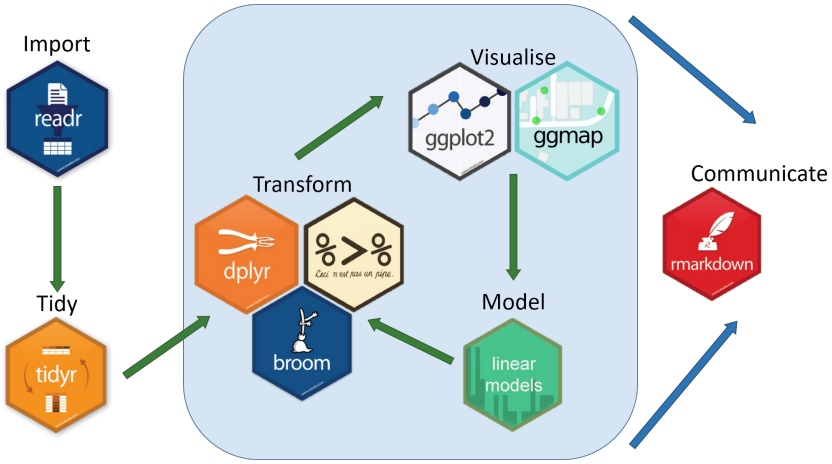
SCHOOL OF FOREST, FISHERIES, AND GEOMATICS SCIENCES | UF IFAS UNIVERSITY of FLORIDA

Fall 2024

Reproducible Quantitative Methods

(FOR 6934 / FOR 4934 - 3 credits)



Course description

This course aims to improve the implementation and execution of reproducible research and analyses in the field of natural resources, using modern (digital) tools.

Students will be introduced to systematic data organization and cleaning, in a way that promotes reproducibility. They will be equipped with the tools to do this work using the R programming language, and will learn essential data management principles. Students will be familiarized with version control tools, online repositories, and databases.

This course is aimed at students engaged in research at the graduate level, as well as advanced undergraduate students interested in data-focused careers.

Class hours, location and instructor

Tuesday 10:40 – 11:30 (period 4) in NZH 222
Thursday 10:40 – 12:35 (period 4&5) in MAEA 327
or synchronous online for off-campus students

Dr. Geraldine Klarenberg (she/her)
430 McCarty Hall C
gklarenberg@ufl.edu
Office hours: Tuesday 3 pm – 4 pm, other times by appointment (see Canvas for details).

Learning objectives

By the end of this course, the student will be able to:

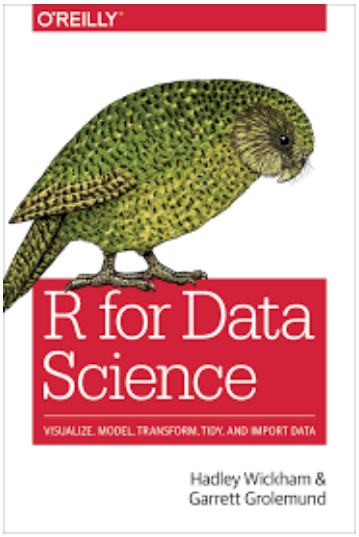
- Identify essential reproducibility components of research and analyses
- Apply a programming language to automate and optimize data cleaning and data analysis - to aid reproducibility
- Design efficient data collection templates
- Apply version control
- Implement good data management practices

Course requirements

Ideally be familiar with some programming, but not required.

The textbooks and resources that we will use in this course are all available for free online, e.g.:

- R Programming for Data Science by Roger D. Peng (https://bookdown.org/rdpeng/rprogdatascience/)
- R for Data Science by Garrett Grolemund and Hadley Wickham (https://r4ds.had.co.nz/index.html)
- Happy Git and GitHub for the useR by Jennifer Bryan (https://happygitwithr.com/)
- Rmarkdown: The Definitive Guide by Yihui Xie, JJ Allaire and Garrett Grolemund (https://bookdown.org/yihui/rmarkdown/)



You will need to bring a laptop to every class.

