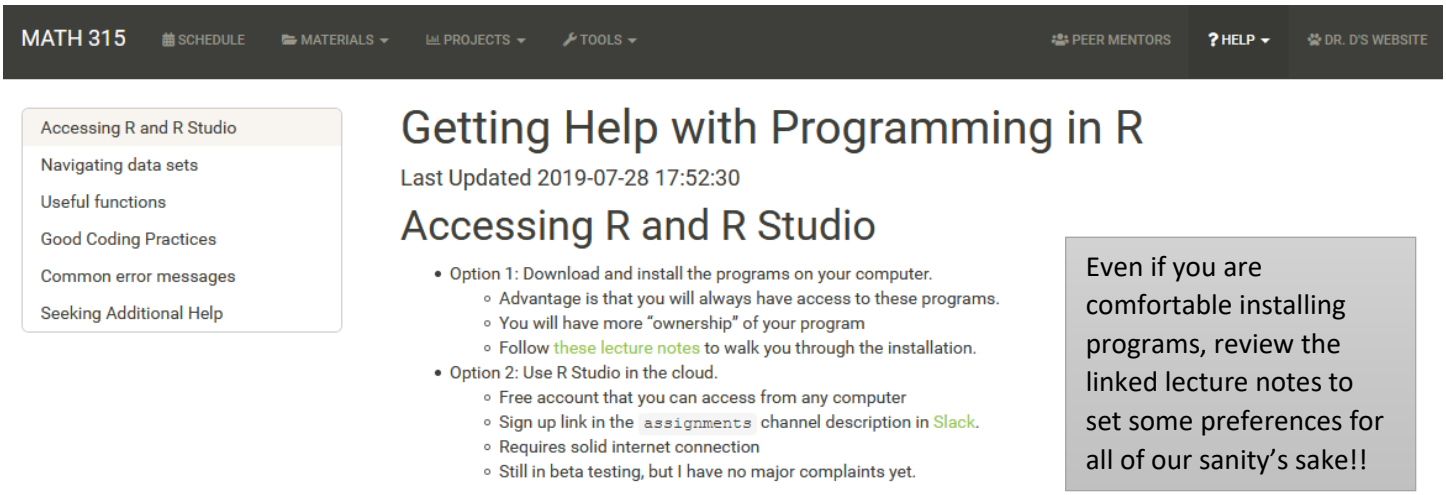
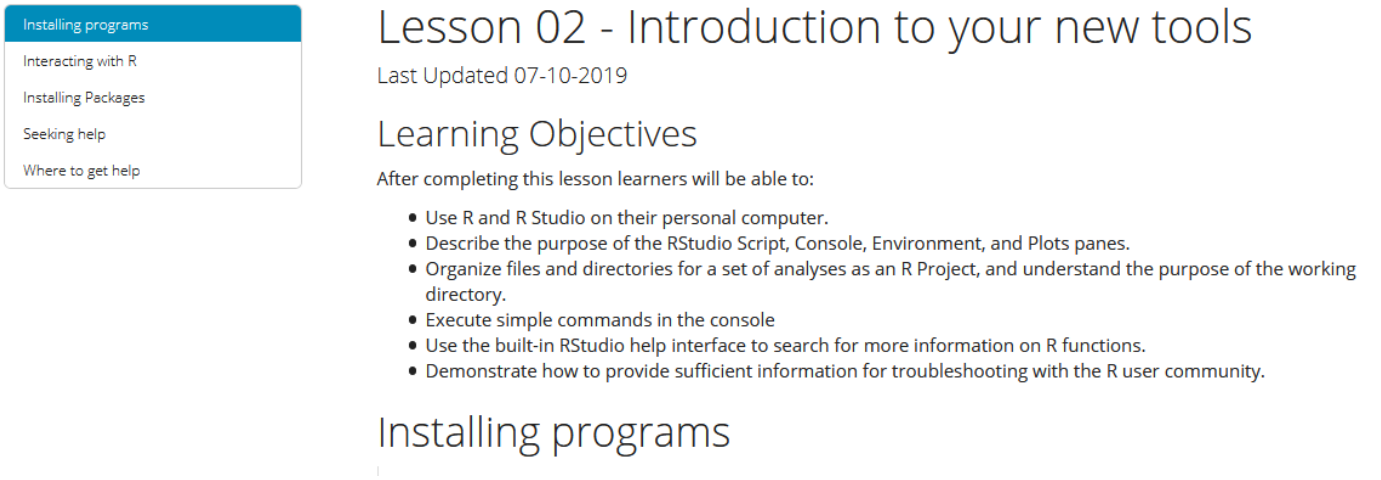
Option 2: Install all necessary programs and packages on your laptop

This can be advantageous if you have a spotty internet connection, plan on taking Math 130, or plan on using R for other classes. This option provides you the most flexibility and ownership of your program.

