2222-LAPS-5360-001/-002/-900
Introduction to Data Analysis and R
Spring 2022

Instructor Information

Instructor(s)
Dr. Vitomir Kovanovic
Dr. Srecko Joksimovic

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Faculty Profile
You will be able to find information about the course instructors at
https://mentis.uta.edu/explore/browse

Office Hours
Given the global nature of our program, instructors will meet with students as needed via Microsoft Teams. Students can schedule a time with faculty via email.

Course Information

Section Information
2222-LAPS-5360-001/-002/-900

Time and Place of Class Meetings
This course will take place online only. While the majority of the course will be completed asynchronously, we plan to host a synchronous lecture one day each week – **Monday at 7pm US CT**. We encourage you to attend, but we understand that it might not be possible. All lectures will be recorded, and we will be available to answer any questions that you might have.

Description of Course Content
In this course, students will learn fundamental elements of conducting data analysis in the R programming language, including basic operations, data structures, dataset cleaning and manipulation, and visualization.

Student Learning Outcomes

- Students will be able to describe the theoretical models commonly used in learning analytics and data analysis with educational data
- Students will demonstrate a broad understanding of the fundamental elements of conducting data analysis in R programming language.
- Students will demonstrate a working knowledge in applying standard processes to prepare large data sets for data exploration.
- Students will demonstrate a working knowledge in performing data exploration on large data sets using visualizations and statistical techniques to identify relationships and opportunities.

Required Textbooks and Other Course Materials
The course will use the following textbook:

Kennedy, R., & Waggoner, P. (2021). *Introduction to R for Social Scientists: A Tidy Programming Approach* (1st ed.). Chapman and Hall/CRC. https://doi.org/10.1201/9781003030669.

In addition, there are several **OPTIONAL**, but highly recommended resources:
- *R for Data Science* (https://r4ds.had.co.nz/index.html) by Garrett Grolemund and Hadley Wickham. This is an excellent introduction to R programming for data management and analysis.
- *Hands on Programming with R* (https://www.oreilly.com/library/view/hands-on-programming-with/9781449359089/) by Garrett Grolemund, an introduction to R focused on learning to program.
- *The Art of R Programming* (https://nostarch.com/artofr.htm) by Norman Matloff, a highly readable general text on programming in R.
- *The R Graph Gallery* (https://www.r-graph-gallery.com/), an amazing resource on R graphics utilities.

Descriptions of major assignments and examinations

Assignments 75%
The course includes **FOUR** (4) major assignments. The assignments are structured in a way to gradually introduce students to some of the common problems being addressed in social sciences. Assignment 1 (due in Week 7) will cover topics of data management and manipulation, with the focus on data preprocessing. Assignment 2 (due in Week 9) will further cover topics of data visualizations, as the next step in exploratory data analysis. Assignment 3 (due in Week 12) and Assignment 4 (due in Week 15) will introduce students to various statistical methods.

Continuous Assessment 25%
Each week a short multiple-choice quiz is due, where each quiz will include 4-5 short questions. Students will have **unlimited time** and **multiple attempts** to complete a quiz. Quizzes will be available until the end of the last week of the course (May 11, 11pm).

Technology Requirements
Canvas and Teams. Students will also need R and RStudio installed. Instructions for R and RStudio installation will be available on Canvas.

Other Requirements
Given the distributed and global nature of the course, interaction with course instructors will be held online, using Microsoft Teams. Students are welcome to create local groups, as needed and appropriate.

Each assignment will be built on the previous one. That means that you are expected to address feedback that will be provided. For example, with a mark for your Assignment 1, you will get feedback on what are the main issues you should address in Assignment 2. In that sense, it is important to follow deadlines. Of course, you can always ask for an extension. Late submissions **WILL NOT HAVE AN IMPACT** on your mark.

Grading Information

Grading

We will post grades on Canvas following each assignment, whereas weekly quizzes will be automatically graded. The grade scale is as follows:

90-100 points	A
80-89 points	B
70-79 points	C
60-69 points	D
< 60	F

Assignments: 75% (15% each – 5 total)
Continuous Assessment: 25% (~1.79% each – 14 total)

There is no extra credit. The best predictor of a good grade is regular attendance in class and reading of the assigned material.

