

STA 4233. INTRODUCTION TO PROGRAMMING AND DATA MANAGEMENT IN R

SPRING 2021

ONLINE ASYNCHRONOUS COURSE

INSTRUCTOR: JOSEPH CAMPBELL, PH.D.

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OFFICE LOCATION: BB 4.05.04

OFFICE HOURS: BY APPT. OR BEFORE AND AFTER CLASS

OFFICE PHONE: (210) 458-6351

COURSE DESCRIPTION

This course introduces statistical computing and programming using the R language. Topics include preprocessing/manipulating datasets, summarizing/visualizing data, and conducting basic statistical analyses using R. Other topics include writing R functions, object oriented programming, statistical simulation and resampling, interfacing R with other programming language environments such as SQL, Python, C++, and Hadoop. Techniques for efficient programming will be stressed. The concept of high-performance computing (multi-core/parallel-processing) is also demonstrated. (Formerly titled Statistical Applications Using SAS Software.) Generally offered: Spring. Course Fees: BISP \$20; BTSI \$15; LRB1 \$21.

COURSE TEXTBOOKS AND MATERIALS

There is one required textbook for the course:

- R for Everyone: R for Data Science: Import, Tidy, Transform, Visualize, and Model Data by Hadley Wickham and Garrett Golemund (2017). ISBN-13: 978-1491910399 from Oreilly
- There will also be a combination of relevant research papers, books, and documentation from relevant systems, as well as readings from the web.

COURSE REQUIREMENTS

1. **Teaching and Learning Style:** This course is taught online as an asynchronous learning course
2. **Technology Expectations:**
 - R statistical computing software. You are not required to buy/rent this. Use it in the various computer labs around UTSA or access it via citrix.utsa.edu
 - R is free so you can easily use it at any company that you may end up at! R can be downloaded from <http://www.r-project.org/>
 - Rstudio is a recommended interface for the R software. It is also free, and it runs on Windows, Mac, and Linux operating systems. <http://www.rstudio.org>
 - Internet access to use the supplements. Internet access is also provided in several computer labs at UTSA
3. **Attendance Policy:** Asynchronous learning happens on your schedule. Materials for reading, lectures for viewing, assignments for completing, and exams for evaluation are provided via Blackboard. You have the ability to access these resources and satisfy the submission requirements within a flexible time frame; however, students fall more than 4 class topics may be withdrawn.
4. **Participation Policy:** Students are strongly discouraged from an irregular learning schedule that will normally lead to poor performance in the course. Deadlines are posted in the course schedule and you are expected to complete the assignments on time.
5. **Late Work, Incomplete Work Policy, Makeup Work:** Missed examinations with documented extenuating or mitigating circumstances will be handled by the instructor on a one-on-one basis. No late homework is accepted. Poor presentation of assignments will result in a deduction in points.
6. **Midterm Grades:** Faculty are required to report midterm grades for all freshmen, and for all other students whose course performance at the time midterm grades are submitted is at the level of a grade of "D" or "F".
7. **Blackboard:** All course correspondence will be through the Blackboard facility. Information including the course calendar, lectures, assignments, guidelines, grades and announcements will be posted. Students are responsible for all material that is posted on Blackboard.

COURSE SCHEDULE

WEEK OF	TOPIC	READING	ASSIGNMENT
1	Tue, Jan 19	Welcome & Introduction	Ch. 1
I EXPLORE			
2	Tue, Jan 26	Data visualization	Ch. 3
3	Tue, Feb 02	Data transformation	Ch. 5
4	Tue, Feb 09	Exploratory Data Analysis	Ch. 7
II WRANGLE			
5	Tue, Feb 16	Data import	Ch. 11
6	Tue, Feb 23	Tidy data	Ch. 12
7	Tue, Mar 02	Relational data	Ch. 13
8	Tue, Mar 09	Spring Break, No class	
9	Tue, Mar 16	Strings	Ch. 14
10	Tue, Mar 23	Factors & Dates and times	Chs. 15 & 16
III PROGRAM			
11	Tue, Mar 30	Pipes & Functions	Ch. 18 & 19
12	Tue, Apr 06	Vectors	Ch. 20
13	Tue, Apr 13	Iteration	Ch. 21
IV MODEL			
14	Tue, Apr 20	Model basics & Model building	Ch. 23 & 24
15	Tue, Apr 27	Many models	Ch. 25
V COMMUNICATE			
16	Tue, May 04	R Markdown & Graphics for communication	Ch. 27 & 28
17	Tue, May 11	R Markdown formats & workflow	Ch. 29 & 30

LETTER GRADE

The final course grade will be based on the following scale:

A = 90-100	B = 80-89	C = 70-79	D = 60-69	F = 0-59
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DETAILED GRADING SCHEME