Instructions can be found on the HELP→ R Programming page of the course website.



You will be following a lesson 02 in Math 130



If you need additional help getting things installed or checking your installation please come to Community Coding (shown later) or office hours.

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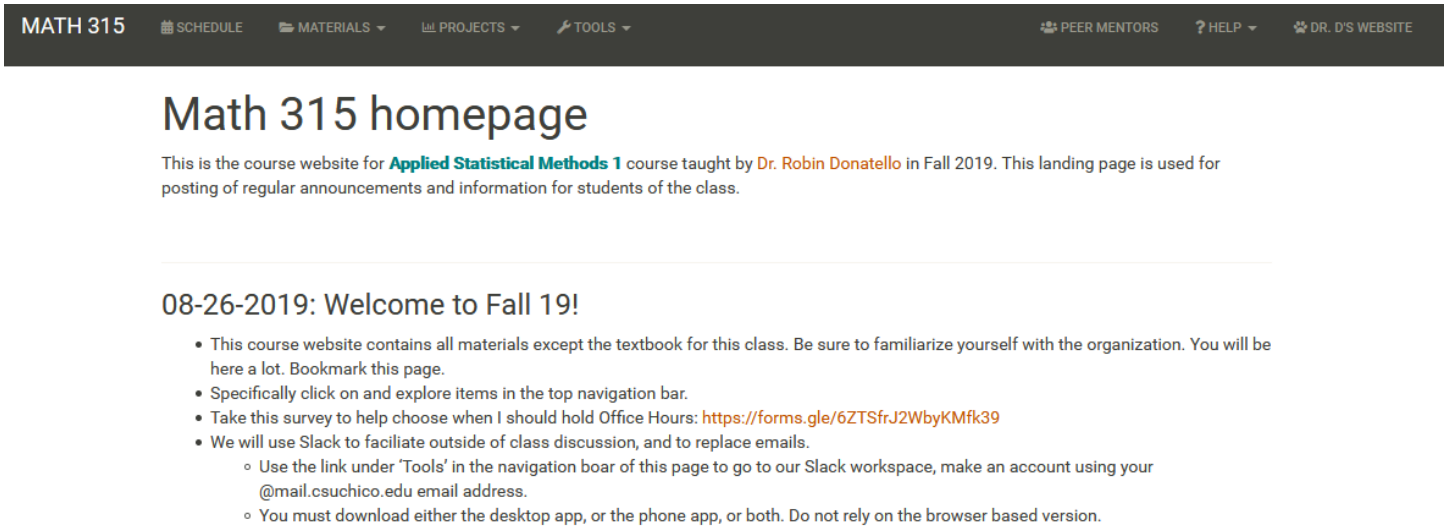
Bringing all materials into one place - The Course Website (Bookmark this)

