Introduction to Data Analytics

EIN4905 Sections 31BC & 31BE
Class Periods: MWF, Period 9, 4:05 PM - 4:55 PM
MWF, Period 6, 12:50 PM – 1:40 PM
Location: Zoom
Academic Term: Spring 2021

Instructor
Sima Sabahi
Email: sima.sabahi@ufl.edu
Virtual Office Hours: Monday and Wednesday, 2:00 PM-4:00 PM (Zoom), or by appointment

Teaching Assistants
Meserret Karaca, Email: mkaraca@ufl.edu
Dean Algave, Email: algavedean@ufl.edu
Virtual 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)
1/11	Introduction	Intro to the course	
1/13		What Is Data Analytics?	
1/15		Popular Data Analytics Tools	
1/18		Holiday-No Class	
1/20		Python Data Analytics Libraries	
1/22		Jupyter Installation and Setup	Quiz 1
1/25	Python Basics	Data Types	
1/27		Data Structure	
1/29		Iteration	
2/1	NumPy	Arrays	Quiz 2
2/3		Basic Operations	
2/5		Manipulation	HW1
2/8		Indexing, slicing, and iterating	
2/10	Pandas	Intro to Pandas	Quiz 3
2/12		Reindexing, Dropping, & Selection	
2/15		Data Alignment	
2/17		Descriptive Statistics	
2/19		Review for Exam 1	
2/22		Exam 1 (7:00 pm-9:00 pm)	
2/24	Data Preprocessing	Data Cleaning	
2/26		Data Transformation	
3/1		Data Aggregation	
3/3		Pivot Tables	
3/5	Data Visualization	Plotting & Visualization	Quiz 4
3/8		Plotting & Visualization (Cont.)	HW2
3/10		Plotting & Visualization (Cont.)	Project Proposal
3/12	Machine Learning	Intro to Machine Learning	
3/15		Regression	
3/17		Regression (Cont.)	HW3
3/19		Classification	
3/22		Classification (Cont.)	
3/24		Recharge Day-No Class	
3/26		Clustering	
3/29		Clustering (Cont.)	
3/31		Review for Exam 2	
4/2		Exam 2 (7:00 pm-9:00 pm)	
4/5	RDBMS	Introduction & SQLite Installation	
4/7		Analyzing Data Using SQL	
4/9		Analyzing Data Using SQL (Cont.)	
4/12		Advanced SQL Queries	
4/14		Project presentations	
4/16		Project presentations	
4/19		Project presentations	HW4
4/21	Conclusion	What's next?	Project submission, project peer assessment

Online Course Recording

Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

Attendance Policy

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

Evaluation of Grades

Assignment	Percentage of Final Grade
Quiz	15%
Homework	15%
Exam 1	20%
Exam 2	20%
Project	25%
Project Peer Assessment	5%
Total	100%

Assignments

Quizzes and Homework (30%): There will be weekly or biweekly quizzes and/or homework assignments throughout the semester. The material will be drawn from the notebooks and exercises thought during the class. Quizzes and homework assignments must be done individually and their due dates will be announced in advance. Homework must be submitted by the due date and there will be a penalty for late homework submissions. Homework assignments submitted 24 hours after the deadline will not be accepted. There are no make-ups provided if you missed a quiz since it is online unless you have a severe illness.

Exams (40%): There will be two evening exams (7:00 pm-9:00 pm). Exam 2 will be cumulative. Students needing a make-up exam due to schedule conflicts or severe illness must provide documentation and notify the instructor at least one week before the day the exam is scheduled for. 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 instructor 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 (25%): 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 maximum of 4 students. You can choose the topic of your choice and answer questions you have about that topic. Project assignments and the due dates are presented in the course schedule section of this syllabus. A project rubric will be provided to students. There will be five deliverables for the project: 1) proposal (no longer than 1 page) including team members, title of the project, project description, and data source, 2) presentation, 3) final report (no longer than 20 pages, 12

point font, single-spaced) including project objectives, background and motivation, methodology, data collection, results, finding and discussion, 4) data, 5) code (Jupyter Notebook).

Project Peer Assessment (5%): Your project score will take into account yourself and peer assessment. The assessment criteria will be announced.

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.aa.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.aa.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 suppor*t*, 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.