Assignment #1	20%	You are required to explore a air quality data set using ggplot
Assignment #2	20%	You will clean a world tourism data set
Assignment #3	20%	You will complete code to perform iteration on two lists from github and write functions to automate some calculations on the USDA crop data.
Assignment #4	20%	We'll examine a crime data set and see which models might help us summarize best.
Assignment #5	20%	You'll need to submit either a web document with an interactive map or a web presentation with an interactive plot.
Total Grade	100%	

UTSA SERVICES AND POLICIES

COUNSELING SERVICES

Counseling Services provides confidential, professional services by staff psychologists, social workers, counselors and psychiatrists to help meet the personal and developmental needs of currently enrolled students. Services include individual brief therapy for

personal and educational concerns, couples/relationship counseling, and group therapy on topics such as college adaptation, relationship concerns, sexual orientation, depression and anxiety. Counseling Services also screens for possible learning disabilities and has limited psychiatric services. Visit Counseling Services at <http://utsa.edu/counsel/> or call (210) 458-4140 (Main Campus) or (210) 458-2930 (Downtown Campus).

STUDENT CODE OF CONDUCT AND SCHOLASTIC DISHONESTY

The Student Code of Conduct is Section B of the Appendices in the Student Information Bulletin. Scholastic Dishonesty is listed in the Student Code of Conduct (Sec. B of the Appendices) under Sec. 203 <http://utsa.edu/infoguide/appendices/b.html#sd>

STUDENTS WITH DISABILITIES

The University of Texas at San Antonio in compliance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act provides “reasonable accommodations” to students with disabilities. Any student with a disability who is requesting an accommodation for this course must provide the instructor with official documentation in the form of a letter from Student Disability Services. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.utsa.edu/disability or by calling Student Disability Services at (210) 458-4157 (Main) or (210) 458-2945 (Downtown).

TOMÁS RIVERA CENTER

I encourage you to utilize the Tomás Rivera Center’s (TRC) student support services for assistance in study strategies and course content. These services are available to you at no additional cost. For more information regarding these services, please visit the TRC web site at www.utsa.edu/trcss.

- Academic Success Coaching provides one-on-one study skills assistance through Academic Coaching and group study skills assistance through the Expert Learner Series Workshops. Call the office to schedule an Academic Coaching appointment at (210) 458-4694, visit the TRC web site for the Expert Learner Series schedule, or stop by MS 1.02.02.
- Supplemental Instruction (SI) offers student-led study groups using collaborative learning for historically difficult classes. Supported courses and schedules can be found on the TRC web site or check with your class SI Leader for details. You can call the SI office if you have questions or for more information at (210) 458-7251.
- Tutoring Services provides walk-in tutoring in a variety of subjects with several locations to choose from and the Math Assistance Program (MAP) for assistance in College Algebra and Pre-Calculus. Call (210) 458-6783 for more information or visit the TRC web site for tutoring schedules.

If you are taking classes at the DT Campus, the TRC Downtown offers a variety of services to assist you. Stop by the TRC at the Downtown Campus in DB 2.114 or call (210) 458-2838.

WRITING CENTER

At the Judith G. Gardner Center for Writing Excellence, peer tutors help undergraduate and graduate students with any step in the writing process, from brainstorming and understanding an assignment to planning and revising. They can help with all types of writing assignments. In addition to one-on-one tutoring, they offer workshops throughout the semester on documentation and other writing topics. There are two locations: JPL 2.01.12D (main campus) and FS 4.432 (downtown campus). They also offer online tutoring seven days a week. To learn more about their hours and to make an appointment, visit the website: utsa.edu/twc.

TRANSITORY/MINOR MEDICAL ISSUES

In situations where a student experiences a transitory/minor medical condition (e.g. broken limb, acute illness, minor surgery) that impacts their ability to attend classes, access classes or perform tasks within the classroom over a limited period of time, the student should refer to the class attendance policy in their syllabus.

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THE ROADRUNNER CREED

The University of Texas at San Antonio is a community of scholars, where integrity, excellence, inclusiveness, respect, collaboration, and innovation are fostered.

As a Roadrunner, I will:

- Uphold the highest standards of academic and personal integrity by practicing and expecting fair and ethical conduct;
- Respect and accept individual differences, recognizing the inherent dignity of each person;
- Contribute to campus life and the larger community through my active engagement; and
- Support the fearless exploration of dreams and ideas in the advancement of ingenuity, creativity, and discovery.

Guided by these principles now and forever, I am a Roadrunner!



CHANGES

This syllabus is provided for informational purposes regarding anticipated course content and schedule of courses. It is based upon the most recent information available on the date of its issuance and is as accurate and complete as possible. I reserve the right to make any changes necessary and/or appropriate. I will make every effort to communicate any changes in a timely manner. Students are responsible for the awareness of these changes.

