CDS 102 Syllabus (Spring 2022)
## Introduction to Computational and Data Sciences
Section 2K1

This lab will reinforce how to use computers to analyze data. You will learn how to program in the R programming language and become proficient in using R to manipulate tables of data, create graphs, and conduct basic statistical analyses. To accommodate students with different levels of coding experience, the lab is presented as if all students are learning to code for the first time. The labs complement and allow further practice for the topics covered in CDS 101.

Your section of CDS 102 is taught by Professor Brian Colchao from the Department of Computational and Data Sciences.
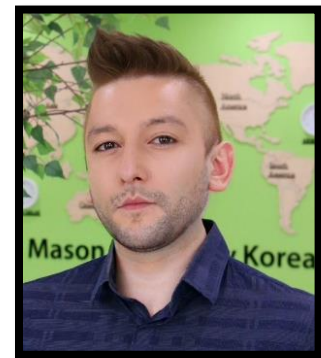
Your tutors for this course are Eun Won Kim and Yena Hong.
- They can be reached through Slack.
- Office hours are virtual, but can be arranged in-person upon request

Description

During this lab, students will develop basic skills for loading, cleaning, transforming, and visualizing real-world datasets using the R programming language and the RStudio integrated development environment. Statistical methods for analyzing, interpreting, and predicting dataset trends are then introduced using randomization and simulation. An emphasis is placed on documenting one's scientific work using the R Markdown format to fulfill the principles of reproducible research. Connections are highlighted between statistical inference and the scientific method and how this is related to both the scientific method's power and its limitations.

- **Classroom:** G301
- **Meeting times:** Thursdays 12:00PM – 1:15PM room G301
- **Office Hours:**
    - Hong: Monday 11AM – 12PM
    - Kim: Tuesday 12PM – 1PM
    - Colchao: Wednesday 4:00 – 5:00 PM
- **Credit hours:** 1.0 credit hour.
- **Prerequisites:** None, but a background in algebra is assumed.
- **Mason Core:** Natural science + lab

Objectives

By the end of the course, students will be able to:

- Obtain, clean, transform, and visualize a dataset using the R programming language.
- Interpret, and predict dataset trends using statistical inference and models.
- Document their work using R Markdown, a reproducible research format.
- Manage files and source code using GitHub.

Materials

Textbooks

None: All course materials will be provided through BlackBoard.

Software

During the course we will use RStudio Server available at https://rstudio.cos.gmu.edu, which provides a complete computing environment that is accessible using any computer with a modern web browser (Firefox and Chrome). Students must also install the R programming language and RStudio on their own computers and will need to install the following applications to match what is available on RStudio Server:

- Programming language: R (https://www.r-project.org)
  - Windows: https://cran.cnr.berkeley.edu/bin/windows/base/
  - Mac: https://cran.cnr.berkeley.edu/bin/macosx/
- Version control: Git (https://git-scm.com)
  - Windows: https://git-scm.com/download/win
  - Mac: https://git-scm.com/download/mac
- Programming software: RStudio (https://www.rstudio.com)
- PDF export: LaTeX (https://www.latex-project.org)
  - TinyTex: https://bookdown.org/yihui/rmarkdown-cookbook/install-latex.html

Platforms

The course will be administered through the following online platforms:

- GitHub: https://github.com
  - GitHub is used for connecting your class files to RStudio Server, tracking changes, distributing starter files for homework assignments and certain module exercises, and for project collaborations

- Slack: https://www.slack.com
  - Slack is the primary communication medium, replacing email (see the *Contact policy* below) while also serving as a discussion board.

- Blackboard: https://mymasonportal.gmu.edu

  - Blackboard operates as the central resource for course materials, homework instructions, and links to the lecture videos hosted on YouTube.
  - Blackboard is also used for module exercises, projects, assignments, and grades.

Policies

Contact policy

All correspondence is to be done using the private, invite-only Slack workspace for the course. **Direct messages on Slack are to be used for contacting me instead of emails**. My ground rules for direct messages are as follows:

- Help will always be given in CDS 101 to those who ask for it. If you are stuck, please reach out to your professor or the tutors on Slack. You are welcome to message us 24 hours a day, 7 days a week.
- Allow up to 24 hours for a response.
- Questions about an assignment should be asked before the due date. Questions asked after 5:00pm on a due date may not receive a response until after the time the assignment is due.
- Messages received over weekends and holidays may receive delayed responses.
- If your questions are complicated, I may ask you to join me in a Zoom meeting or in my office to work through it.
- Emails sent during the first week of classes will be responded to, but I will respond to you using Slack. Emails sent to me after the first week will be redirected to Slack.

Tech support: R, RStudio, GitHub, and your computer

When posting or messaging about an issue, here are some basic questions to answer that will help with troubleshooting:

1. What is happening when you run your code? What were you expecting?
   a. If there's an error message, write what it is. You must provide a screenshot. Be sure to take a real screenshot, not a photograph of your screen using your phone.

Illness and emergencies

It is a student's responsibility to inform me about illnesses or personal/family emergencies that will interfere with submitting work on time. This must be done as soon as possible. In case of illness, you may be asked to provide a doctor's note before being granted an assignment extension or exemption. During the COVID-19 pandemic this is more important than ever.

