CDS 102 Syllabus (Summer 2020)

Introduction to Computational and Data Sciences Lab

Section

Description

In this lab, students will develop basic skills for understanding, obtaining, 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 and approached from a computational point of view using randomization and simulation. Emphasis is placed on documenting one's scientific work using RStudio in conjunction with GitHub to fulfill the principles of reproducible research. The labs complement and allow further practice for the topics covered in CDS 101.

- **Classroom:** Virtual
- **Meeting times:** Asynchronous
- **Credit hours:** 1.0 credit hour
- **Prerequisites:** Computer running Microsoft Windows or Apple iOS and reliable internet access
- **Mason Core:** Natural science + lab requirements fulfilled if CDS 101 is also completed

Objectives

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

- Use GitHub for collaborating on a reproducible research document
- Obtain, clean, transform, and visualize a dataset using the R programming language
- Interpret, and predict dataset trends using statistical inference and models

Materials

Software

Students have two (2) options regarding how they wish to code their work: in an online environment or to download the proper program onto their personal computers. During the course we will use RStudio Server available at https://rstudio.cos.gmu.edu, which provides a complete computing environment. However, if the server were to go down, students are strongly advised to have installed RStudio on their own personal computers, running Windows or iOS, and will need to install the following applications in order 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
- PDF export: LaTeX (https://www.latex-project.org)
  - Windows: https://mirrors.rit.edu/CTAN/systems/win32/miktex/setup/windows-x64/basic-miktex-2.9.6753-x64.exe
  - Mac: http://tug.org/cgi-bin/mactex-download/MacTeX.pkg
- Programming software: RStudio (https://www.rstudio.com)
  - Windows: https://s3.amazonaws.com/rstudio-ide-build/desktop/windows/RStudio-1.2.830.exe
  - Mac: https://s3.amazonaws.com/rstudio-ide-build/desktop/macos/RStudio-1.2.830.dmg

Technical support will only be provided for RStudio Server.

Platforms
The course will be administered through the following online platforms:

- Course website (http://labs.cds101.com/)
- GitHub (https://github.com)
- Slack (sp20-masoncds101.slack.com)
- Blackboard (https://mymasonportal.gmu.edu)

The course website operates as the central repository for the lab instructions. Slack is the primary communication medium, replacing email (see the *Contact policy* below) and serving as a discussion board. GitHub is used for storing your classroom files, distributing and collecting homework assignments, handing out example code. Blackboard will be used for posting grades.

Policies

Contact policy

All correspondence is to be done using a Slack workspace. Direct messages on Slack are to be used for contacting me instead of emails. Your Slack username *must* be registered and associated with your Mason @gmu.edu email address per your FERPA agreement.

Slack Requirements

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

Post all technical issues or error messages for R, RStudio, GitHub, and your computer on Slack. This is to create a welcoming online environment where students can work together and learn from each other. Many times students encounter similar problems, so students can choose to either help out or see how to resolve what is likely a common problem. Students should not share or compare answers publicly, or privately, as this is considered a violation of the honor code. If it becomes clear that the error or issue is highly specific, then discussion can be moved to Direct Message or handled via a remote desktop sharing session with the instructor.

Illness and emergencies

It is a student's responsibility to inform the instructor about illnesses or personal/family emergencies that will interfere with submitting work on time. Due to the current circumstances revolving around the COVID-19 pandemic, students are expected more than ever to communicate any illness that will affect their performance as soon as possible. All cases of illness will be handled on a case-by-case basis with the complete discretion of the instructor. Students who fail to communicate an illness or family emergency that causes them to fail an assignment for over two weeks past a deadline will not be given an opportunity to redress their missed assignments.

Attendance policy

Students are expected to complete every lab on time, and links to begin work will be distributed weekly. Students are responsible for informing me about upcoming absences due to religious holidays, scheduled varsity sports trips, or a school-sponsored activities. Any make-up work is to be completed within the time-frame set forth by the instructor. Exemptions may be granted at my discretion.

