

QM 7103: Analytics Programming

Fall 2021

Instructor Information

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Hours: Thursday, 1:00pm – 3:00pm

Instructor Information

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Class Information

Dates: 8/23/2021 – 12/18/2021
Time: Wednesday, 6:00pm – 8:45pm
Classroom: HELM 100

Course Description

This course will introduce students to the analytics programming languages, R and Python. A programming background is a plus, but not required. There will be an assumption that students have completed prior basic statistics courses.

Course Objectives

Students completing the Analytics Programming shall:

- Demonstrate knowledge in the fundamental concepts of R and Python Programming languages.
- Perform data manipulations in R and Python.
- Code basic functions and implement basic calculations in RStudio and Python Jupiter Notebook environment.
- Extend the functionality of R by using add-on packages.
- Extend the functionality of Python by using NumPy, Pandas, and Matplotlib libraries.
- Use R and Python to perform the workhorse analytical tasks such as data preprocessing and explanatory data analysis.

Textbook & Materials

- 1) *R for Data Science: Import, Tidy, Transform, Visualize, and Model Data*, by Hadley Wickham & Garrett Grolemund.
- 2) *Python Data Science Handbook: Essential Tools for Working with Data*, by Jake VanderPlas.
- 3) *An Introduction to R*, by W.N.Venables, D.M.Smith and the R Core Team.
Can be accessed at: <https://cran.r-project.org/doc/manuals/R-intro.pdf>
- 4) *Python for Everybody: Exploring Data in Python 3*, by Dr. Charles Russell Severance.

Academic and Computational Prerequisites

All students are expected to have a working familiarity with personal computers, including operating system procedures, file creation and transfer, operation of Microsoft Excel and Microsoft PowerPoint, and experience in using the Internet.

Access to Course Materials

HARVEY is the learning/content management system used in this course. Although course materials may be distributed in class, all such materials, including assignments, schedules, etc., will always be available to students through HARVEY. You can log in to HARVEY at <http://HARVEY.utulsa.edu> using your University of Tulsa username and password.

Student Tasks and Deliverables

- **Self-Pace Practices** - The best way to learn programming/coding is to practice every day. This online tool will help you learn it by doing. Since each student has a different pace and background, there is no limit on the type of exercise or topic. You can choose your own tracks/courses. You need to complete 5,000 points in R (DataCamp) and 10,000 points in python (DataCamp)!
- **Learning Practices** - Completion of all Learning Practices (LP), to get you comfortable with the material covered. The more effort you invest in these exercises, the better you will likely do on the exams and project. You need to complete assignments individually. These tests will be prescriptive and involve performing a set of programming related tasks in R and Python. The deliverables will be Jupiter Notebook Python code and /or, R code output and related discussions. Some assignments include an Interactive component that help students to enhance their knowledge and provide them hands on experience. It teaches students R and Python programming and data science interactively, at students own pace, and right in the R console or Jupiter Notebook!
- **Exams** - will consist coding tasks along with learning practices, multiple choice, True/False, and short answer questions. Exams will be cumulative. There will be 2 exams.
- **Term Project** - will give student an opportunity to apply the knowledge obtained to a more

applied real-life case. You can conduct the project singly or in groups (I have higher expectations for groups).

Important Note: Unless you have worked out an arrangement with me prior to the due date, a late assignment will result in a 20 percent deficit per 24 hours up to 5 days. Also, please try to avoid emailing me only hours before an assignment is due expecting a quick response.

Grading

The course grade is determined by the following components:

Self-Pace Practices (Datacamp)	20%
Learning Practices	20%
Exams	40% (20% Each)
Term Project	20%

Grade Scale

Final grades will be assigned according to the following scale:

Letter Grade	Semester Average
A	90 – 100
B	80 – 89
C	70 – 79
D	60 – 69
F	0 – 59

Digital Communication Etiquette

From time to time, course participants may communicate with the instructor and classmates via email or social media. Email tends to be a more common form of communication. Things said out loud to someone may seem impolite or even inflammatory in an email situation. **THINK BEFORE HITTING SEND!** Always reread the message and ask, “could this offend someone?”

Your instructor is committed to developing and actively promoting a class environment in which respect is shown to everyone to facilitate and encourage the expression, testing, understanding, and creation of a variety of ideas and opinions. Rude, sarcastic, obscene, or disrespectful messages/comments/remarks have a negative impact on everyone’s learning and will not be tolerated.

Instructor Availability and Response Time

Please feel free to email your instructor directly with questions of a personal nature, questions about grades, requests for help, or other issues that are not appropriate for the rest of the class to hear/read. Email is checked regularly, and responses are sent as quickly as possible.

Please be aware that grading of written assignments and homework takes time, in the same way,

that it takes time for students to prepare them. The instructor's goal is to promptly give feedback on all assignments, but there may be some assignments that require considerable time to grade. It is important to make sure that everything each student prepares and submits is thoughtfully and carefully considered.

Academic Integrity

All students are reminded that they are subject to policies on **Academic Honesty** and **Student Responsibility** as defined by the policy of the Graduate School. The Academic Misconduct Policy of the Graduate School found at:

<https://portal.utulsa.edu/colleges/graduate/Shared%20Documents/Graduate%20School%20Academic%20Misconduct%20Policy-%20August%202017.pdf>

Academic dishonesty will not be tolerated. I have very strong feelings about this and will not hesitate to pursue adequate punishment for offenders. Do not diminish the quality of your school and your degree by falling prey to situations where your academic honesty may be questioned. Unethical academic behavior (cheating) includes, but is not limited to, copying assignments or answers on exams, plagiarism, inappropriate or fraudulent citation of the work of others, "borrowing" other students' data/information and submitting/representing it as your own, unauthorized copying of computer files, and unauthorized use of electronic media to transmit information and communicate with other students at test time (email, instant messaging, use of chat rooms, etc.). Any evidence of misconduct at a minimum result in the loss of all points for the assignment plus a drop of a letter grade for the course. The penalty could also result in an F for the course grade.

