STAT 412/612 STATISTICAL PROGRAMING IN R **SYLLABUS**  FALL 2021

Instructor J. Dickens, PhD [jdickens@american.edu](mailto:jdickens@american.edu)

Class Meeting Information : Thursdays 5:30pm – 8:10pm Don Myers room

Office Location : Don Myers room 218C

Office Hours: Wednesdays 5pm – 7pm Thursdays 2pm – 4pm Fridays 5pm – 7pm (you can also email me for help if you cannot make office hours) Office Hours will be held via Zoom on weekends if needed; the link will be posted on Canvass

**Overview of Topics and Course Objectives**

The basics of programming using the open source statistical program R. Inputting data, performing basic analyses, graphing, data types, control structures and functions in R. Most of the course will involve the usage of the tidyverse packages in R and the RStudio IDE (Integrated Development Environment).

Learning Objectives;

* Reproducible research using R
* Use R as a powerful calculator
* Import data from external sources
* Perform analyses including hypothesis testing and regression
* Write basic R programs using control and data structures
* Install and use packages for specific applications
* Use graphical tools to visualize and understand data

Required Course Materials:

* Laptop or desktop computer with high speed internet access.
* Textbook: R for Data Science by Wickham and Grolemund(O’Reilly) http: //r4ds.had.co.nz/ and style.tidyverse.org

Class Structure This class will be a blend of lecture, class discussion and labs. I want all students to be involved during class and please do not hesitate to ask questions whenever something is unclear to you. You are expected to attend all online class meetings. Online class meetings will be recorded so that you will have access to class discussions in the event that you cannot attend class due to an emergency or for other follow up reasons. All students are responsible for any assignments or papers made available during, before or after class. Important class related documents will, however be posted on blackboard.

Data scientists must learn to discover solutions for themselves. You should expect to have to perform research (using Google, Stackoverflow, etc) to do your assignments. All you need to complete an assignment may not be provided to you in the lectures and text book. This is an essential part of becoming a data scientist!

GRADED WORK

**Assignments**: During the semester I will assign, collect, and grade assignments. There will be approximately 10 formal assignments throughout the semester.

You may receive assistance from other students in the class as well as myself, and / or the TA designated for this class., but your submissions must be composed of your own thoughts, coding, and explanations. I expect you to get ideas from online resources such as stackoverflow or github when you get stuck. Please cite your source when you do so and be specific about what you have added to it. You should be able to redo the code “cold” when you do this. Failure to do so is a violation of AU’s Academic Integrity Code.

Generally, I do not accept late assignments. To accommodate extraordinary circumstances and illness, I will drop the lowest assignment grade. You should not use this as an excuse to skip an assignment, but rather to handle a situation where you are unable to submit an assignment in a timely manner due to an emergency.

**Exams:** We will have approximately three exams. Any material covered in class, reading assigned, or on assignments is “fair game”. No make-up exams will be given unless you have an extremely compelling excuse such as observance of a religious holiday (In which case you need to let me know in advance) or a documented medical emergency.

**Projects:** Students taking the course for graduate credit will prepare a final project using the tools learned in the class. Work with me to get your topic approved. Undergraduate students may complete a final project at their option. Your project should involve working with a fairly large real-world dataset to answer some question of interest to you. It should be reproducible and include graphical representations of your data.

**Grading:** You should be able to explain your work on assignments, exams, and projects and your rationale. Based on your explanation (or lack thereof), I may modify your grade**. Exams for Graduate students will be more challenging but will reflect the material, concepts and procedures discussed and demonstrated in class.**

Your final grade will be determined as follows;

|  |  |
| --- | --- |
| **Graduate Students** | **Undergraduate Students** |
| Classwork 10% Homework(40%) | Classwork 10% Homework (40%) |
| Exams (35% composed of : Exam 1 =10%,  Exam 2 = 10%, Final Exam 15%) | Exams (50% composed of : Exam 1 = 15%, Exam 2 = 15%, Final Exam = 20%) |
| Final Project = 15% |  |

Grading Scale

A (100 – 95), A- (94 – 89), B+ (88 – 85), B (84 – 80), C+ (79 – 75), C ( 74 – 70),

D ( 69 – 50) F ( 49 – 0)

**Textbook / Topical Coverage and general pacing**

Week 1 R Introduction and Course Preliminaries

Week 2 Chapter 1 Week 9 Chapter 9

Week 3 Chapters 1 and 2 Week 10 Chapters 9 and 10

Week 4 Chapter 3 Week 11 Chapter 10 and 11

Week 5 Chapters 3 and 4 Week 12 Chapter 11

Week 6 Chapter 5 Weeks 13 Chapter 12

Week 7 Chapter 6 and 7 Week 14 Chapter 12

Week 8 Chapters 7 and 8 Week 15 Review and/or additional topics if time permits.

**ASSISTANCE/SUPPORT**: Before receiving any assistance please make sure that you have read through the class materials, and that you have made a fair attempt at the problem. You have many excellent resources to use for assistance outside of class:

• Always feel welcome to come visit me during my office hours. Office hours are often busy so please come prepared with specific questions. If you are having ANY trouble with the class, please come see me about it as soon as possible. Do not wait until it is too late.

• I set aside a few hours each week specifically for individual meetings with students. If you need extra help, please email me to set up a time.

• Use your peers! Feel free to work with your classmates on assignments. Just make sure that you write down the solutions in your own words, just as you do in class.

