Data Science for Biologists

Course Instructor	Stephanie J. Spielman, PhD (Dr. Spielman or Professor Spielman)
Office	SCI 201D
Email	spielman@rowan.edu
Student Visiting Hours	Wednesday and Thursday 2:30-4 pm in SCI 201D, or by appointment
Course Website	http://users.rowan.edu/~spielman/courses/datascience_for_biologists/
Classroom/Times	**Monday 12:30-1:45 SCI 239**
	Wednesday 12:30-1:45 SCI 226 ← note the different room!
	Friday 11:00 - 1:45 SCI 239

Course Description and Objectives:

Modern-day biological research produces volumes of data that all scientists need the skills to analyze. In this course, students will learn and apply foundational concepts in data science, including visualization, wrangling, modeling, and communicating using open-source and reproducible frameworks. This course assumes no background in any computer programming or other computational skills.

Upon completing this course, students will be able to:

- Apply the R statistical computing language (notably the "tidyverse" packages) to visualize, interpret, manage, and model data
- Communicate data analyses using professional markup languages
- Utilize version control for code and data management, communication, and reproducibility
- Become familiar with real datasets from the biological research
- Develop and address scientific questions using reproducible data science techniques

Required Texts and Materials:

- All students need a laptop or similar (i.e. Microsoft Surface) with functioning wifi. There are NO other computer requirements! Mac or Windows are both ok, the amount of memory (RAM) is ok, etc. **Students should bring their machine to EVERY class.**
    - If you have an external mouse, I highly recommended bring to class.
- All course materials are *freely available online!!* There is NO need to purchase any books or other materials. Please consult the course website for all links to materials.

Evaluation:

Your grade will be derived from the following assessments:

Assessment	**Deadline**	**Percentage of final grade**
Mid-semester Project	Due 3/13/20	25%
Final Project	Due 5/6/20	25%
Weekly Assignments	Due weekly	50%

1. You are strongly encouraged to discuss assignments and the mid-semester project with your classmates. **However, all students must submit their own code and written language. *This is taken extremely seriously.***

2. You are expected to work independently on your final project, however you are still encouraged to discuss broad concepts in data science with classmates! ***Again, all code and written language must be YOUR OWN.***
3. For additional factors that may affect your grade, see "Course Policies."

Your final grade will be converted to a letter grade according to the table below. Percentages for final grades are rounded; for example, a final grade of 89.5 rounds to an A-, and a final grade of 89.4 rounds to a B+.

A = 93 - 100%	B- = 80 - 82%	D+ = 67 - 69%
A- = 90 - 92%	C+ = 77 - 79%	D = 63 - 66%
B+ = 87 - 89%	C = 73 - 76%	D- = 60 - 62%
B = 83 - 86%	C- = 70 - 72%	F = below 60%

#TidyTuesday Extra Credit

Starting in week three of the semester (Monday February 3rd, 2020) there will be *weekly* opportunities for extra credit! You can receive a bonus **1% towards your final grade** for each "Tidy Tuesday" dataset you analyze, which will be discussed more in class. To obtain the extra credit, you must do the following:

- Produce one original figure displaying the data
- Use RMarkdown and fully reproducible practices to create the figure
- Share on social media with the hashtag #tidytuesday OR provide me with all your Tidy Tuesday work (stand-alone figure and corresponding RMarkdown) so that it can be shared (with option for anonymous sharing!)
    - Once we have learned version control with git (likely early March), you can **add 0.5% to this extra credit** by submitting your TidyTuesday code and visualization to me via a GitHub pull request for a total of **1.5% bonus.**

Even though this is extra credit, any figure or code that is NOT *ENTIRELY* YOUR OWN will constitute an Academic Integrity Violation and be subject to University penalties. Do NOT try to be sneaky.

Course Policies:

1. **Assignment Policy**
    a. All assignments are due **one hour before** class starts on their deadline. For example, if class starts at 11:00 am, that day's assignment is due at 10:00 am. Assignments submitted within one hour of class time will automatically be deducted 10%. *Late assignments submitted after the class start start will NOT be accepted without prior permission.* If you need an extension on an assignment, you must contact me at least 24 hours in advance of the deadline with a request for an extension explaining why it is merited. If you receive a positive email confirmation in response, you have been granted an extension.

b. All students will receive a one-time "free" late assignment that must be submitted within 24 hours of the deadline. You must notify me if/when you use your late assignment no later than the original deadline.
c. Your lowest assignment grade will be **dropped!!**

