

Data Science for Biologists (BIOL 01301)

Course Instructor Stephanie J. Spielman, PhD (Dr. Spielman or Professor Spielman)

Email spielman@rowan.edu (ie, NOT ei!)

Course Meeting Times Monday and Thursday 2:00 - 3:15 pm via Zoom
Wednesday 3:30 - 6:15 pm via Zoom (see Canvas for link)

Virtual Office Hours Open Office Hours: Tuesdays 2:00 - 3:00 pm
Appointment Block Office Hours: Tuesdays 3:00 - 4:15 pm or *email me!*
Please see Canvas for links to office hours and to schedule appointments

Course Description:

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, manipulate, and model (light modeling!) data
- Communicate data analyses using professional markup languages
- Utilize version control for code and data management, communication, and reproducibility
- Gain familiarity with real datasets from the biological research
- Develop and address scientific questions using reproducible data science techniques

Course Requirements:

We will use Zoom for synchronous remote classes during the scheduled class meeting times. There are no additional requirements for this course beyond having a Zoom-capable computer or tablet. However, I strongly recommend purchasing **an external monitor** (and suitable adaptor) to use with your laptop, and possibly an external mouse and/or keyboard.

COVID-19 Statement:

This semester will be one unlike any other, for both students and instructors alike. We will be learning in a new type of environment, with students taking the course from a variety of logistical scenarios. The key goal for this class is to learn new topics, learn how to communicate these new topics, and be engaged with the learning experience. In order to make that happen, we must agree to the following principles.

- **We will be Kind and Understanding towards one another.** Unforeseen circumstances will arise that are out of our control. As your instructor, I promise to work with you if/when an unexpected or extenuating circumstance broadly related to the COVID-19 situation affects your ability to participate in class and/or complete assignments in a timely fashion. We are all getting through these difficult times in our own way, so it is important that we cultivate a mutual respect for everyone's personal approaches to these unprecedented societal changes.
- **We will Take Care of our mental, emotional, and physical health.** In order to achieve the right mindset for engaged learning, you need to be healthy - all kinds of health!! Maintaining our well-being will be an integrated component of this class. You can

Data Science for Biologists (BIOL 01301)

expect that we will have regular "check-ins" during class time to talk about how we are managing in this challenging new environment. One key component of protecting your health is to *forgive yourself if you are struggling*. There will be times when you will struggle this semester, but *struggling does not mean you have failed*. It means that taking care of yourself is an ongoing process rather than a quick fix. Health does not increase linearly over time - it has ups and downs. Please be forgiving to yourself during any "downs" - *I am here for you.*

- **We will be Flexible about some of the course goals and objectives.** The overall goal for this course is to provide you with a set of practical skills in data analysis, suitable for any field you pursue including biology. While I promise we will achieve these goals, there are likely to be some aspects of the class that we will not get to given the uncertain logistics of the semester. To accommodate this uncertainty, course schedules and materials will be announced, at the very least, on a week-by-week basis. This means we will not have to "rush" through certain materials for the mere sake of advancing to the next section of the course. Instead, the pace of the course will "reveal itself" we learn how to navigate this new learning environment as a team. This also means that the grading scheme is subject to change, *in a way that favors YOU*. For example, if assignment(s) is/are canceled, this may cause other assignments to count "too much" towards your overall grade. I will make sure your grade is not negatively affected by such circumstances.

Evaluation (grading) Policy and associated information:

Your course grade will come from two main components, plus some regular extra-credit opportunities:

