

Data Science Fundamentals

DACSS 601

University of Massachusetts Amherst

Fall 2023

Course Time	University/Synch Monday & Wednesday 5:30 – 6:45 pm UWW/Async: Online Lab meeting: Thursday (from Sep 21): 4:45-6:15 pm	Multimodal Course Venue	University/Synch: Machmer Hall Room W-13, Lecture and Lab meeting: Zoom UWW/Async: Online Lab meeting: Zoom
Instructor:	Erico Yu(him/his)	Class Assistant:	Rylyn Williams (they/them or any); Hours: 1-2:30pm Mon; 12-4pm Fri Mekhala Kumar (she/her) Hours: 3-5pm on Tu; 1:30-3:30 pm on Wed
Office	257 Bartlett Hall	Office Hours:	Monday & Wednesday 10-12 PM EST (in my office), Thursday 6:30-8pm (Calendly), and by appointment
Appointment Link:	https://calendly.com/dongericoyu/dacss-601and604-tutorial-clone	Course Website	Google Classroom: https://classroom.google.com/c/NjlxMTU0NDYwNDky?cjc=5kuektx Piazza: https://piazza.com/umass/fall2023/dacss601

Campus
Resources:



[Graduate Student Services](#)



[Disability & Accessibility](#)



[DACSS](#)

[1. Course Description]

This 3-credit course serves as an essential introduction to the R programming language, catering especially to students who lack prior programming and statistical experience. R's significance spans across all core courses and a plethora of technical electives within the DACSS program. R serves as a foundational tool utilized across all core courses and several technical electives. The contemporary landscape demands individuals skilled in versatile data science languages like R, distinguishing them from those proficient in narrower platforms like Excel or specialized statistical packages such as SPSS or Stata.

This course also establishes students with a robust foundation in fundamental skills encompassing general data management, data wrangling, and data visualization—which are crucial for advanced quantitative and data analysis courses. Beyond these skills, the course delves into the realm of data-driven storytelling by demonstrating the importance of technological and data literacy for purposes of analysis, argument, and understanding. It aims to equip students with the prowess to intuitively interpret and convey insights derived from data. This extends to arming students with the ability to construct appropriate tables and figures that fortify their arguments, thus empowering them to wield data as a persuasive tool in communication.

[2. Learning Objectives]

By the end of the semester, you will be able to:

- Acquire skills necessary to conduct data analysis in R, capable of understanding and implementing data science research designs across a variety of settings.
- Use tools such as R, RStudio, Quarto, and GitHub to design and complete basic data science tasks, both individually and in group collaborations.
- Engage with research and adeptly identify both the strengths and weaknesses of increasingly common arguments grounded in empirical evidence.
- Communicate the results or limitations of data-centered research clearly and appropriately through both oral and written formats.

[3. Textbook]

There are no textbooks to buy. Articles, coding manuals, book chapters, and other documentations and videos will be available online through the Learning Management System (Canvas and Google Classroom). Each week, I will send out a weekly announcement to remind students of the class topics and related readings (either required or recommended) for the next week.

There is a very good introductory source for the topics of this course and it is **freely available online**. I strongly recommend that you review existing documentation prior to and after the weekly meeting each week.

[Wickham, H., & Grolemund, G. \(2016\). R for data science: Visualize, model, transform, tidy, and import data. O'Reilly Media.](#)

And for those of you who do not have much prior experience in R programming, this classic book will definitely help you survive the steep learning curve in the beginning. It provides guidelines to each step from installing R to more advanced analysis.