Appeals Policy for Grades Academic Decisions and Student Complaints

The Collins College of Business has procedures in place regarding student complaints and appeals of grades or academic decisions. These can be accessed through the following web address:

<https://univoftulsa.sharepoint.com/sites/AcademicAffairs/academicpolicies/SitePages/Appeal%20Policy%20for%20Grades%20and%20Academic%20Decisions%20for%20Undergraduate%20Students.aspx>

Student Success Team statement

All students are encouraged to familiarize themselves with and take advantage of services provided by The Student Success Team, including Student Access, Student Success Coaching, and tutoring. To request a student success coach to improve study skills, email successcoaches@utulsa.edu. To request a tutor, email tutoring@utulsa.edu.

Student Access statement

Students who have or believe they may have a disability and would like to set up accommodations should contact Student Access within the Student Success Team to discuss their needs and facilitate their rights under the Americans with Disabilities Act and related laws. Student Access provides private consultations to any student. Contact Student Access staff by email at

studentaccess@utulsa.edu or by phone at 918-631-2315. The online application for accommodations may be obtained here. Student Access staff will assist students in the implementation of approved accommodations. Students who qualify for accommodations should meet with the instructor privately (during office hours or by appointment) as soon as possible to arrange for their needs and obtain support for the class.

Online Access Request statement

Many in-person courses are designated as such because they require in-person elements that cannot be substituted. If you get ill and are attending in-person classes, please fill out the Online Access Request form and Student Success will work with you and your instructors to determine if there is a way to meet course expectations online.

Counseling & Psychological Services Center and the Alexander Health Center

Should you need some help with stress or need some counseling to get you through a difficult situation, you should get in touch with the Counseling & Psychological Services Center:

<http://utulsa.edu/campus-life/counseling-services>

If you are experiencing health issues, then please take advantage of the services provided by the Alexander Health Center:

<http://utulsa.edu/campus-life/alexander-health-center>

Students often try to “push their way through a health issue or an emotional issue, and are often not successful which results in diminished classroom performance. I would encourage to address problems before they negatively impact your performance and your life by contacting the appropriate office listed. If you are ill and forced to miss class, you must notify me in writing—this includes exam periods and other assignments.

Know Your Title IX

Sexual misconduct is prohibited by Title IX of the Educational Amendments of 1972 (“Title IX”) and will not be tolerated within the TU community. Sexual misconduct encompasses all forms of sex and gender-based discrimination, harassment, violence, and assault, as well as dating violence, domestic violence, interpersonal violence, stalking and sexual exploitation. If you or someone you know has been harassed, assaulted, or stalked, or if you have questions about violence prevention resources available to you, please contact any of the following campus and community resources:

Service	Phone Number
Title IX Coordinator	918-631-4602
Office of Violence Prevention	918-631-2324
Office of Violence Prevention	918-631-2324
TU Counseling and Psychological Services	918- 631-2241
Campus Security	918-631-5555
Domestic Violence Intervention Services	918-585-3163 or 918-743-5763
Tulsa Police Department	918-596-9222 or 911 (emergency situations)

For more information about your rights under Title IX, please visit our Policies and Laws page <https://utulsa.edu/sexual-violence-prevention-education/policies-laws/> on the TU website or contact the Title IX Coordinator. Every student on our campus has the right to resources. Please come forward and ask questions, report, and help us eradicate sexual misconduct and interpersonal violence by stopping the silence surrounding it.

Important Dates

Last day to add a class	August 31
Labor Day	September 6
Last day to withdraw from a class without academic penalty	September 10
Last day to sign up to audit a class	September 10
No withdrawals after this date	November 12
Last day to declare Pass/Fail with Center for Academic Advising	November 12
Thanksgiving Break	November 22 - 26
Last day of classes	December 6
Reading Days	December 7 - 8
Final Examinations	December 9 - 10, 13 - 16
Grades due at noon	December 21

Tentative Schedule

Part	Week	Topic(s)	Assignment(s)
R-1	Aug 25	Introduction •Class objectives, Intro and History First R Session •Installation and Basic Computations	Survey
R-2	Sep 1	Data Structures •Vectors, Sequences, Indexes and Lists •Matrices, Data Frames and Arrays	
R-3	Sep 8	Working with Data •Import and Export Data •Hands on Data Analysis	LP-1 Due
R-4	Sep 15	Data Manipulation •Cleaning Data •Tidyr, Stringr and DateTime	
R-5	Sep 22	Data Transformation •Dplyr	
R-6	Sep 29	Data Visualization •Basics and Plotting •Advanced Visuals and ggplot2	LP-2 Due
E-1	Oct 6	Exam 1	R-SPs Due
P-1	Oct 13	Exam Review First Python Session •Basics and Installation •Data Types, Comments, Variables, Assignments	Project Workout
P-2	Oct 20	Data Structures •Variables, Types, Expressions, Strings and Operations •Lists, Range, Subsetting, Tuples, and Dictionaries	
P-3	Oct 27	Advanced Elements •Libraries, Conditionals, Loops and Functions	LP-3 Due
P-4	Nov 3	Data •Packages, Numpy, Pandas, Series, DataFrames	
P-5	Nov 10	Data Manipulation •Missing Data, and Manipulating DataFrames	
P-6	Nov 17	Visualization •Matplotlib	LP-4 Due
	Nov 24	Thanksgiving Break	No Class
E-2	Dec 1	Exam 2	
Proj-1	Dec 8	Project Meetings	Python-SPs Due
Proj-2	Dec 15	Projects Due	