Course Syllabus

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Arizona State University

DAT 301

Exploring Data in R and Python

Course and Faculty Information

Course Description: This course focuses on the exploration of the types of data typically encountered in modern data science, such as text data, spatial data, network data, and time series data.

Various statistical techniques are used to gain insight into the structure of the data, including graphical visualization, linear regression, trees, and clustering.

Credits: 4

Prerequisites: MAT 266 or MAT 271, MAT 343

Instructor: Samantha Tran

Contact Info:

Zoom Office: **https://asu.zoom.us/j/4172076737 (https://asu.zoom.us/j/4172076737)**

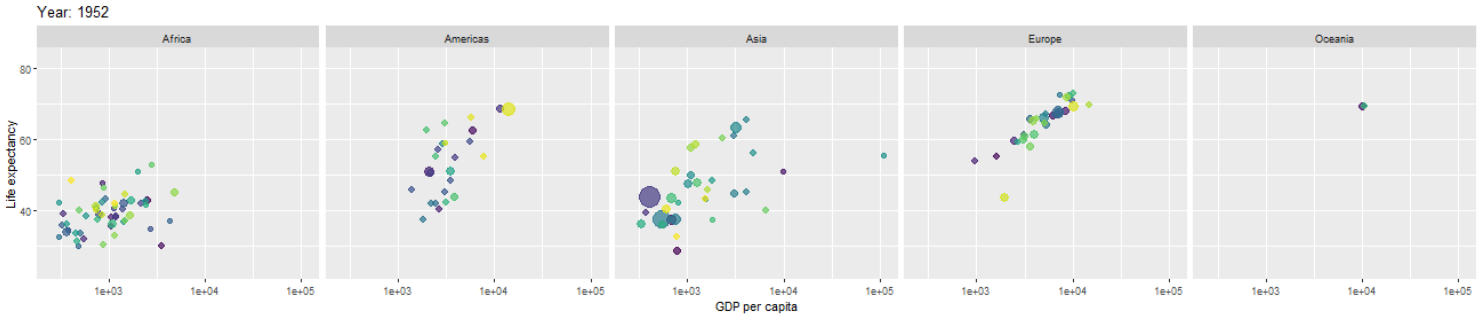
Email: smirwin1@asu.edu

Office Hours: Tuesdays and Thursdays 1-2 PM (AZ)

Course Learning Outcomes

At the completion of this course, students will be able to:

1. Program in R and Python and demonstrate proficiency in organizing data sets; use these programming languages to implement statistical methods and perform exploratory data analysis
2. Process data into usable formats; manipulate data
3. Tidy common modern data types: text, spatial data, time series, matrices and arrays
4. Effectively use data science visualization tools - histograms, KDE, ECDF, scatterplots, interactive plots, simple animations
5. Model and fit data for exploration: linear models, trees, clustering
6. Create summaries and reports on exploratory data analysis in forms of slides, interactive graphs and apps
7. Create simple animations of data (like the one below)



Textbooks

Lecture notes are provided at

https://math.la.asu.edu/~samara/RandPy-lectures/index.html (https://math.la.asu.edu/~samara/RandPy-lectures/index.html)

and are sufficient for the course. However, if you prefer to consult published literature, you may find the following two books useful.

Book 1: ***R for Data Science*, by H. Wickham & G. Grolemund;** publisher O'Reilly Media, 2017.

There is a free online version of this book at **https://r4ds.had.co.nz (https://r4ds.had.co.nz/)**

Book 2: ***Python for Data Analysis***, **2nd edition, by Wes McKinney;** publisher: O'Reilly Media, 2017.

Some of our lecture notes on Python are based on modified versions of Jupyter notebooks (ipynb files) that come as auxiliary material for the 2nd book.

Course Access

Your ASU courses can be accessed by both **my.asu.edu (http://my.asu.edu)** and asu.instructure.com; bookmark both in the event that one site is down.

Computer Requirements

This is a fully online course; therefore, it requires a computer with internet access and the following technologies:

- Web browsers (**Chrome (https://www.google.com/chrome)**, **Mozilla Firefox (http://www.mozilla.org/en-US/firefox/new/)**, or **Safari (http://www.apple.com/safari/)**)
- **Adobe Acrobat Reader (http://get.adobe.com/reader/)** (free)
- **Adobe Flash Player (http://get.adobe.com/flashplayer/)** (free)
- Webcam, microphone, headset/earbuds, and speaker
- Reliable broadband internet connection (DSL or cable) to stream videos.

Note: A smartphone, iPad, Chromebook, etc. will not be sufficient for completing your work in ASU Online courses. While you will be able to access course content with mobile devices, you must use a computer for all assignments - projects, labs and homework.