I understand that certain emotional or physical situations can impact a student's willingness and ability to communicate what is going on and that it can take a few days to inform me about a personal emergency or severe illness. At the same time, all students are expected to exercise personal responsibility. It is not acceptable to wait to tell me about the impacts of a personal illness or emergency until you're about to fail the course due to missing multiple submission deadlines.

Late work policy

Unless otherwise noted, assignments are to be submitted by 11:59pm on the due date. The following penalties apply for most assignments (please note that weekends count as days):

- First day late, by 11:59pm: -10%

- Second day late, by 11:59pm: -20%
- Third day late or later: no credit

If a student submits more than 5 late labs, they will automatically fail the course.

Students are responsible for informing me about any religious holidays, scheduled varsity sports trips, or other school-sponsored activities that will interfere with submitting an assignment on time. Extensions are to be completed within the time-frame I set forth. Exemptions may be granted at my discretion.

Extra credit and grading curves policy

Individual requests for extra credit or a grading curve will not be granted, no exceptions. Any opportunities to earn extra points will be offered to the entire class. Grading curves are handled on a per-assignment basis and are applied to all students equally.

Accommodations policy

Students with disabilities who need academic accommodations, please contact Joanna Park (spark214@gmu.edu) at the Office of Disability Services (ODS) at +82-32-626-5071. All academic accommodations must be arranged through the ODS: http://ds.gmu.edu/ during the first 2 weeks of class. Please notify me after your accommodation has been approved by the Office of Disability Services.

Campus Closure or Class Cancelation/Adjustment Policy

If the campus closes, or if a class meeting needs to be canceled or adjusted due to weather or other concern, students should check Blackboard and Slack for updates on how to continue learning and for information about any changes to events or assignments.

Grading

Breakdown

Category	Weight
Lab Submissions	100%

Schema

Based on the final total score, your final grade will be determined as follows: A+ [97-100], A [93-96], A- [90-92], B+ [87-89], B [83-86], B- [80-82], C+ [77-79], C [73-76], C- [70-72], D [65-69], F [<65].

Expectations

Lab Reports

At the beginning of each lab you will be provided with a set of instructions and a link to obtain your lab repository on GitHub. The lab reports will be completed and submitted using the starter files provided to you in the lab repository. <mark>The labs are like interactive online tutorials, where you will read some instructions, see an example, and then complete an exercise to demonstrate that you understand a concept. When you have completed writing up your report in the RMarkdown file format, you will submit the results on GitHub</mark> using a *Pull Request*.

Final exam

There is no final exam for the labs.

Conduct

Academic integrity

<mark>Plagiarism, copying, cheating, sharing answers, etc. are strictly prohibited</mark>. You will be caught and reported to the University, which can result in failing the course or expulsion. <mark>All course materials and class sessions are considered Intellectual Property</mark> and therefore copyrighted by the instructor. Sharing of any recorded, copied, or other class materials without the professor's written permission is considered stealing and is STRICTLY prohibited.

Students are permitted to ask questions about the assignments on Slack and discuss assignments in private communications, however <mark>it is important to make sure that you write your assignments by yourself and in your own words</mark>, meaning that students are not permitted to collaborate on write-ups for assignments and projects. <mark>Do not duplicate another person's material or ideas and represent them as your own. It is not a sign of respect and both students will be punished.</mark> "Individual assignment" is the default classification for all assignments, exams, and projects in the course. Content that comes from a resource or another student should be properly cited.

ANY MATERIAL THAT IS TAKEN FROM ANOTHER SOURCE AND NOT PROPERLY CITED WILL BE TREATED AS A VIOLATION OF MASON'S ACADEMIC HONOR CODE.

Other violations of Mason's Honor Code will be treated similarly. Suspected violations will be reported to the Office of Academic Integrity. <mark>This report goes to both Mason Korea and the Fairfax campus</mark>. The minimum sanctions I will recommend are:

- <mark>Minor infraction</mark> (e.g. improper citation):
    - First offense (university-wide): 0% on the assignment
    - Second offense: F for the course
    - Third offense: Suspension from the university

- <mark>Major infraction</mark> (e.g. copying from another student's lab):

- First offense: F for the course
- Second offense: Suspension from the university
- Third offense: Expulsion from the university

Decorum/discourse

Students are expected to be civil in their conduct and respectful of their fellow classmates and the professor for the duration of the course on all discussion platforms. Students are expected to follow proper grammar and punctuation in their posted messages and to refrain from using internet slang, abbreviations, and sarcasm.

I will address violations of classroom decorum on a case-by-case basis and reserve the right to enact grade-based penalties for disruptive or repeat violations. Penalties for decorum violations cannot be negotiated or appealed.

Mason diversity statement

George Mason University promotes a living and learning environment for outstanding growth and productivity among its students, faculty and staff. An emphasis upon diversity and inclusion throughout the campus community is essential to achieve these goals. Diversity is broadly defined to include such characteristics as, but not limited to, race, ethnicity, gender, gender identity, religion, age, disability, and sexual orientation. Diversity also entails different viewpoints, philosophies, and perspectives. Attention to these aspects of diversity will help promote a culture of inclusion and belonging, and an environment where diverse opinions, backgrounds and practices have the opportunity to be voiced, heard and respected.

Disclaimer

The professor reserves the right to modify this syllabus at any time during the course to improve the learning experience and classroom environment. The professor reserves the right to adjust grades as he/she deems appropriate. The pacing of the course and the list of covered topics may also be adjusted in response to student progress.