

Data Analytics I
ESI4610 Section 5240
Class Periods: MWF, Period 7, 1:55 PM - 2:45 PM
Location:
Zoom on Mondays
[WEIM 1094](#) on Wednesdays and Fridays
Academic Term: Spring 2022

Instructor

Sima Sabahi

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Virtual Office Hours: Thursdays, 8:00 AM-10:00 AM (Zoom), or by appointment

Teaching Assistant

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Office Hours: TBD

Course Description

This course provides a basic understanding of the skills necessary for managing and analyzing data. The concepts that will be covered in this class include exploratory data analysis, data manipulation, data cleaning, data wrangling, and machine learning models. We also provide a basic understanding of data management with SQL. All the technical skills will be motivated by different examples involving data. Python is the programming language that will be used in this class. This course is worth 3 credits.

Course Pre-Requisites / Co-Requisites

COP2271, and STA4322 with a minimum grade of C.

Course Objectives

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

- Prepare data for analysis
- Pose correct and relevant questions in the presence of large-scale datasets
- Conduct exploratory data analysis
- Find patterns in large-scale datasets
- Develop hands-on experience utilizing Python and SQL to manage data and apply proper models

Materials and Supply Fees

None

Required Textbooks and Software

- No textbook required
- Lecture notes (posted online in Canvas)
- Jupyter Notebook
- SQLite

Recommended Materials

- Title: Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython
 - Author: Wes McKinney
 - Date and Edition: 2018 2nd Edition
 - ISBN: 9781491957660
- Title: An Introduction to Statistical Learning: With Applications in R
 - Authors: Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani

- Date and Edition: 2013 1st Edition
- ISBN: 9781461471387

Course Schedule

Date	Module	Topics	Assignments (due at 11:59 PM)
1/5	Introduction	Intro to the course	
1/7		What Is Data Analytics?	
1/10		Popular Data Analytics Tools	
1/12		Python Data Analytics Libraries	
1/14		Jupyter Installation and Setup	
1/17		Holiday	
1/19	Python Basics	Data Types	
1/21		Data Structure	
1/24		Iteration	
1/26	NumPy	Arrays	HW1
1/28		Basic Operations	
1/31		Manipulation	
2/2		Indexing, slicing, and iterating	
2/4	Pandas	Intro to Pandas	
2/7		Reindexing, Dropping, & Selection	
2/9		Data Alignment	HW2
2/11		Descriptive Statistics	
2/14		Review for Exam 1	
2/16		Exam 1 (Evening Exam)	
2/18	Data Preprocessing	Data Cleaning	
2/21		Data Transformation	
2/23		Data Aggregation	
2/25		Pivot Tables	
2/28	Data Visualization	Plotting & Visualization	
3/2		Plotting & Visualization (Cont.)	
3/4		Plotting & Visualization (Cont.)	HW3
3/7		Spring Break	
3/9		Spring Break	
3/11		Spring Break	
3/14	Machine Learning	Intro to Machine Learning	
3/16		Regression	
3/18		Regression (Cont.)	
3/21		Classification	
3/23		Classification (Cont.)	
3/25		Clustering	HW4
3/28		Clustering (Cont.)	
3/30		Review for Exam 2	
4/1		Exam 2 (Evening Exam)	
4/4	RDBMS	Introduction & SQLite Installation	
4/6		Analyzing Data Using SQL	
4/8		Analyzing Data Using SQL (Cont.)	

4/11		Project presentations	
4/13		Project presentations	
4/15		Project presentations	
4/18		Project presentations	
4/20		Project presentations	

Attendance Policy

Attendance is not required; however, it is strongly recommended. Students will be responsible for all material covered in class.

Assignments

Homework (15%): There will be four homework assignments throughout the semester. The material will be drawn from the notebooks and exercises thought during the class. Homework assignments must be done individually and their due dates will be announced in advance. Homework assignments must be submitted by the due date and there will be a penalty (30%) for late homework submissions. Homework submitted 24 hours after the deadline will not be accepted.

Exams (50%): There will be two evening exams. Exam 2 will be cumulative. Students needing a make-up exam due to schedule conflicts must provide documentation and notify the instructor at least one week before the day the exam is scheduled for. If you miss any exam due to a justified emergency, you must contact the instructor immediately within 24 hours for scheduling a make-up exam. Exam grade disputes must be made to the instructor within one week after grades are posted. Any grade dispute after the specified period will not be considered. The following describes the procedure:

- (1) Within one week after your grade has been posted, e-mail the teaching assistant requesting a grade breakdown,
- (2) Compare your solution to the solution posted on the website using the detailed grade breakdown you receive,
- (3) If you still have questions about your grade, to resolve the issue either meet the instructor during office hours or request an appointment.

Project (20%): Students are required to work on a data analytics project to practice the skills learned during the class. Projects should be done in a team of a maximum of 3 students. There will be five deliverables for the project: 1) proposal (no longer than 1 page) including team members, the title of the project, project description, and data source, 2) presentation, 3) final report (no longer than 20 pages) including project objectives, background, and motivation, methodology, data collection, results, finding and discussion, 4) data, 5) code (Jupyter Notebook). Your project score includes peer assessment. The assessment criteria will be announced.

Grading Policy

Your performance in the course will be evaluated based on two exams, homework assignments, project, and in-class assignments/participation. More information on UF grading policy may be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>. The table below shows the percentage of each assignment.

Assignment	Percentage of Final Grade
Homework	15%
Exam 1	25%
Exam 2	25%
Project	20%

In-Class Assignment and Participation	15%
Total	100%

Grading Policy

Range	Grade	Grade Points
93.0 – 100.0	A	4.00
90.0 - 92.9	A-	3.67
87.0 - 89.9	B+	3.33
83.0 – 86.9	B	3.00
80.0 - 82.9	B-	2.67
77.0 - 79.9	C+	2.33
73.0 – 76.9	C	2.00
70.0 - 72.9	C-	1.67
67.0 - 69.9	D+	1.33
63.0 - 66.9	D	1.00
60.0 - 62.9	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:
<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

Students Requiring Accommodations

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.ua.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.ua.ufl.edu/public-results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every

person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

Campus Resources:

Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: <https://care.dso.ufl.edu>.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.