• You are also encouraged to ask me questions online via email. If you are having problems with your code, be sure to attach your code to your email. Additional support services are available on campus that may assist you in successfully completing the course requirements. Details provided by each support service’s office are provided below.

• **The Academic Support and Access Center** (x3360, MGC 243) supports the academic development and educational goals of all AU students while also providing support to students with disabilities. We offer workshops on topics of interest to all students such as time management, note taking, critical thinking, memory skills, and test taking. Additional support includes free private and group tutoring in many subjects, supplemental instruction, The Math Lab and The Writing Lab.

• **The Counseling Center** (x3500, MGC 214) is here to help students make the most of their university experience, both personally and academically. We offer individual and group counseling, urgent care, self-help resources, referrals to private care, as well as programming to help you gain the skills and insight needed to overcome adversity and thrive while you are in college. Contact the Counseling Center to make an appointment in person or by telephone, or visit the Counseling Center page on the AU website for additional information.

**• Center for Diversity & Inclusion** (X3651, MGC 201) is dedicated to enhancing LGBTQ, Multicultural, First Generation, and Women's experiences on campus and to advance AU's commitment to respecting & valuing diversity by serving as a resource and liaison to students, staff, and faculty on issues of equity through education, outreach, and advocacy.

• **OASIS: The Office of Advocacy Services for Interpersonal and Sexual Violence** (X7070) provides free and confidential advocacy services for anyone in the campus community who is impacted by sexual violence (sexual assault, dating or domestic violence, and stalking).

A Few Additional Notes

• I expect you to be courteous to me and your fellow classmates both inside and outside of the classroom. This generally just involves a bit of common sense. Cell phones need to be silenced and put away during class. Laptops should be out during class time for use only on class activities. Please save texting, typing/sending emails, checking Facebook, etc. for outside of class time. Any correspondence pertaining to the course needs to be handled in a respectful manner.

• Please let me know during the first week of classes if you have any special needs that require accommodations.

• A grade of incomplete will only be given under extreme circumstances and will not be granted to any student who is failing.

• In the event of an emergency, refer to the AU information line at (202) 885-1100 and the AU Web site (http://www.american.edu/emergency) for general university-wide information. In the event that class is cancelled for ANY reason I will communicate with you via email and Blackboard to let you know what work you will be responsible for.

• Please be sure that you are familiar with AU’s Academic Integrity Code, as I am required to report any cases of academic dishonesty to the dean of CAS. For your review: http://www.american.edu/academics/integrity/.

Important course dates:

Exam 1 October 4th , 2021

Exam 2 November8th, 2021

Graduate Student Presentations 12/10 – 12/18/2021

Final Exam December13rh 2021

On the following pages I have attached the official Spring 2021 academic calendar that you may find to be informative and useful.

FALL SEMESTER CALENDER 2021

|  |  |  |
| --- | --- | --- |
| 8/1/2021 | Sun | Payment due for fall classes |
| 8/21/2021 - 8/29/2021 | Sat-Sun | All-American Welcome (Events begin with new student move-in and continue through the first two weeks of classes) |
| 8/27/2021 | Fri | Last day to register for fall without a late fee |
| 8/30/2021 | Mon | Fall classes begin |
| 8/30/2021 | Mon | Late registration (with $100 fee) begins |
| 9/3/2021 | Fri | Late registration for fall ends |
| 9/6/2021 | Mon | Labor Day; no classes, university offices closed |
| 9/13/2021 | Mon | Last day to add a fall course, internship, Independent Reading or Research, or Community Service-Learning project |
| 9/13/2021 | Mon | Last day to drop a fall course for a 100% refund and without a "W" recorded |
| 9/20/2021 | Mon | Last day to withdraw from a fall course for a 50% refund |
| 9/27/2021 | Mon | Last day to withdraw from a fall course for a 25% refund (no refunds after this date) |
| 10/1/2021 - 10/3/2021 | Fri-Sun | All-American Weekend |
| 10/4/2021 | Mon | Schedule of Classes for Spring published |
| 10/4/2021 | Mon | Academic alerts due in Registrar's Office |
| 10/15/2021 | Fri | Fall Break; no classes, university offices open |
| 10/25/2021 | Mon | Spring priority registration for graduate students begins |
| 10/31/2021 | Sun | Last day to apply for fall graduation |
| 11/1/2021 | Mon | Spring priority registration for undergraduate students begins |
| 11/5/2021 | Fri | Last day to withdraw from a fall course or change a grade option (end of the 10th week) |
| 11/12/2021 | Fri | Theses and dissertations due in deans’ offices for fall degree candidates |
| 11/23/2021 | Tue | Tuesday classes cancelled; Friday classes meet |
| 11/24/2021 - 11/28/2021 | Wed-Sun | Thanksgiving holiday; no classes; university offices closed Thursday and Friday |
| 12/10/2021 | Fri | Fall classes end. Theses and dissertations due in Registrar's Office for fall degree candidates |
| 12/11/2021 - 12/12/2021 | Sat-Sun | Fall Study Days |
| 12/13/2021 - 12/18/2021 | Mon-Sat | Fall final examinations |
| 12/19/2021 | Sun | Fall Commencement Ceremony for August and December graduates |
| 12/23/2021 | Thu | All full-term fall classes final grades due. |
| 12/23/2021 | Thu | Official Degree Award Date (date that appears on December diplomas; no event associated with this date) |
| 12/24/2021 - 1/2/2022 | Fri-Sun | Winter break; university offices closed |

Lets have a great semester!!