2. **Attendance Policy**
   a. Although you are strongly encouraged to attend class, attendance will not (usually) count towards your grade. You are also strongly encouraged to notify me when you will not be in class and explain why.
   b. If you miss **FOUR or more classes** over the semester without notifying me, or if you miss **TWO absences within one week** without notifying me (this includes a Friday followed by Monday absence), or any similar "patterns of skipping class", **you may be automatically deducted 5% of your overall semester grade.** To potentially avoid this penalty, you will be required to have a one-on-one meeting with me to discuss the circumstances surrounding your absences. Any similar "patterns of skipping class" may have analogous repercussions. **Punchline: Keep me in the loop!**
   c. You should feel free to have one _encouraged_ absence as a Personal Wellness Day whenever you need, to take care of yourself physically, mentally, and emotionally.
   d. Remember - you are responsible for material discussed in ALL classes.

3. **Cell Phone Policy**
   a. All phones must be on SILENT during class (not vibrate - SILENT!).
   b. You may use your cell phones to record lecture (audio and/or video) so long as the phone is SILENT.
   c. Texting is not allowed during class. Excessive texting will be regarded as an absence.
   d. If you are in a situation where you feel you must be able to use an electronic device during class, please speak to me directly and we will devise a customized plan for how to proceed.

4. **Email Policy**

Emails should be reserved for logistical, administrative, or clarifying questions. *I will not answer content-based questions over email.* Compliant with FERPA regulations, I will also not discuss specific grades over email.

Types of questions which you *can* email me include the following:

- Confusion about wording or scope of an assignment or project
- Questions about deadlines
- Notification of any anticipated issue (attendance, late assignment, etc)
- Scheduling a meeting outside of normal student visiting hours

I will *not answer* emails in these circumstances:

- Emails of the category “Is my answer correct?” or “How do I do this question?” *You must see me during student visiting hours or schedule an appointment to discuss this type of question.*
- Emails requesting grades
- Emails whose answer can be found on the course website or syllabus.

In addition, please do not expect an email response between the hours of 7 pm - 9 am, and anytime on Saturday.

5. **Academic Integrity Policy**

Academic integrity is taken **EXTREMELY SERIOUSLY** in this class. You are ALWAYS expected to submit your OWN work, both code and written language. **Any form of cheating or plagiarism, including plagiarism of code, is not permitted and WILL BE REPORTED TO THE UNIVERSITY, NO EXCEPTIONS.**

There are *limited* circumstances when code reuse is acceptable, including:

- Front matter in Rmarkdown documents
- Specific phrasing of hypothesis testing results and conclusions
- Template code that I provide explicitly for your use

You may NOT:

- Copy/paste your code from the internet.
- Copy/paste your code from someone else's code.
- Copy/paste your code from elsewhere, but change the variable names so I can't tell. (Hint: I can tell.)
- Do anything besides write your own code!

It is understood that there are certain circumstances when many/most ways to code a problem are exactly the same. You will never be penalized in these circumstances.

6. **Regrade Policy**

If you feel that a re-grade of an assignment or project is merited, you must fill out and submit *on paper* a regrade form, which can be found on the course website. To be considered, this form must be submitted *within two weeks* of receiving the disputed grade. If you believe points were incorrectly added for an assignment or there is a similar minor grading error, you can speak with me directly to request a re-grade without this form.

7. **Key University Policies:**

As a student at Rowan University, you are expected to adhere fully to all university-wide academic policies outlined here: https://confluence.rowan.edu/display/POLICY/Administrative+Policies.

Key policies to be aware of can be found at the following links:

- Classroom Behavior Policy: https://confluence.rowan.edu/display/POLICY/Classroom+Behavior
- Academic Integrity Policy: https://confluence.rowan.edu/display/POLICY/Academic+Integrity+Policy
- Student Accommodation Policy: https://confluence.rowan.edu/display/POLICY/Accommodation+Policy
- University Attendance Policy: https://confluence.rowan.edu/display/POLICY/Attendance+Policy

Data Science for Biologists

Rowan University is required to accommodate students with documented disabilities. **Your academic success is important. If you have a documented disability that may have an impact upon your work in this class, please provide the professor with up-to-date documentation from the Academic Success Center *as soon as possible!*** Students must provide documentation of their disability to the Academic Success Center in order to receive official University services and accommodations. The Academic Success Center can be reached at 856-256-4234. The Center is located on the 3rd floor of Savitz Hall. The staff is available to answer questions regarding accommodations or assist you in your pursuit of accommodations. Additional information and resources can be found at this link: https://sites.rowan.edu/disabilityresources/.