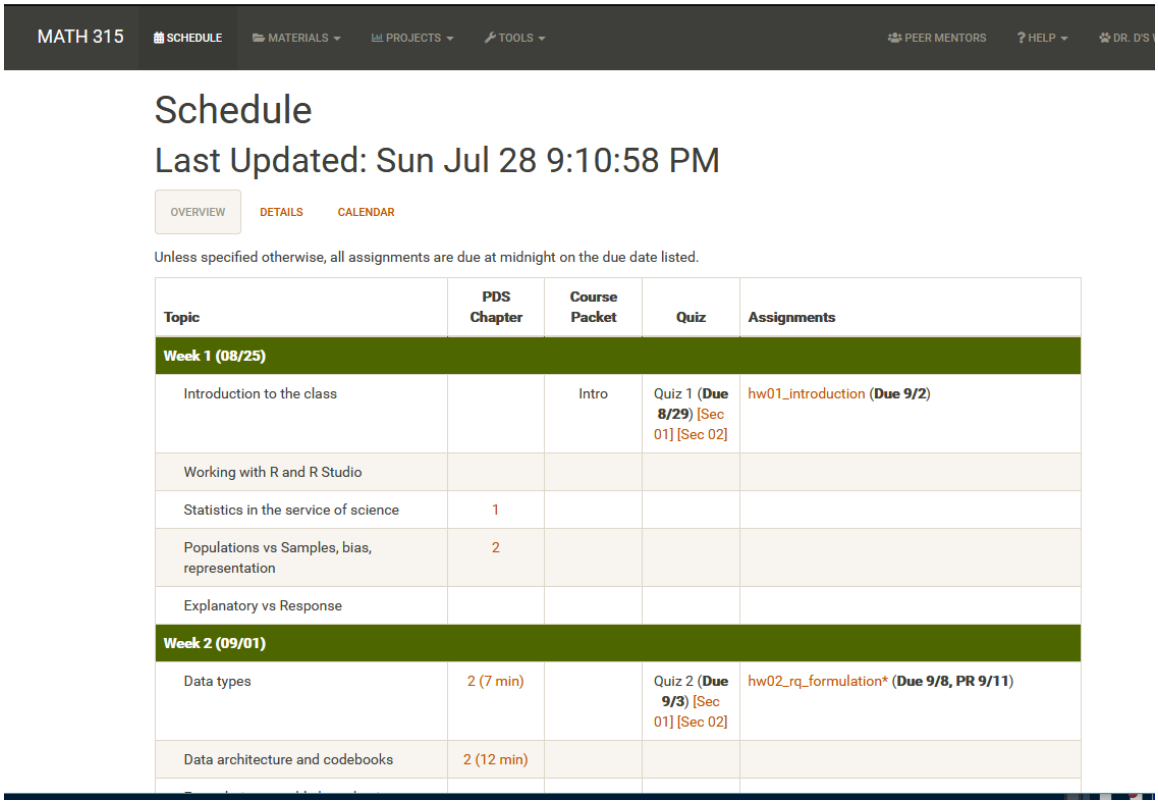
https://norcalbiostat.github.io/MATH315/

The landing page shows announcements for the week.



Schedule – Overview tab

The schedule gives you a week/topic level overview of what we'll be covering that week. It