[Long, J. D., & Teetor, P. \(2019\). R cookbook: proven recipes for data analysis, statistics, and graphics. O'Reilly Media.](#)

[4. Course Meetings, Website and Technology]

Course Meetings & Schedule:

- **Lecture & Recorded Video:** Our synchronous lectures will be held **in person every Monday from 5:30 PM to 6:45 PM at Machmer Hall room W-13**. Additionally, for your convenience, we will also provide an **online option for these lectures via [Zoom](#)**.
- **Lab Meetings:** We have weekly lab meetings for both course sessions. During these lab meetings, I will cover additional points that may not have been completed in the previous lecture. We'll review instructions, example code, and data for challenges/assignments. These meetings also provide opportunities for you to work on assignments and ask questions.

Synchronous Lab Meeting: For the in-person session, the lab meeting will take place every

Wednesday at the same time and location, starting on September 13.

UWW/Asynchronous Session(updated 9/13): If you are part of the UWW/Asynchronous session, we will host a separate online lab meeting on Zoom.

Time: 4:45-6:15 p.m. EST, every Thursday, starting on September 21. The link is: <https://umass-amherst.zoom.us/j/94772359833>.

Note: While the synchronous lab meeting is primarily tailored to assist students with limited or no prior experience in data analytics or programming, individuals with previous programming backgrounds may find the online/advanced lab meetings more suitable for their needs.

Course Website/LMS:

All classroom material will be posted on **Canvas**. For students who are not formally enrolled or do not have the access to Canvas at the moment, you can check out the course materials through [Google Classroom](#). You will be submitting assignments and feedback and grades will be given via **Canvas**.

In the future weeks, we will also be using Piazza for after-class discussion and Q&A.

Technology/Software (Updated 9/6/2023):

R and RStudio: We will primarily use R and RStudio for this course. Both software applications are freely available online. You can find a comprehensive installation guide on [this website](#). No prior knowledge of the R programming language is assumed.

Alternative platforms to local R and RStudio:

- [Posit Cloud](#): 25 hours compute time per month for Free Plan.
- [Google Colab](#): not available to run Quarto for publishing files.

Online Platforms: In addition to R and RStudio, we will utilize several online platforms. All of these platforms are freely accessible online.

- [Google Classroom](#): This platform will be the mirror of Canvas and backup for course materials and announcements.
- [Piazza: Piazza](#) will serve as a discussion forum for course-related queries and discussions.
- [GitHub](#): In the Module#3 of this course, we will learn how to use GitHub for collaborative projects and version control.

Technical Support: Please note that the instructional team cannot provide extensive support for software installation or general computing issues. We will offer limited hands-on debugging assistance during lab meetings and drop-in office hours. If you encounter any issues while installing R, we recommend creating a free RStudio Cloud account. This will allow you to continue your work while seeking assistance from experts to resolve installation problems. We also recommend that students work in small groups and support each other as much as possible during class.

[5. Course Assessment and Feedback]

Grades are calculated as follows:

- Challenges (80%)
- Synchronous and Asynchronous Participation (20%)

	University/In-person	UWW/Asynchronous
Attendance See 6. Course Policies-Attendance for more information.	Strongly recommended for both lectures and lab meetings.	Optional for lectures; Encouraged for lab meetings
Challenges	80%	80%
Participation (20%): 2% for each week	Optional 1: In-person participation in discussions during class meetings; Option 2: In-person participation (10%) + Piazza Discussion (10%) Option 3: Piazza Only (20%)	Optional 1: Lab meetings (10%) + Piazza Discussion (10%) Optional 2: Piazza Only (20%)

Challenges: A set of weekly challenges to help you practice specific skills using provided datasets. Challenges help you build your ability to capably and efficiently accomplish data science tasks in R and will establish a foundation for your subsequent methods courses. Feedback is provided to help individual students “stretch” and improve their data management and programming skills regardless of their background.

For each challenge, you have one chance to revise and resubmit your challenge and get an updated grade. There are two check-in points (Week 6 and Week 11) throughout the semester. There will be no challenges in that week, and I will review and grade any resubmitted challenges if the previous week during the time.

