

STA 6233: Advanced R Programming – Spring 2020

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Office Hours/Availability: Thursdays 5:00 – 6:00pm. I will make every effort to respond to e-mails, texts within 24hours. I will not respond over the weekend. Do not text/call after 9:00pm on any day.

Class Location/Meeting Times

Main Campus, BB 3.02.30; Fridays 5:00 – 7:45pm

Description of Course

Prerequisites: STA 5093 and experience of basic R Programming. R function programming, Data Manipulation with dplyr, object-oriented programming, R graphics using ggplot2 and Google Vis, application development using Shinny, Performance enhancement: Speed and Memory, how to make R packages, Interfacing R to other languages such as Hadoop, SQL, and Python.

This course is designed to move forward your utilization of R in a practical environment. A basic understanding of coding in the R environment is assumed. If you do not have prior R experience this course will be difficult and frustrating as we will not spend much time on rudimentary tasks. Although you may find the applications discussed in this course beneficial for research purposes, the main aim of this course will be to equip you to use R as one would at a daily job in a Fortune 500 company. In this sense, the course materials and assignments will focus more on practical application than theoretical understanding.

By completing this course, you will have the opportunity to:

1. Develop high-end graphical representations of data
2. Find ways to simplify your code for readability and performance
3. Learn how to interface R with SQL, Python, and Github
4. Use web and document scraping for innovation and curation of data
5. Learn how to present your highly technical work to non-technical audiences in a clear, concise, and brief manner

Required Materials

All required readings will be available on Blackboard Learn. You will have to incur costs of printing posters, but this is minimal compared to textbooks. Additionally you will have to have access to a laptop to use during the course.

Course Policies

Attendance

Students are expected to attend and actively participate in the classroom discussions. Failure to attend will significantly decrease your success in the class. You are responsible for the material presented in class regardless of whether you are in attendance. If you show up at the end of the semester and I don't recognize you, chances are you haven't attended a significant portion of the course.

Classroom Etiquette

I consider the classroom to be a safe, productive environment. As such, we will maintain a harassment-free classroom. I encourage you to share your viewpoints in an appropriate manner and expect that you will respect the viewpoints of others. Part of classroom etiquette is remaining engaged throughout course time. Please refrain from side conversations as they are distracting to others around you and to me. I hear your conversations and it throws off my train of thought usually resulting in longer class periods. I will call you out for repeated offenses and it will be awkward – because you are adults and should act as such.

Projects and Presentations

Assignments are due on the day indicated in the syllabus before the start of class at 5:30PM via Learn. **No late work will be accepted.** Additionally, assignments *will not* be accepted via email. *We will discuss all assignments in much more detail in class.

Teams

Given the size of this course, you all will be assigned to a team. This team provides troubleshooting support of each other's code. They are your first line of defense for trouble with code such as reviewing code to find where potential errors exist. If team members cannot find a solution within a reasonable time, then you may e-mail/text me directly concerning this. Note that I will not continue to troubleshoot your code. As a burgeoning data scientist this will largely be your and your team's responsibility.

Grades

This is a graduate level course. I assume you are in this course to gain valuable information. I also assume you will put forth maximum effort and work during and outside of class. Failure to complete projects and presentations may result in an incomplete or failing grade.

University Policies

Please visit <http://www.utsa.edu/syllabus> for University policies including those related to accommodations and academic dishonesty.

PROJECTS

This course will have two main projects and presentations of those projects along with an evaluation of your peers' work.

Document/Web-scraping

This project focuses on the creation of a unique dataset using data that are mined from documents and/or web sources. You will be responsible for coming up with a research question that you desire to answer using data that are previously unavailable. This task is designed to sharpen your skills in creative problem solving and ability to distill copious information into usable products using R packages centered on text manipulation, data frame management, feature creation, and regular expressions.

You will create a poster style presentation that will be showcased in a course symposium open to the department and the public. You will also evaluate your peer's work providing constructive criticism and encouragement.

Interactive Project

For this project you will have to design an interactive presentation using data to answer a different research question. This interactive project will either be a web document utilizing graphs and interactives from ggplot, Plotly, Google Vis, or d3 or you will create and deploy a Shiny Application. This task will allow you to use R packages centered on graphical representations of data including learning how to write and compile R Markdown files. Additionally, this project sharpens your ability to distill complex data to everyday audiences in a manner they find engaging and understandable.

You will publish your results online via Github and will be responsible for providing feedback to two of your classmates on their slide deck, use of graphics and interactivity, and your own ability to understand the main takeaway from their project.

Summary of Assignments

Poster Presentation
Evaluation of Peer's Posters
Interactive Project
Evaluation of Peer's Interactive Projects
Classroom Participation

Grading Scale

A+ = Successful Completion of All Projects
Incomplete/No-Credit = Unsatisfactory Work

Tentative Class Schedule

Tentative Course Schedule of Assignments

Date(s)	Material to be Covered	Readings/Assignments/Exercises/Etc.
January 24th	<ul style="list-style-type: none"> • Introduction to Course 	
January 31st	<ul style="list-style-type: none"> • Data Manipulation: plyr, dplyr, Data Table 	
February 7th	<ul style="list-style-type: none"> • Data Readability and Performance: Functions, Loops, and Package Creation 	Idea for Document/Web Mining Due
February 14th	<ul style="list-style-type: none"> • Document and Web Mining 	
February 21st	<ul style="list-style-type: none"> • R Connections: Using and Learning Regular Expressions 	
February 28th	<ul style="list-style-type: none"> • Making Presentation Worthy Graphs: ggplot 	
March 6th	<ul style="list-style-type: none"> • Course Symposium 	Document/Web Mining Project Due
March 13th	<ul style="list-style-type: none"> • Spring Break – No Class 	
March 20th	<ul style="list-style-type: none"> • Github and R Markdown 	Peer Evaluation of Document/Web Mining Projects Due
March 27th	<ul style="list-style-type: none"> • Making Interactive Presentations: Plotly and Google Vis 	Idea for Interactive Project Due
April 3rd	<ul style="list-style-type: none"> • Shiny Apps Part 1 	
April 10th	<ul style="list-style-type: none"> • Shiny Apps Part 2 	
April 17th	<ul style="list-style-type: none"> • R Connections: SQL Coding Examples and Hadoop 	
April 24th	<ul style="list-style-type: none"> • R Connections: Python Coding Examples 	
May 1st	<ul style="list-style-type: none"> • Working Week – No Class 	Interactive Project Due
May 8th	All Peer Evaluations Due Friday, May 8 th 5:45pm	