has links to the corresponding video, course packet section, quiz links for each section, links to assignments, and due dates.



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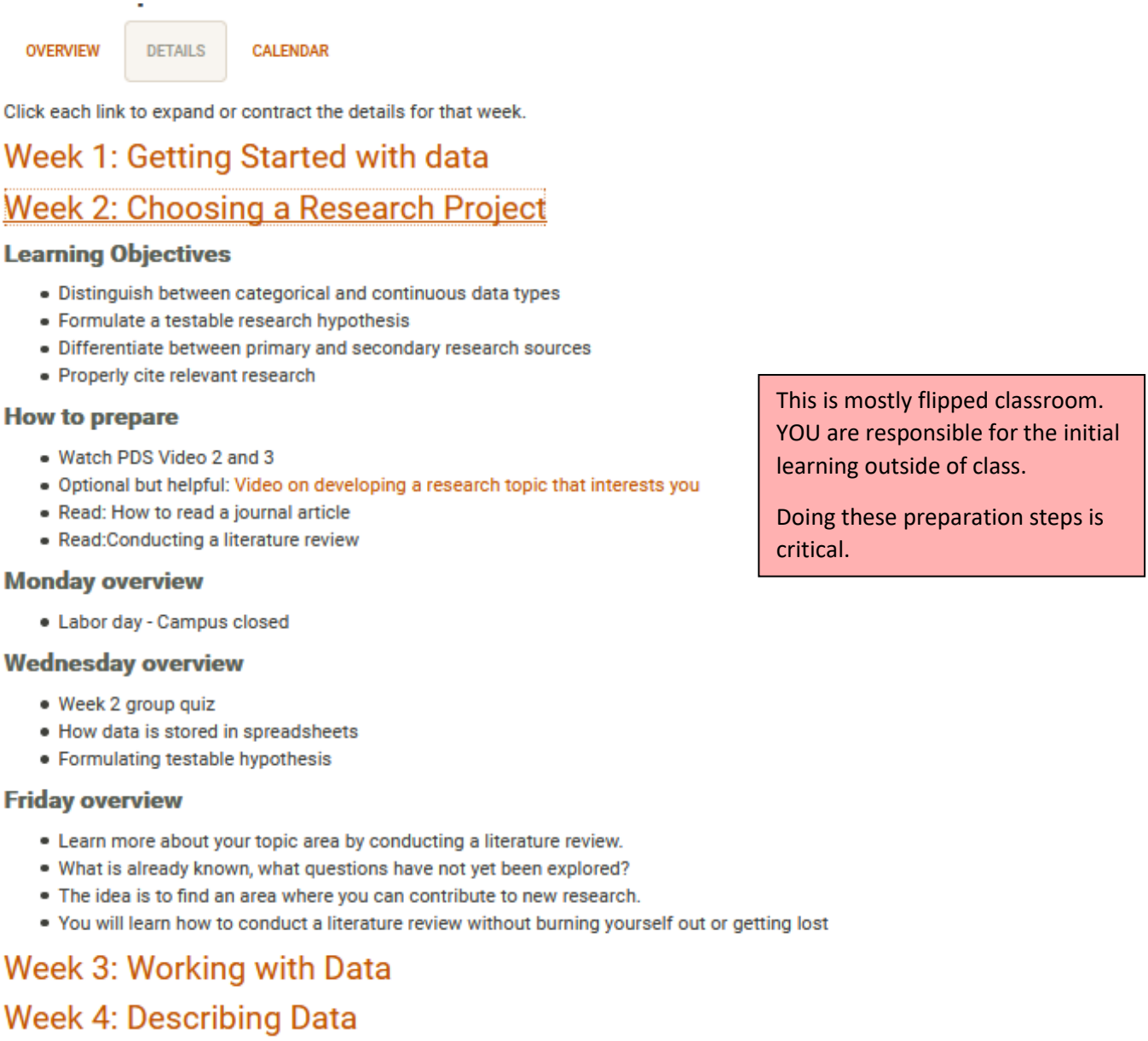
Schedule - Detailed Weekly View