Participation: We have found that students who actively participate in class discussion - whether synchronously (when possible) or asynchronously - get a lot more out of the course and learn new skills at an accelerated rate. Students should participate regularly - including posting or answering questions on Piazza or participating in discussions during lectures and lab meetings every week. Participation does not need to reflect expertise; rather, students should seek to both ask and answer questions regularly and in equal proportion.

(9/17 Update) The baseline for weekly participation is 50%. You will achieve a full participation grade if you engage in class discussions, which include asking or answering questions in synchronous meetings or on Piazza, emailing me with non-logistics questions, or meeting with

me and tutors during office hours. If you do not participate in class discussions during a particular week (neither posting things during that week nor posting under the weekly designated questions), your participation grade will be 50%. I will also track students' time spent on Piazza for reference.

If you cannot participate in the discussion in a given week, you can always come back and join the discussion in the later week. I will close the grading for previous weeks' course participation by each check-in point listed on the syllabus. Before the time, you can make up your participation by posting under the weekly designated questions

Tutorials (Optional): There may be some online R tutorials that will walk you through basic data science tasks in R. These tutorials are FORMATIVE work - they are not intended to negatively affect your grade but to provide you a safe environment to practice coding and develop familiarity with R. Failure to submit work for tutorials will not harm your final grade.

Final letter grades are assigned using the University's Plus-Minus Grading Scale according to following rubric:

A (94-100%)
A- (90-93%)
B+ (86-89%)
B (81-85%)
B- (77-80%)
C+ (74-76%)
C (70-73%)
F (Below 70%)

[6. Course Policies]

Office Hours & Emails

My office hours are held either in person or via Zoom. If you know that you would like to come see me, I encourage you to sign up for a 30-minute slot through [Calendly](#) (you should be able to see my schedule and appointments).

You can always reach out to me by email. I try to respond to all email and phone messages within 24 hours during weekdays, but generally do not check and respond to email between 4pm on Friday and 10am on Monday. Also, please expect delay in responding to evening emails after 6pm.

Incomplete and Retake

Special note for those who retake the course this semester: the previous incomplete-and-retake policy applied between Summer 2021 and Spring 2023 is discontinued. You will need to pass DACSS-601 before you can effectively take other DACSS courses. In special circumstances

where an incomplete is needed, a student needs to have completed 60% of their work for the term.

For your reference, a copy of the essential sections of the UMass policy regarding Incomplete grades has been provided below. (More information can be found on page 28 of the following document: <https://www.umass.edu/registrar/sites/default/files/academicregs.pdf>):

“Students who are unable to complete course requirements within the allotted time because of severe medical or personal problems may request a grade of Incomplete from the instructor of the course. Normally, incomplete grades are warranted only if a student is passing the course at the time of the request and if the course requirements can be completed by the end of the following semester. Instructors who turn in a grade of "INC" are required to leave a written record of the following information with the departmental office of the academic department under which the course is offered: (1) the percentage of work completed, (2) the grade earned by the student on the completed work, (3) a description of the work that remains to be completed, (4) a description of the method by which the student is to complete the unfinished work, and (5) the date by which the work is to be completed. In the case of an independent study where the entire grade is determined by one paper or project, the instructor should leave with the department information pertaining to the paper or project, which will complete the course. To avoid subsequent misunderstanding it is recommended that the student also be provided with a copy of this information. Grades of Incomplete will be counted as F's until resolved.”

Pronoun & Communication

I take seriously my responsibility as a member of the UMass community. As a way to promote an inclusive environment for all of my students, I will refer to everyone using “they” as a gender-neutral singular pronoun in general situations. In the meantime, I will also accommodate you with your preferred pronoun.

Protocols for Zoom Participation

- Mute your microphone upon joining the meeting room.
- For students of University/In-person(Course #83088), please keep your camera on during the whole class meeting period.

Attendance(Updated: 9/6/2023)

- **University/In-person(Course #83088):** To ensure the best possible learning experience and access to tutoring assistance, regular attendance is strongly recommended for all students enrolled in this session. If attending in person is not feasible, you can always use Zoom for synchronous online participation.