Course resources and implementation

This course will be implemented using a blended learning approach. This means that you will be expected to prepare / complete work (with online resources such as videos and reading) before the lab on Thursday in order to do/finish the lab assignment.

Every week you will do an ungraded quiz before lab, which you will then do again in a group at the beginning of lab (for a grade).

There will be assignments every week, associated with, and started during, the lab. The final project will ideally revolve around your own data – but there will be projects to work with if you do not have data yet. You will be required to present your work to the class.

Every week you will be asked to provide brief feedback on things you think went well or need improvement: this ongoing evaluation helps me provide you the most effective implementation of the course material.

Active involvement will be crucial to be prepared for labs. I will also rely on students to communicate their challenges, implement peer-to-peer learning and practice collective problem solving.

Course evaluations

Student assessments are an important part of efforts to improve teaching and learning. Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

About the instructor

Dr. Geraldine Klarenberg is a lecturer in quantitative data science in the School of Forest, Fisheries, and Geomatics Sciences. She has a PhD in Agricultural and Biological Engineering (UF) and an MSc in Tropical Land Use / Irrigation (Wageningen University).

Teaching philosophy: I like to see my classroom as a community and I specifically promote interaction and peer learning. I believe that interactive work and learning-by-doing are the best ways to gain skills and retain knowledge. Most of all, I want everyone to enjoy their learning journey and feel valued!

Grading policy

Self-assessments ..... 5 %
Quizzes ..... 10 %
Assignments ..... 60 %
Final project ..... . 25 %

Points for self-assessments are given for participation, not correct answers. For each assignments, 5 out of 20 points are awarded for work due before the lab.

Grading Policy

A	90.0-100
B+	86.7-89.9
B	83.7-86.6
B-	80.0-83.6
C+	76.7-79.9
C	73.7-76.6
C-	70.0-73.6
D+	66.7-69.9
D	63.7-66.6
D-	60.0-63.6
E	< 60.0

More information on UF grading policy may be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Late / make-up work

Late assignments will be graded as follows:
< 24 hrs: -10%
< 48 hrs (or after assignment is discussed): -25%
> 48 hrs: -50%

Make up work: contact the instructor to agree on new deadlines (only for excused absences)

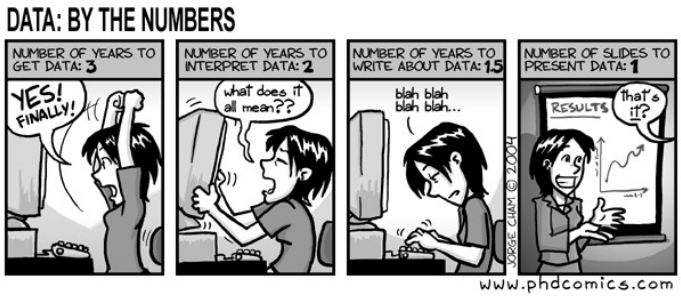
Class expectations

Attendance

Attendance is strongly encouraged, especially labs. If you will be absent, inform the instructor at least a week in advance. In the case of emergency absences, inform the instructors as soon as possible.

Excused absences must be consistent with university policies in the Graduate Catalog (http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance) and require appropriate documentation. Additional information can be found here: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. See https://aa.ufl.edu/policies/in-class-recording/ for details.



Code of Conduct

I am dedicated to providing a welcoming and supportive environment for all people, regardless of background or identity. By participating in this course, participants accept to abide by these ground rules. Any form or behavior to exclude, intimidate, or cause discomfort is a violation of these ground rules. In order to foster a positive and professional learning environment we expect and encourage the following kinds of behaviors in all platforms and events:

- Use welcoming and inclusive language
- Be respectful of different viewpoints and experiences
- Gracefully accept constructive criticism
- Focus on what is best for the community
- Show courtesy and respect towards other participants

UF policies

Honesty policy

UF students are bound by The Honor Pledge which states, *"We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code."* On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: *"On my honor, I have neither given nor received unauthorized aid in doing this assignment."* The Honor Code (https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions.

Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Student privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Students requiring accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://disability.ufl.edu/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. **Students requiring accommodations should follow this procedure as early as possible in the semester.**

Software use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

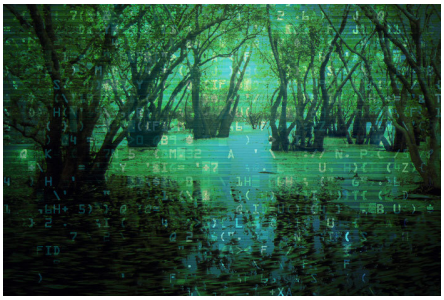
Campus resources

Health and wellness

- **U Matter, We Care**: If you or a friend is in distress, please contact umatter@ufl.edu, 352 392-1575 or visit the U Matter, We Care website so that a team member can reach out to you or the student.
- **Counseling and Wellness Center**: http://www.counseling.ufl.edu, and 352-392-1575
- **Student Health Care Center**: 352-392-1161.
- **University Police Department**: 352-392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic resources

- **E-learning (Canvas) technical support**: 352-392-4357, e-mail to helpdesk@ufl.edu, or contact the UF Computing Help Desk .
- **Career Resource Center**: Reitz Union, 352-392-1601. Career assistance and counseling. https://www.crc.ufl.edu/.
- **Library Support**: http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.
- **Teaching Center**: Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.
- **Writing Studio**: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.
- **Student Complaints Campus**: Visit the Student Honor Code and Student Conduct Code webpage for more information.
- **On-Line Students Complaints**: https://pfs.tnt.aa.ufl.edu/state-authorization-status/#student-complaint



Important dates

Assignments
- 4 Sep
- 11 Sep
- 18 Sep
- 25 Sep
- 2 Oct
- 9 Oct
- 16 Oct
- 23 Oct
- 30 Oct
- 6 Nov

Presentations
- 21 Nov & 3 Dec

Final project
- 13 Dec

Course schedule, topics and assignment/project due dates are subject to change. If changes are necessary, these will be announced at least one week in advance, on Canvas.

Course schedule

Date	Module	Week	Topic
Th 22 Aug	1	1	Introductions and install software
Tue 27 Aug		2	Research: reproducibility, data lifecycle
Th 29 Aug		2	Lab – Reproducibility
Tue 3 Sep	2	3	Introduction to R
Th 5 Sep		3	Lab - Introduction to R
Tue 10 Sep		4	Introduction to R
Th 12 Sep		4	Lab – Introduction to R
Tue 17 Sep	3	5	Spreadsheets for data collection & programming for data analysis
Th 19 Sep		5	Lab – Good practices (spreadsheets & programming)
Tue 24 Sep	4	6	Version control: git
Th 26 Sep		6	Lab – Version control: git (and R)
Tue 1 Oct		7	Version control: GitHub
Th 3 Oct			Lab – Version control: GitHub
Tue 8 Oct	5	8	Exploratory Data Analysis (EDA), incl visualization
Th 10 Oct		8	Lab – EDA, incl visualization
Tue 15 Oct	6	9	Tidy data in R: tidyverse
Th 17 Oct		9	Lab – Tidy data in R: tidyverse
Tue 22 Oct			Tidy data in R: tidyverse
Th 24 Oct		10	Lab – Tidy data in R: tidyverse
Tue 29 Oct	7	11	Metadata, repositories and data management plans
Th 31 Oct		11	Lab – RMarkdown
Tue 5 Nov	8	12	Databases and SQL (MySQL)
Th 7 Nov		12	Lab – MySQL (and R)
Tue 12 Nov	9	13	Project
Th 14 Nov		13	Project
Tue 19 Nov		14	Project
Th 21 Nov		14	Project presentations
Tue 26 Nov		15	No class (Thanksgiving break)
Th 28 Nov		15	No class (Thanksgiving break)
Tue 3 Dec		16	Project presentations