This view gives you a detailed list of weekly learning objectives, how to prepare, and some notes on what we'll be covering each day.



OVERVIEW | DETAILS | CALENDAR

Click each link to expand or contract the details for that week.

Week 1: Getting Started with data

Week 2: Choosing a Research Project

Learning Objectives

- Distinguish between categorical and continuous data types
- Formulate a testable research hypothesis
- Differentiate between primary and secondary research sources
- Properly cite relevant research

How to prepare

- Watch PDS Video 2 and 3
- Optional but helpful: Video on developing a research topic that interests you
- Read: How to read a journal article
- Read:Conducting a literature review

This is mostly flipped classroom. YOU are responsible for the initial learning outside of class.

Doing these preparation steps is critical.

Monday overview

- Labor day - Campus closed

Wednesday overview

- Week 2 group quiz
- How data is stored in spreadsheets
- Formulating testable hypothesis

Friday overview

- Learn more about your topic area by conducting a literature review.
- What is already known, what questions have not yet been explored?
- The idea is to find an area where you can contribute to new research.
- You will learn how to conduct a literature review without burning yourself out or getting lost

Week 3: Working with Data

Week 4: Describing Data

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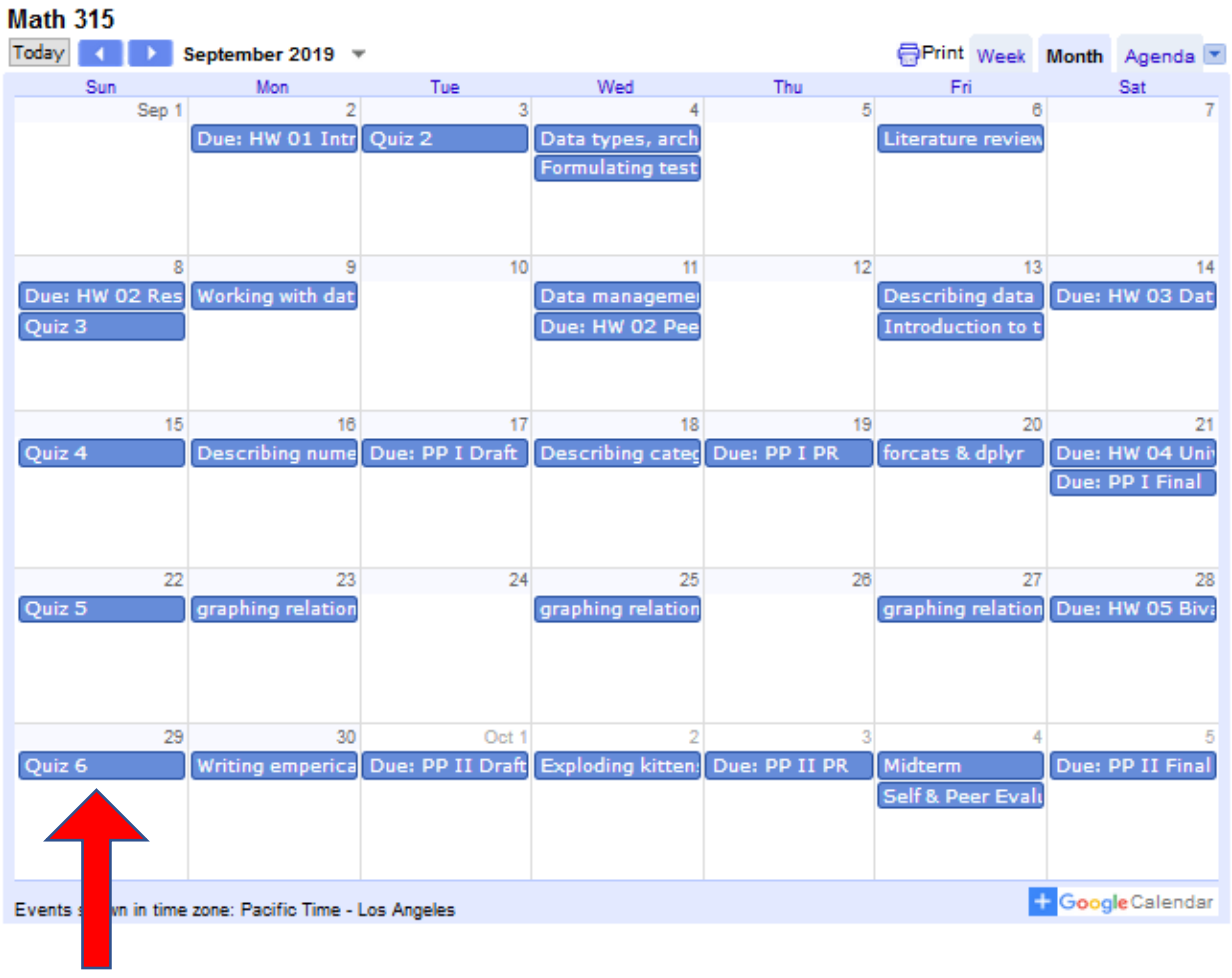
Schedule – Calendar

This view shows you a Google Calendar view of topics and due dates. The dates on this calendar should be consistent with the weekly schedule overview. If there are discrepancies, please let me know.

OVERVIEW DETAILS CALENDAR

For those of you that like the calendar view of your schedule. Due to schedule adjustments during the semester these dates may not match exactly with the schedule. In those cases please bring any descrepencies to my attention via Slack.



These Sunday quizzes are on material FOR THAT UPCOMING WEEK.

If you don't follow the preparation steps (read notes, watch videos) you won't do well on these exams.

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Materials

MATERIALS

This page contains links to all the lecture videos, homework files, additional lecture notes as needed, and readings.

Homework

hw01_orientation	html	pdf	
hw01_orientation_template			Rmd
hw02_personal_codebook	html	pdf	
hw03_lit_review	html	pdf	
hw04_data_management	html	pdf	
hw05_univ_graphing_template			Rmd
hw06_biv_graphing_template			Rmd
hw08_bivariate_inference_template			Rmd
hw09_moderation_template			Rmd
hw10_regression_template			Rmd

Homework instructions are available as HTML or PDF.

The link to the homework found on the overall schedule page links to the same HTML page as shown here.

For Homework that is to be completed in R Markdown I have provided homework template files for you to use.

If you are using R Studio Cloud, the first HW01 template is pre-loaded for you.

If you will be using your own laptop, you will have to download these files and put them into your MATH315 folder.

Reading Materials

- Adventures in R (Tippmann 2015)
- Advice from prior Math 315 students
- Analyzing exam errors
- Example_Research_Plan_from_Add_Health
- How to Read a Journal Article
- Importance of sharing code (Nature 2014)
- Journals unite for reproducibility (Nature 2014)
- Learning Your First Job (Leamnson 2002)
- MAI and academic achievement in college students (Young, Fry, 2008)
- Metacognition Awareness Inventory
- RAD_course_notes_F19
- sample_exam_1
- Self Regulated Learning Questions (Neilson)
- Thou Shalt Be Reproducible in Psychology (Mair 2016)
- Why you should care about reproducible research (Blog post Revolution R 2011)

DO NOT RUN CODE FILES FROM YOUR BROWSER.