If you anticipate missing more than FOUR class meetings (including lectures or lab sessions), please arrange a meeting with me in advance to discuss the reasons for your absence, or I will reach out to you to check out. I will make every effort to accommodate your needs.

If you miss class, it is your responsibility to review recorded lectures and lab meetings, class notes, inquire about announcements or assignments you may have missed, and seek me out in office hours with any questions. A significant number of missed classes will impede your ability to complete course expectations successfully.

- **UWW/Asynchronous (Course #84263):** Lecture attendance is optional in this session. Recorded lectures mirror those of the University/In-person sessions, allowing you the flexibility to attend the synchronous Zoom meetings or access the recordings at your convenience.

While participation in the online lab meetings is not mandatory, I strongly encourage your attendance whenever possible. If attending lab meetings is not possible, active participation in online discussions (Piazza) is recommended to make up for any missed sessions. To foster your learning progress and address any concerns, I expect to check in with each UWW/online student for at least one time during the whole semester.

Collaboration and Academic Integrity

I support collaboration and encourage you to work together with your peers in offering feedback on assignments. You are also encouraged to cite class discussions, conversations with peers, posted notes and any other material prepared by your classmates. **But all written work must be your own. Make sure to clarify and acknowledge collaboration with your peers, accurately represent your own contributions, and properly cite all sources.** Any suspected misrepresentation of your own original contributions—even if the result of carelessness—will be brought to the attention of me, DACSS, or the Academic Honesty Office and may result in a failing grade for the course.

Since the integrity of the academic enterprise of any institution of higher education requires honesty in scholarship and research, academic honesty is required of all students at the University of Massachusetts Amherst.

Academic dishonesty is prohibited in all programs of the University. Academic dishonesty includes but is not limited to: cheating, fabrication, plagiarism, and facilitating dishonesty. Appropriate sanctions may be imposed on any student who has committed an act of academic dishonesty. Instructors should take reasonable steps to address academic misconduct. Any person who has reason to believe that a student has committed academic dishonesty should bring such information to the attention of the appropriate course instructor as soon as possible. Instances of academic dishonesty not related to a specific course should be brought to the attention of the appropriate department Head or Chair. The procedures outlined below are intended to provide an efficient and orderly process by which action may be taken if it appears that academic dishonesty has occurred and by which students may appeal such actions.

Since students are expected to be familiar with this policy and the commonly accepted standards of academic integrity, ignorance of such standards is not normally sufficient evidence of lack of intent.

For more information about what constitutes academic dishonesty, please see the Dean of Students' website: http://umass.edu/dean_students/codeofconduct/acadhonesty/.

Special Note on using AI Tools:

Although UMass does not have a formal policy on the use of AI Tools (such as ChatGPT), I have specific expectations of AI use in this course.

For essay-writing assignments (summary or responding to a reading, describing a data, or explaining a visualization), using AI tools is strictly prohibited, and I will pay specific attention to your works.

For other assignments, if you refer to AI helps, you should properly cite it: which tool you use, and how you use it (for example, the exact text of question you ask the AI tools).

The bottom line is: if you are not sure whether you can use it, please consult with me before using it.

Extensions(TBD)

You have THREE 24-hour extensions that you may use on any challenges. You do not need advanced permission to use this extension, but it is your responsibility to tell me if you wish to apply the extension to the specific assignment. Further extensions will not be granted unless they are properly communicated in advance and supported by me or the related offices of the UMass(such as in a situation of a protracted illness or personal/family emergency that causes you to miss a week or more of coursework). You should contact DACSS student advising, which will coordinate with me to determine possible extensions or accommodation for missed work.

Late submission will result in a penalty of 10% of that challenge grade (or 1% of the final course grade) for every 24 hour the paper is late.