- **Attendance and participation (20%)**
 - Attendance is **required** for our synchronous remote classes over Zoom - this means you must actually attend all classes on Mondays, Wednesdays, and Thursdays.
 - Your attendance grade will be derived from 20 "attendance points." You will begin the semester having all attendance points. For every unexcused absence (or day you attend but categorically do not participate), you will lose 1 attendance point. With open and regular communication, it is more likely than not that your absences will be excused. During class, we will discuss how participation works in our remote classrooms. Please note there are a total of 41 scheduled course days. This means if you miss half the classes, you will not receive *any* attendance credit.
 - If you are unable to attend class synchronously on a given day, **you must communicate this with me before class time**. You should not assume that your absences are excused unless you hear back from me.
 - If you are experiencing **technological problems** that are preventing you from coming to class, please document these (screen shots and time stamps!) and email it to me as soon as you are able to. You will not be penalized for circumstances like this that are outside of your control!
 - If a seriously extenuating circumstance arises (e.g. COVID illness for you, family, or close friend), I will work with you on a case-by-case basis to determine the best way for you to proceed in class. Similarly, if you are in an exceptional circumstance and cannot communicate an absence to me before class time,

Data Science for Biologists (BIOL 01301)

you will not be penalized - *please do not worry that I will penalize you if you or a family member is ill.*

- Late entry into Zoom meetings is exceptionally jarring for class discussion. In addition, because we will have already started class if you are late, I may not see you in the Zoom waiting room attempting to enter class (Note: Rowan's Zoom account mandates the waiting room). **Please therefore arrive at least 5 minutes early.** You may not be allowed into the Zoom class if you are more than 5 minutes late (thus making you absent), unless you have previously communicated this with me.
- **You are entitled to TWO PERSONAL HEALTH DAYS where you have a free absence on the basis of "I just need today off."** As long as you notify me before the start of class that you are taking a Personal Day, there will be no ramifications for missing class. *If you are sick, don't "waste" a Personal Day - being sick would be an excused absence!*
- **Weekly assignments (60%)**
 - You can expect one assignment each week of the semester (starting in week 2). You are expected to complete assignments **USING YOUR OWN CODE**, but you are STRONGLY ENCOURAGED to work together (in appropriately socially-distanced settings!) on assignments to master the topics and skills.
 - Your lowest homework grade will be **dropped**. Canvas will automatically take care of this for you when calculating your final grade. You can also interpret this as one allowed "skipped" an assignment, but remember that you are responsible for learning all material regardless.
- **Final independent project (20%)**
 - You will have a final independent class project analyzing a data set of your choosing. More details will be announced as the semester progresses.
- **#TidyTuesday extra credit:**
 - In the early-mid semester (hopefully by October, once we learn a "critical mass" of skills), there will be weekly extra credit opportunities to participate in a community and social-media driven initiative to foster the R community called #TidyTuesday. More details will be announced when it is time to begin #TidyTuesday. *Each successfully completed #tidytuesday is worth either 1% or 0.5% (depending on when you submit) towards your OVERALL course grade. You read that right - UP TO A WHOLE POINT!* You have been thusly incentivized!
 - **Doing this extra credit will also help you to succeed in class - programming requires you to practice, practice, practice, PRACTICE! Without lots of practice outside of class time, you will not do well in this class.**

Your final grade will be converted to a percentage and then to a letter grade according to the table below. These grade boundaries are subject to change, but cutoffs here correspond to the lowest letter grade you can receive for the corresponding percentage. 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%

Data Science for Biologists (BIOL 01301)

B = 83 - 86%	C- = 70 - 72%	F = below 60%
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Zoom usage and policies

- You should plan to arrive to Zoom class meetings **at least 5 minutes early**. Unless you have previously communicated to me that you will be late and you have received a confirmatory response, **you will not be allowed into the meeting room more than 5 minutes late.**
- You are required to use your FULL (preferred) NAME when logging into Zoom. **If I cannot immediately verify your identity, I will not let you into class.**
- You may NOT SHARE the class Zoom link or information with anyone not in our class.
- You are not required to use a webcam, but you are more than welcome to! If you do not have a webcam, please **ensure that a picture of yourself is shown as your profile image.**

Email Policy

As a remote class, it will be even more important that you communicate with me regularly should any concerns (broadly interpreted!) arise. **Please ensure you are crafting professional and adult emails with informative subjects.** Please use the table below to help you!!