For sanity's sake you must put them into your class folder before you open them in R studio.

Long read, but informative for your mindset going into this class. Themes emerge that you should pay attention to and be mindful about if you want to get an "A" grade in here.

These are part of Homework 1

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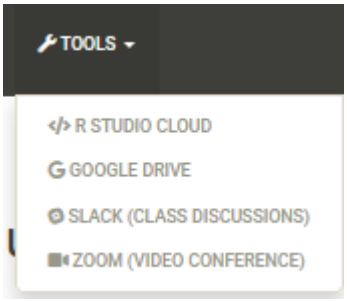
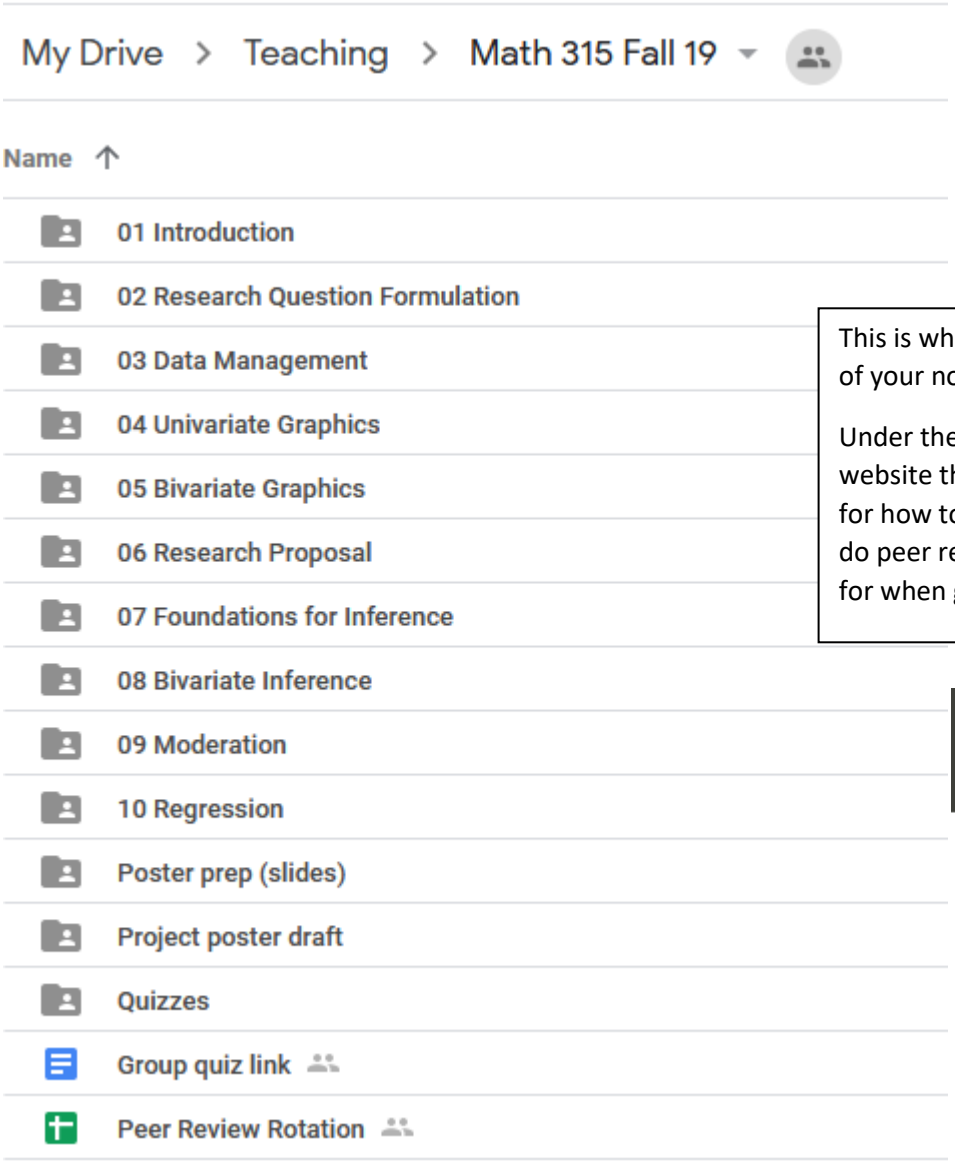
How to turn in homework - Google Drive