[7. Additional Resources and Accommodations]

Statement on Disabilities

The University of Massachusetts Amherst is committed to making reasonable, effective and appropriate accommodations to meet the needs of students with disabilities and help create a barrier free campus.

If you are in need of accommodation for a documented disability, register with Disability Services to have an accommodation letter sent to your faculty. It is your responsibility to initiate these services and to communicate with faculty ahead of time to manage accommodations in a timely manner. For more information, consult the [Disability Services website](#).

Taking Care of Yourself

Grad school is difficult, pandemic or not, and I want you to pay attention to your physical and mental health. I encourage you to reach out to University Health Services at (413) 577-5000 if you would like help with anxiety, depression, or mental health issues. The emergency counseling line is (413) 545-2337. Reach out to the UMass Police Department if you are having problems with your basic security. Contact

your department or program to assist with academic difficulties as a result of sexual assault or violence, as well as contacting faculty on behalf of the student.

Title IX Statement

In accordance with Title IX of the Education Amendments of 1972 that prohibits gender-based discrimination in educational settings that receive federal funds, the University of Massachusetts Amherst is committed to providing a safe learning environment for all students, free from all forms of discrimination, including sexual assault, sexual harassment, domestic violence, dating violence, stalking, and retaliation. This includes interactions in person or online through digital platforms and social media. Title IX also protects against discrimination on the basis of pregnancy, childbirth, false pregnancy, miscarriage, abortion, or related conditions, including recovery. There are resources here on campus to support you. A summary of the available Title IX resources (confidential and non-confidential) can be found at the following link: <https://www.umass.edu/titleix/resources>. You do not need to make a formal report to access them. If you need immediate support, you are not alone. Free and confidential support is available 24 hours a day / 7 days a week / 365 days a year at the SASA Hotline 413-545-0800.

[8. Course Schedule]

The following course schedule may change to reflect our dynamic learning process.

All asynchronous materials, assignment instructions and due dates are provided on Canvas and Google Classroom.

Check out the course notes: what cover in each session; what challenge is announced for the next week.

Week	Date	Format	Topics	Homework/Challenges	Suggested Readings
Module#1: Introduction to R Programming and Data Management					
Week 1	6 Sep 2023	Lecture & Lab	Class Introduction; R, RStudio, Quarto	1. Installing R & RStudio on your devices. Or Set up an account for Posit Cloud and Google Colab. 2. Make sure the Quarto render function works properly: use QuartoPractice.qmd file. Submit the .html file to Canvas (due by Sep 13).	For R & RStudio Installation: R Cookbook Ch1.1-1.10 ; For RStudio interface: R Cookbook Ch3.1-3.10
Week 2	11 Sep 2023	Lecture	Basic R Commands, Data Structure, Simple Statistics	Non-graded Practice on Basic R	R Basic Commands: R for Data Science Ch 4 R for Data Science Ch 20.1-3 ; skip 20.4-6 or R Cookbook Ch2.1-2.14
	13 Sep 2023	Lab			
Week 3	18 Sep 2023	Lecture	Import & Describe Dataset	Challenge 1 (due by Sep 27)	R for Data Science Ch 1.1 R for Data Science Ch 5 R for Data Science Ch 11.1-2 2nd Edition Ch 21
	20 Sep 2023	Lab			Tidyverse Family Packages: dplyr
Week 4	25 Sep 2023	Lecture	Data Wrangling & Transformation	Challenge 2 (due by Oct 4)	R for Data Science Ch 12.3-4 R for Data Science Ch 5.5 R for Data Science Ch 16-16.3
	27 Sep 2023	Lab			Tidyverse Family Packages: lubridate
Week 5	2 Oct 2023	Lecture	Data Wrangling & Transformation (Cont.)	Challenge 3 (due by Oct 11)	R for Data Science Ch 13 R for Data Science Ch 26.2-26.3
	4 Oct 2023	Lab			
Week 6	10 Oct 2023	Lecture	Review; Advanced programming (iteration + function)	Check-in Point#1 Review your previous challenges (1-3) and see how you can improve your codes	R for Data Science Ch 14.1-14.3
	11 Oct 2023	Lecture + Lab			R for Data Science Ch 21 Tidyverse Family Packages: Purrr