Unprofessional/unacceptable email	Professional/acceptable email
Hey professor, I can't make it to class.	Hi Dr. Spielman, Due to reason XYZ, I will be unable to attend class on <whatever day>. Sincerely, Your name
Hi Spielman, When is the homework due?	Dear Dr. Spielman, Can you please remind me what the deadline is for this assignment? -Your name
Hi Dr. Spielman, What's the answer to question 5? -Your name	Hello Professor, I'm struggling with question 5 on the homework. Can we meet to discuss it? Here are times I am available: <times> -Your name
Hi Professor, I don't know how to do #5. -Your name	Hi Professor, #5 on the homework is really confusing to me. I have tried <i>the following strategies</i> <TELL ME ABOUT YOUR APPROACHES!>. Can you help me get on the right track? Thanks, Your name

Data Science for Biologists (BIOL 01301)

Please be aware that I do NOT GUARANTEE EMAIL AVAILABILITY during the following times:

- Monday - Friday, 7 pm - 9 am
- Any time on the weekends

If you email me on Saturday, therefore, do not expect a response until Monday. If you email me after 7 pm, do not expect a response until the following day. **If you don't hear from me, email me again!!! I get >50 emails a day - sometimes they get lost!!**

Other Important Course Policies:

1. Regrade Policy

If you feel that a re-grade of an assignment is merited, you must fill out and submit 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, you can speak with me directly to request a re-grade without this form.

2. Late Assignment Policy

You are expected to submit all assignments on time, *especially* since many assignments will have direct bearing on in-class discussions. Late submissions will be deducted **10%** for each day that they are late. You are further entitled to **one free 24-hour late submission** without penalty, as long as you notify me within the 24 hours before the original deadline that it will be late.

If for whatever reason you are concerned about being able to submit an assignment on time, reach out to me!! It is VERY likely I will work with you on a case-by-case basis!!

3. Academic Integrity and Plagiarism

Plagiarism is taken very seriously in this course and at Rowan University as a whole.

You are expected to always and only submit YOUR OWN CODE. *You should **always** feel free to contact me before the deadline if you are unsure if your code may, perhaps inadvertently, be plagiarized.* Please note: If your friend asks you to send them your code, and your friend then submits your code, *you will be regarded as equally culpable.*

When in doubt, ask!!!! THERE IS NO SHAME IN ASKING FOR HELP. I LOVE HELPING!!!! THERE IS A LOT OF SHAME IN SUBMITTING WORK THAT YOU DID NOT DO.

INSTANCES OF ACADEMIC INTEGRITY VIOLATIONS WILL BE REPORTED TO THE UNIVERSITY. DON'T DO IT. TRUST ME - I CAN TELL IF YOU DO IT. YOU ARE NOT SNEAKY. I HAVE BEEN USING R FOR A LOOOOONG TIME. I CAN IMMEDIATELY TELL IF YOU WROTE YOUR CODE, YOU COPIED IT FROM THE INTERNET, OR YOU COPIED CODE FROM A FRIEND.

JUST DON'T DO IT. PLEASE, DON'T DO IT. I BEG YOU, DON'T DO IT. I WILL NOT SHOW YOU ANY MERCY. CHEATING IS NOT A GOOD ALTERNATIVE TO ASKING ME FOR HELP OR ASKING FOR AN ASSIGNMENT EXTENSION. IF YOU WORK WITH ME, I WILL WORK WITH YOU. IF YOU CHEAT, THERE WILL BE PAPERWORK AND CONSEQUENCES.

Data Science for Biologists (BIOL 01301)

Additional University Policies:

As a student at Rowan University, you are expected to adhere fully to all university-wide academic policies outlined [here](#). Key policies to be aware of can be found at the following links:

- [Classroom Behavior Policy](#) and [Interim Behavior Policy during Fall 2020](#)
- [Academic Integrity Policy](#)
- [Student Accommodation Policy](#)
- [University Attendance Policy](#) and [Interim Attendance Policy during Fall 2020](#)