Expectations for Out-of-Class Study
Beyond the time required to attend each class meeting, students in this course should expect to spend at least an additional 5-6 hours per week of their own time in course-related activities, including reading required materials, completing assignments, or preparing for exams, to name a few.

Grade Grievances
Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog.

Course Schedule

As the instructors for this course, we reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.

Week	Dates	Topic	Continuous Assessment	Assessment Details	Comment
W0	Jan 10 – Jan 16	Orientation			
W1	Jan 17 – Jan 23	Overview of data analysis	Quiz 1		
W2	Jan 24 – Jan 30	Introduction to R data analysis environment	Quiz 2		
W3	Jan 31 – Feb 6	Basics of programming in R (part 1)	Quiz 3		
W4	Feb 7 – Feb 13	Basics of programming in R (part 2)	Quiz 4		
W5	Feb 14 – Feb 20	Loops and conditionals	Quiz 5		
W6	Feb 21 – Feb 27	User-defined functions	Quiz 6		
W7	Feb 28 – Mar 6	Data management and manipulation	Quiz 7	Assignment 1 due – data manipulation	
W8	Mar 7 – Mar 13	Data visualization with ggplot2	Quiz 8		
	Mar 14 – Mar 20				Spring vacation

W9	Mar 21 – Mar 27	Inferential statistics	Quiz 9	Assignment 2 due – data visualizations
W10	Mar 28 – Apr 3	Hypothesis testing and Analysis of Variance	Quiz 10	
W11	Apr 4 – Apr 10	Correlation analysis	Quiz 11	
W12	Apr 11 – Apr 17	Chi-square test	Quiz 12	Assignment 3 due – Correlation and Chi-square
W13	Apr 18 – Apr 24	Student t-test and analysis of mean differences	Quiz 13	
W14	Apr 25 – May 1	ANOVA	Quiz 14	
W15	May 2 – May 8	Linear regression	Quiz 15	Assignment 4 due – t-test and ANOVA

Institutional Information

UTA students are encouraged to review the following institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the Institutional Information page (https://resources.uta.edu/provost/course-related-info/institutional-policies.php) which includes the following policies among others:

- Drop Policy
- Disability Accommodations
- Title IX Policy
- Academic Integrity
- Student Feedback Survey
- Final Exam Schedule

Additional Information

Master of Science in Learning Analytics Orientation and Resource Hub
This Orientation and Resource Hub is a central resource for students in the master's program. It has all critical information related to the program, any events, UTA resources, and training for new students.

Departmental and Program Assistance
If you have any questions about the MSLA program, please contact Justin T. Dellinger, Ph.D. at jdelling@uta.edu.

Attendance
At the University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructors of this section, we will take attendance sporadically. However, students are expected to participate weekly in order to complete all the activities.

While UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report must the last date a student attended their class based on evidence such as a test, participation in a class project or presentation, or an engagement

online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

Academic Success Center
The Academic Success Center (ASC) includes a variety of resources and services to help you maximize your learning and succeed as a student at the University of Texas at Arlington. ASC services include supplemental instruction, peer-led team learning, tutoring, mentoring and TRIO SSS. Academic Success Center services are provided at no additional cost to UTA students. For additional information visit: Academic Success Center. To request disability accommodations for tutoring, please complete this form.

The English Writing Center
The Writing Center offers **FREE** tutoring in 15-, 30-, 45-, and 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Register and make appointments online at the Writing Center (https://uta.mywconline.com). Classroom visits, workshops, and specialized services for graduate students and faculty are also available. Please see Writing Center: OWL for detailed information on all our programs and services.

Library Information
Each academic unit has access to Librarians by Academic Subject that can assist students with research projects, tutorials on plagiarism and citation references as well as support with databases and course reserves.

Research or General Library Help
Ask for Help
- Academic Plaza Consultation Services (library.uta.edu/academic-plaza)
- Ask Us (ask.uta.edu/)
- Research Coaches (http://libguides.uta.edu/researchcoach)

Resources
- Library Tutorials (library.uta.edu/how-to)
- Subject and Course Research Guides (libguides.uta.edu)
- Librarians by Subject (library.uta.edu/subject-librarians)
- A to Z List of Library Databases (libguides.uta.edu/az.php)
- Course Reserves (https://uta.summon.serialssolutions.com/#!/course_reserves)
- Study Room Reservations (openroom.uta.edu/)