Week	Date	Format	Topics	Homework/Challenges	Suggested Readings
Module#1: Introduction to R Programming and Data Management					
Week 1	6 Sep 2023	Lecture & Lab	Class Introduction; R, RStudio, Quarto	1. Installing R & RStudio on your devices. Or Set up an account for Posit Cloud and Google Colab. 2. Make sure the Quarto render function works properly: use QuartoPractice.qm d file. Submit the .html file to Canvas (due by Sep 13).	For R & RStudio Installation: R Cookbook Ch1.1-1.10 ; For RStudio interface: R Cookbook Ch3.1-3.10
Week 2	11 Sep 2023	Lecture	Basic R Commands, Data Structure, Simple Statistics	Non-graded Practice on Basic R	R Basic Commands: R for Data Science Ch 4 R for Data Science Ch 20.1-3 ; skim 20.4-6 or R Cookbook Ch2.1-2.14
	13 Sep 2023	Lab			
Week 3	18 Sep 2023	Lecture	Import & Describe Dataset	Challenge 1 (due by Sep 27) Resubmission Deadline: Challenge#1: Oct 20; Challenge#2: Oct 23; Challenge#3: Nov 7	R for Data Science Ch 1.1 R for Data Science Ch 5 R for Data Science Ch 11.1-2 2nd Edition Ch 21
	20 Sep 2023	Lab			Tidyverse Family Packages: dplyr
Module#2: Introduction to Visualization					
Week 7	16 Oct 2023	Lecture	Introduction to Visualization	Challenge 4: descriptive visualization (due by midnight Oct 29)	A Grammar for R Graphis: 3.1 (Skim, just understand the vocabularies) A Grammar for R Graphics: 3.2.1 and 3.2.2 Skim the following page on R Graph Gallery: Distribution (Histogram, Boxplot, Violin)

Week	Date	Format	Topics	Homework/Challenges	Suggested Readings
Module#1: Introduction to R Programming and Data Management					
Week 1	6 Sep 2023	Lecture & Lab	Class Introduction; R, RStudio, Quarto	1. Installing R & RStudio on your devices. Or Set up an account for Posit Cloud and Google Colab. 2. Make sure the Quarto render function works properly: use QuartoPractice.qmd file. Submit the .html file to Canvas (due by Sep 13).	For R & RStudio Installation: R Cookbook Ch1.1-1.10 ; For RStudio interface: R Cookbook Ch3.1-3.10
Week 2	11 Sep 2023	Lecture	Basic R Commands, Data Structure, Simple Statistics	Non-graded Practice on Basic R	R Basic Commands: R for Data Science Ch 4 R for Data Science Ch 20.1-3 ; skrip 20.4-6 or R Cookbook Ch2.1-2.14
	13 Sep 2023	Lab			
Week 3	18 Sep 2023	Lecture	Import & Describe Dataset	Challenge 1 (due by Sep 27)	R for Data Science Ch 1.1 R for Data Science Ch 5 R for Data Science Ch 11.1-2 2nd Edition Ch 21
	20 Sep 2023	Lab			Tidyverse Family Packages: dplyr
	18 Oct 2023	Lecture			Barrplot, Grouped and Stacked Bars, Pie Chart, and Scatter plots
Week 8	23 Oct 2023	Lecture	Visualization: time-series, spatial	Challenge 5 (due by Nov 5)	Data Visualization: Ch7.Draw Map R Graph Gallery: Time-series R Graph Gallery: Map
	25 Oct 2023	Lab			
Week 9	31 Oct 2023	Lecture	Review and Catching Up		R for Data Science Ch 28: Customization of Graphs: Label, Annotations, Scales, Zooming, Themes Dealing with Colors
	1 Nov 2023	Lab			Graphical Data Analysis with R; Miller, J. E. (2005). The Chicago