Late work policy will fail you

Unless otherwise noted, labs are to be submitted by the given due date. The following penalties apply for labs (please note that weekends count as days):

- First day late, by 11:59pm: -10%
- Second day late, by 11:59pm: -20%
- Third day late, by 11:59pm: -30%
- Fourth day late or later: no credit

Extensions or exemptions may be granted at my discretion.

Regrading appeals policy

Regrade appeals need to be communicated via Slack, no exceptions. Appeals are only to be used for correct answers being marked as incorrect, misapplication of the grading rubric, or incorrectly tallied points. Submissions need to clearly state what you want regraded and to justify the request by citing evidence[1]. The number of points a question, exercise, or rubric category is worth or that were deducted for an incorrect answer or mistake cannot be appealed and are not up for debate or negotiation.

Accommodations policy

Students with disabilities who need academic accommodations, please see me and contact the Office of Disability Services (ODS) at (703) 993-2474. All academic accommodations must be arranged through the ODS: http://ods.gmu.edu/.

---

[1] Acceptable evidence includes class notes from CDS 101 (provide date of class), a reading passage (provide full citation), or another valid source (textbooks, official publications, etc).

Instructor

Brian Colchao

- **Office**: On <mark>Slack</mark>
- **Email:** jcolcha1@masonlive.gmu.edu (poor choice for student/instructor communication)

Dominic White (back-up)
- **Office**: On Slack
- **Email**: dwhite34@gmu.edu

Grading

Breakdown

Category	Weight
Lab Reports:	90%
Participation:	10%

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

Participation – 10%

Participation in an online forum presents a unique challenge. The current circumstances are new for both students and instructors. Students will not be expected to speak publicly or present videos online for this course. However, students are expected to give their full effort while completing exercises and to complete them within the expected timelines. <mark>Participation is worth 10% of students' final grade and will be calculated by the timeliness of students' lab submissions. Each lab submitted late will cause a student to lose 1 point of their participation grade.</mark>

If a student submits more than 10 late labs they will automatically fail the course.

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 similar to 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 final result on GitHub</mark> using a *Pull Request*.

Final exam

There is no final exam for the labs.

Conduct

Academic integrity

"Student members of the George Mason University community pledge not to cheat, plagiarize, steal, or lie in matters related to academic work."[2]

Your lab report is to be written by yourself and in your own words. Do not duplicate or paraphrase another person's material or ideas and represent them as your own. Content that comes from a resource or another student should be properly cited.

ANY MATERIAL THAT IS TAKEN IN WHOLE OR IN PART 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. Please see the Honor Code page for details.

Decorum/discourse

Students are expected to be civil in their classroom conduct and respectful of their fellow classmates and the instructor for the duration of the course. Hate speech of any kind will not be tolerated. Internet trolling will not be tolerated. Conversations are expected to remain polite and on-topic. All expectations of civil and respectful behavior still apply for all online discussions. Students are expected to follow proper grammar and punctuation in online posts and to refrain from using internet slang, abbreviations, and disrespectful sarcasm.

I will address violations of classroom decorum on a case-by-case basis and reserve the right to enact grade-based penalties for highly 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 instructor reserves the right to modify this syllabus at any time during the course to improve the learning experience and classroom environment. The digital version of the syllabus on the course

---

[2]   Office for Academic Integrity. *2017-2018 Honor Code and Honor System.* Web. 27 Aug. 2017.

website will be updated to reflect the changes. The pacing of the course and the list of covered topics may also be altered in response to student progress.

The course objectives reflect what a student is expected to understand by the end of the course after putting in the necessary time and effort both inside and outside the classroom and completing all assignments. These outcomes are not a guarantee, and students will get more out of the course the more they put into it. Any acquired skills and knowledge can fade over time if not reviewed or practiced after the course concludes.