Open to only those in our class, and available through the TOOLS folder on the course website

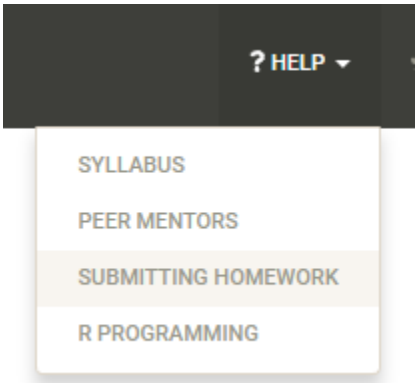
Specifically, your campus email will be provided access to this folder during week 1.





This is where you will be turning in all of your non-quiz homework.

Under the HELP tab on the course website there are more instructions for how to submit homework, how to do peer review, and what I'm looking for when grading.



We'll talk about this **Peer Review Rotation Spreadsheet** as Homework 02 gets closer to being due.

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Weekly Quizzes

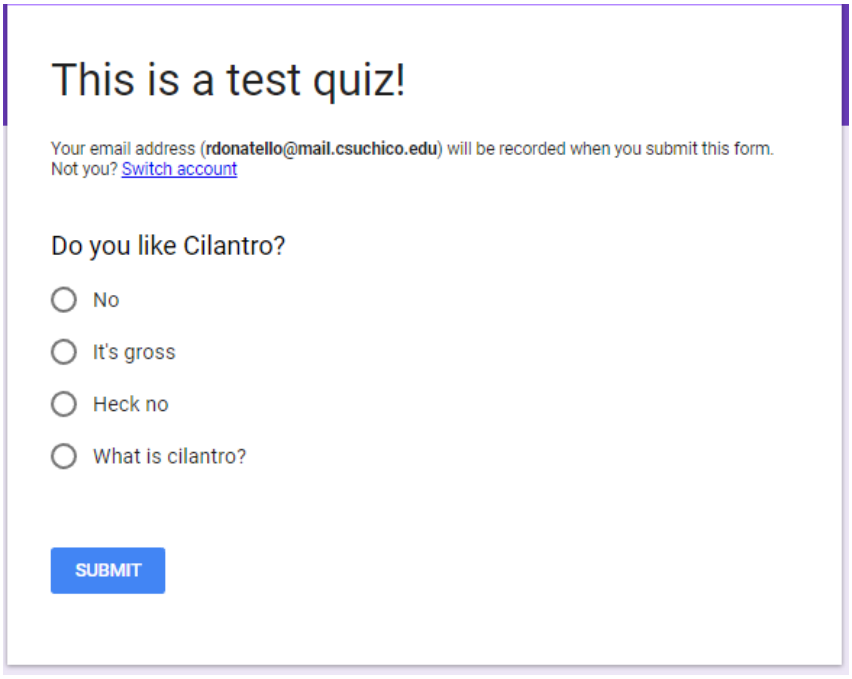
Preparation quizzes are done on the night *prior* to the topic being discussed in class. This being a flipped class and all, you are responsible for watching the video and learning the initial content outside of class. This quiz is a "check" to see what you have learned so far. I will check the scores that next morning and we'll fill in some gaps during the next class period. You'll have another chance to do a Group quiz at that point to re-earn a few points back.

When you're ready to take the quiz, click on the link in the class schedule for your class meeting time.

Week 2 (09/01)				
Data types	2 (7 min)		Quiz 2 (**Due 9/3**) [Sec 01] [Sec 02]	hw02_rq_formulation* (**Due 9/8, PR 9/11**)
Data architecture and codebooks	2 (12 min)			

You will be required to login to your Chico State google account before taking the quiz (this is so you get credit!)