Week	Date	Format	Topics	Homework/Challenges	Suggested Readings
Module#1: Introduction to R Programming and Data Management					
Week 1	6 Sep 2023	Lecture & Lab	Class Introduction; R, RStudio, Quarto	1. Installing R & RStudio on your devices. Or Set up an account for Posit Cloud and Google Colab. 2. Make sure the Quarto render function works properly: use QuartoPractice.qm d file. Submit the .html file to Canvas (due by Sep 13).	For R & RStudio Installation: R Cookbook Ch1.1-1.10 ; For RStudio interface: R Cookbook Ch3.1-3.10
Week 2	11 Sep 2023	Lecture	Basic R Commands, Data Structure, Simple Statistics	Non-graded Practice on Basic R	R Basic Commands: R for Data Science Ch 4 R for Data Science Ch 20.1-3 ; skip 20.4-6 or R Cookbook Ch2.1-2.14
	13 Sep 2023	Lab			
Week 3	18 Sep 2023	Lecture	Import & Describe Dataset	Challenge 1 (due by Sep 27)	R for Data Science Ch 1.1 R for Data Science Ch 5 R for Data Science Ch 11.1-2 2nd Edition Ch 21
	20 Sep 2023	Lab			Tidyverse Family Packages: dplyr
Module#3: Data Analysis: Principles & Topics & Practices					
Week 10	6 Nov 2023	Lecture	Review Challenge#4 and #5	Check-in Point#2 Review your previous challenges (4-5) and see how you can improve your codes Resubmission Deadline:	Visual Variables and Plotting Maps Representing Data: Data Points: this reading does not contain R codes for customization, but it summarizes and resonates the

Week	Date	Format	Topics	Homework/Challenges	Suggested Readings
Module#1: Introduction to R Programming and Data Management					
Week 1	6 Sep 2023	Lecture & Lab	Class Introduction; R, RStudio, Quarto	1. Installing R & RStudio on your devices. Or Set up an account for Posit Cloud and Google Colab. 2. Make sure the Quarto render function works properly: use QuartoPractice.qm d file. Submit the .html file to Canvas (due by Sep 13).	For R & RStudio Installation: R Cookbook Ch1.1-1.10 ; For RStudio interface: R Cookbook Ch3.1-3.10
Week 2	11 Sep 2023	Lecture	Basic R Commands, Data Structure, Simple Statistics	Non-graded Practice on Basic R	R Basic Commands: R for Data Science Ch 4 R for Data Science Ch 20.1-3 ; skim 20.4-6 or R Cookbook Ch2.1-2.14
	13 Sep 2023	Lab			
Week 3	18 Sep 2023	Lecture	Import & Describe Dataset	Challenge 1 (due by Sep 27) Challenge#4: Nov 21 Challenge#5: Dec 3	R for Data Science Ch 1.1 R for Data Science Ch 5 R for Data Science Ch 11.1-2 2nd Edition Ch 21
	20 Sep 2023	Lab			Tidyverse Family Packages: dplyr
					graph components content covered in the lecture (Oct 31) Challenge#4 and #5 Solutions
		8 Nov 2023	No Class Meetings for Nov 8 and 9 for attending a conference		
Week 11	13 Nov 2023	Lecture	Principles for Compelling Narratives based on Data	Challenge 6 (due by Nov 26) Weekly Participation Catching up for Week#7-Week#8: due by Nov 17	Miller, J. E. (2005). The Chicago guide to writing about multivariate analysis. Read Ch2; Skim Ch5;
	15 Nov 2023	Lab/Discussion	Explaining Figures and Tables		