In this course, you will use a computer for writing and executing codes in R and Python.

Help

For technical support, use the Help icon in the black global navigation menu in your Canvas course or call the ASU Help Desk at +1 (855) 278-5080. Representatives are available to assist you 24 hours a day, 7 days a week.

Student Success

A regular on-ground class typically has 16 weeks, while online courses are 7 weeks long. Since $\frac{16}{7} \approx \mathbf{2.3}$, it means that time flies in an online course and the clock is ticking about 2.3 times faster than in an on-ground class. It also means that we cover material in this class

2.3 times faster than it is done in an on-ground class. You should always keep this in mind in order to be successful in the course, as you can so quickly fall behind. You are expected to spend between 15 and 18 hours per week to read and watch course content and work on assignments.

Other important tips to be successful:

- check the course daily
- read announcements
- read and respond to course email messages as needed
- complete assignments by the due dates specified
- communicate regularly with your instructor and peers
- create a study and/or assignment schedule to stay on track
- access **ASU Online Student Resources (http://goto.asuonline.asu.edu/success/online-resources.html)**

Grading

Your grade will be determined based on the following grading scheme:

Assignment	Points
Homework	25%
Labs	25%
Project 1	25%
Project 2	25%
Total	100%

Grade	Percentage
A+	[97 - 100]
A	[94 - 97)
A-	[90 - 94)
B+	[87 - 90)
B	[84 - 87)
B-	[80 - 84)
C+	[77 - 80)
C	[70 - 77)
D	[60 - 70)
E	< 60

Important Dates

Week	Assignment	Due Date (by 11:59pm AZ time)
Week 1	Module 1 HW 1	Wednesday, 5/18/2022
Week 2	Module 2 HW 2	Tuesday, 5/24/2022
	Module 2 Lab 1	Thursday, 5/26/2022
Week 3	Module 3 Lab 2	Monday, 5/30/2022
	Module 4 HW 3	Friday, 6/3/2022
Week 4	Module 5 Lab 3	Tuesday, 6/7/2022
	Project 1 due	Thursday, 6/9/2022

Week 5	Module 6 HW 4	Thursday, 6/16/2022
Week 6	Module 7 Lab 4	Tuesday, 6/21/2022
	Project 2 due	Friday, 6/24/2022

Submitting Assignments

Lab assignments and projects should be submitted to the designated area in Canvas. You will work on homework assignments and submit them in **nbgrader (https://mathds.asu.edu)** . Do **not** submit an assignment via email.

Assignment due dates follow **Arizona Standard time**. Click the following link to access the **Time Converter (http://www.thetimezoneconverter.com/)** to ensure you account for the difference in Time Zones. Note: Arizona does not observe daylight savings time.

Grading Procedure

Grades reflect your performance on assignments and adherence to deadlines. I will try to make grades on assignments available within 3 days of the due date in the Gradebook but will not exceed 5 business days.

Late or Missed Assignments

In the event of a valid urgent excuse (supported by valid documentation, such as doctor's note) that prevents you to submit an assignment on time, notify the instructor **BEFORE** the assignment is due.

Follow the appropriate University policies to request an **accommodation for religious practices (http://www.asu.edu/aad/manuals/acd/acd304-04.html)** or to accommodate a missed assignment **due to University-sanctioned activities (http://www.asu.edu/aad/manuals/acd/acd304-02.html)** .

Communicating With the Instructor

Community Forum

This course uses "Ed Discussion" for general questions and comments about the course. Prior to posting a question or comment, check the syllabus, announcements, and existing posts to ensure it's not redundant. You are encouraged to respond to the questions of your classmates.

Email questions of a personal nature to your instructor. You can expect a response within 48 hours.

Email

ASU email is an **official means of communication (http://www.asu.edu/aad/manuals/ssm/ssm107-03.html)** among students, faculty, and staff. Students are expected to read and act upon email in a timely fashion. Students bear the responsibility of missed messages and should check their ASU-assigned email regularly.

All instructor correspondence will be sent to your ASU email account.

ASU Online Course Policies

View the **ASU Online Course Policies (https://asuonline-dev.asu.edu/qm-template/CanvasQM/qm-policies.html)**

Accessibility Statements

View the **Accessibility section** to review accessibility statements for common tools and resources used in ASU Online courses.

If any other tools are used in this course, links to the accessibility statements will be listed below this sentence.

Syllabus Disclaimer

The syllabus is a statement of intent and serves as an implicit agreement between the instructor and the student. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. Remember to check your ASU email and the course site often.