These quizzes are administered through Google Forms and will look something like this:



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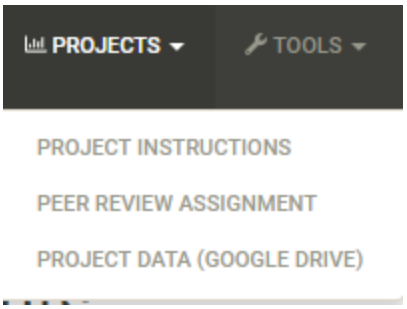
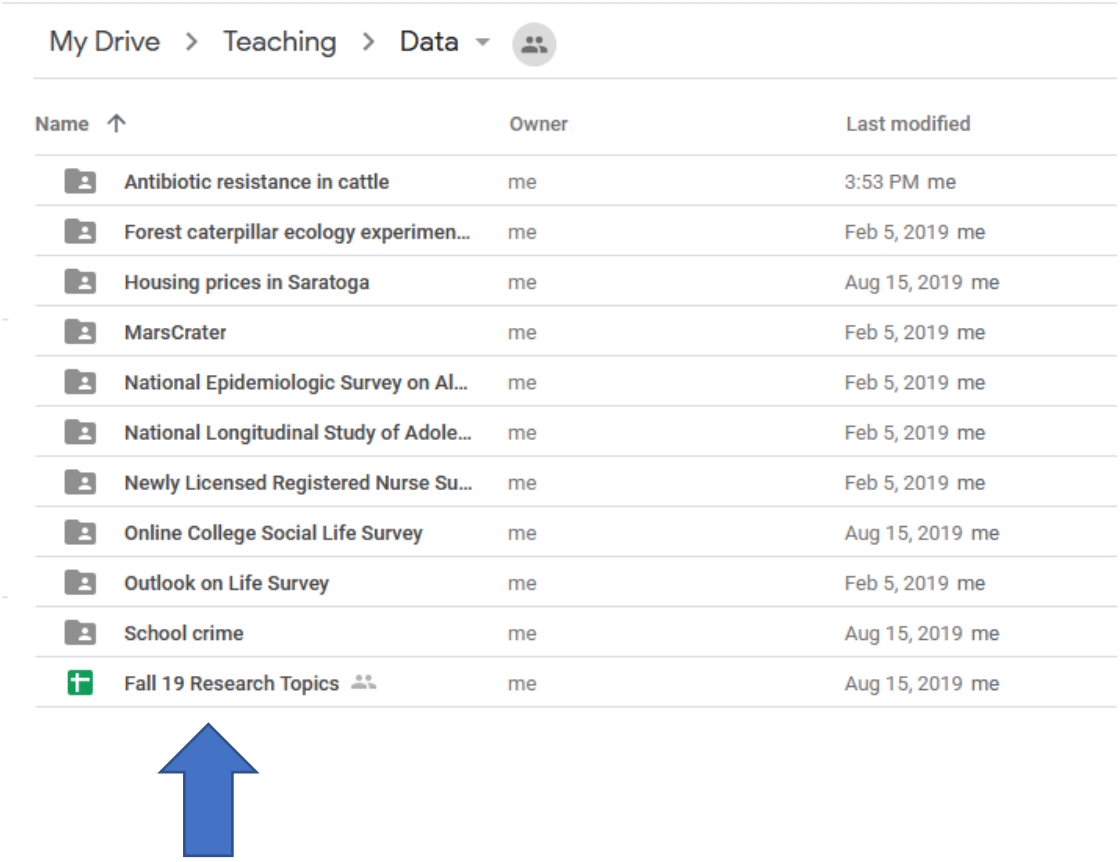
Research Data

You will be conducting original research on topics that interest you. You will use data that is already collected but be warned – it is not pre-cleaned up data! That is part of the journey in this class is how to be the boss of your data!

Under the Projects tab on the course website you'll find a link to the Project Data

This takes you to a Google Drive where you will find **ten** data sets for you to choose from.





Be sure to read the documentation in each folder to get to learn a little about the data sets you have available.

You will be paired up with individuals who are interested in the same research topic as you to do the project

Sign up for the data set you want to work on in this spreadsheet. Spots are limited for each data set.

You do not have to have a clearly defined research question to sign up for a data set, but you have to have something that indicates you have looked at the data & given it some thought.

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Getting Help

- List of resources can be found at https://norcalbiostat.github.io/MATH315/help_R.html
- Ask in the #assignment Slack channel
- Ask for tutoring in the #tutoring-request channel
- Visit the Math tutoring lab on the 4th floor
- Come to office hours. TBD – Help me decide! https://forms.gle/6ZTSfrJ2WbyKMfk39
- Go to the **Contact** page of my personal website and book an appointment with me http://www.norcalbiostat.com/

Community Coding!

You are required to come at least once as part of your grade. I encourage you to commit to coming to work on your research project and homework at least 10 times in the semester and get 1 unit. Enroll in Math 290-02. Hours available TWR 2-4pm, YOLO 206