Week	Date	Format	Topics	Homework/Challenges	Suggested Readings
Module#1: Introduction to R Programming and Data Management					
Week 1	6 Sep 2023	Lecture & Lab	Class Introduction; R, RStudio, Quarto	1. Installing R & RStudio on your devices. Or Set up an account for Posit Cloud and Google Colab. 2. Make sure the Quarto render function works properly: use QuartoPractice.qmd file. Submit the .html file to Canvas (due by Sep 13).	For R & RStudio Installation: R Cookbook Ch1.1-1.10 ; For RStudio interface: R Cookbook Ch3.1-3.10
Week 2	11 Sep 2023	Lecture	Basic R Commands, Data Structure, Simple Statistics	Non-graded Practice on Basic R	R Basic Commands: R for Data Science Ch 4 R for Data Science Ch 20.1-3 ; skip 20.4-6 or R Cookbook Ch2.1-2.14
	13 Sep 2023	Lab			
Week 3	18 Sep 2023	Lecture	Import & Describe Dataset	Challenge 1 (due by Sep 27)	R for Data Science Ch 1.1 R for Data Science Ch 5 R for Data Science Ch 11.1-2 2nd Edition Ch 21
	20 Sep 2023	Lab			Tidyverse Family Packages: dplyr
Week 12	20 Nov 2023	Lecture	Designing Data Science Projects		KKV: Designing Social Inquiry: Scientific Inference in Qualitative Research (selected pages) Gelman and Baseball: Storytelling as Ideology
Week 12: 22 and 23 Nov 2023: Thanksgiving Holiday; No Lab Meetings					
Week 13	27 Nov 2023	Lecture	Other Topics in Data Science	Challenge 7 (due by Dec 10) Weekly Participation Catching up for Week#9-Week#10: due by Dec 1	Modern Data Science with R (2ed) Browse the chapter titles in Part I and Part III; Choose the following chapters of your interests to skim Ch 9, Ch 11, Ch 18, Ch 19, and Ch 20.
	29 Nov 2023	Discussion	Data Science Ethics		Modern Data Science with R (2ed) Chapter 8
Week 14	4 Dec 2023	Lecture	Data Project	Challenge 8 (due by Dec 11)	Happy Git and GitHub with useR

Week	Date	Format	Topics	Homework/Challenges	Suggested Readings
Module#1: Introduction to R Programming and Data Management					
Week 1	6 Sep 2023	Lecture & Lab	Class Introduction; R, RStudio, Quarto	1. Installing R & RStudio on your devices. Or Set up an account for Posit Cloud and Google Colab. 2. Make sure the Quarto render function works properly: use QuartoPractice.qmd file. Submit the .html file to Canvas (due by Sep 13).	For R & RStudio Installation: R Cookbook Ch1.1-1.10 ; For RStudio interface: R Cookbook Ch3.1-3.10
Week 2	11 Sep 2023	Lecture	Basic R Commands, Data Structure, Simple Statistics	Non-graded Practice on Basic R	R Basic Commands: R for Data Science Ch 4 R for Data Science Ch 20.1-3 ; skip 20.4-6 or R Cookbook Ch2.1-2.14
	13 Sep 2023	Lab			
Week 3	18 Sep 2023	Lecture	Import & Describe Dataset	Challenge 1 (due by Sep 27)	R for Data Science Ch 1.1 R for Data Science Ch 5 R for Data Science Ch 11.1-2 2nd Edition Ch 21
	20 Sep 2023	Lab			Tidyverse Family Packages: dplyr
			Management and Collaboration using GitHub and GitHub Webpage	15)	Ch 1, Ch 4
	6 Dec 2023	Lab		Resubmission Deadline: Challenge#6: Dec 15 Challenge#7: Dec 17; only for early-bird submission before Dec 6 Weekly Participation Catching up for Week#11-Week#13: due by Dec 15	Happy Git and GitHub with useR Ch 9 - 12