

Data Analytics I

ESI 4610 Section 5240

Class Periods: M,W,F | Period 8 (3:00 pm – 3:50 pm)

Location: LAR 330

Academic Term: Spring 2024

Instructor:

Xiaochen Xian, xxian@ufl.edu, (352-294-7713)

Office Hours: Wednesday 12:30pm–2:30pm or by appointment. Zoom link:

Graders:

Andres Espinosa, andresespinosa@ufl.edu, office hours on Tuesday at 3–5pm. Zoom link:

Mallika Jain, mallikajain@ufl.edu

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.

Course Pre-Requisites / Co-Requisites

COP 2271 and STA 4322 with minimum grades 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

Relation to Program Outcomes (ABET):

Outcome	Coverage*
1. Ability to identify, formulate and solve engineering problems by applying principles of engineering, science and mathematics	High
2. Ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare as well as global, cultural, social, environmental, and economic factors	Medium
3. Ability to communicate effectively with a range of audiences	
4. Ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	
5. Ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives	
6. Ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	High
7. Ability to acquire and apply new knowledge as needed, using appropriate learning strategies	Medium

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

Required Textbooks and Software

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- No textbook is required but the list of recommended books is as follows:
 - Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython by *Wes McKinney*.
 - Python Data Science Handbook: Essential Tools for Working with Data by *Jake VanderPlas*.
 - An Introduction to Statistical Learning: With Applications in R by *Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani*.
- Lecture notes (posted online in Canvas)
- Jupyter Notebook
- Microsoft Access SQL

Course Schedule

Week	Topic	Assignments (general weeks given – subject to change)
1	Introduction to Data Analytics	Introduction Assignment
2	Introduction to Data Analytics	
3	Getting to Know Your Data	Homework 1
4	Data Operations	Forming a Project Team
5	Data Operations	Homework 2
6	Data Operations	
7	Data Preprocessing	Exam 1 (tentative date: 10/07)
8	Data Preprocessing	Homework 3, Project Proposal Due
9	Data Visualization	
10	Machine learning	Homework 4
11	Machine learning	
12	Machine learning	
13	Relational Database Management (SQL)	Exam 2 (tentative date: 11/10)
14	Relational Database Management (SQL)	Homework 5
15	Project Presentations	Peer evaluations
Finals		Project submissions

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance is not required; however, it is strongly recommended. It will be to your benefit to attend all lectures. Students will be responsible for all material covered in class.

Lectures are there to facilitate efficient learning, not chatting with friends, surfing the net, or sleeping. You should be focused on the course material and the in-class exercises assigned, not on activities that do not involve course work. Those who behave inappropriately will be asked to leave. Please remember to follow Zoom guidelines. <https://elearning.ufl.edu/keep-zoom-secure/student/#extra-tips-and-best-practices>

Excused absences require appropriate documentation.

If you missed an exam due to a health problem, you will need to provide documentation that indicates the date of the visit. A note indicating that you were seen at the health center the day of the exam is not sufficient documentation of a medically excused absence from an exam. The note must say that you were medically unable to take the exam.

In case of an exam conflict, you will need to present evidence of the conflict to the instructor. Employment interviews, employer events, weddings, vacations, etc. are not excused absences.

Project

Students are required to work on a data analytics project to practice the skills learned during the class. Projects can be done individually or in a team of maximum of 5 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. The final project grades will be the average of instructor assessment and peer assessment based on the rubric. A project rubric will be provided to students for peer-assessment.

Evaluation of Grades, and Assignments & Grade Disputes

Your grade will be based on exams, quizzes, homework assignments, and project. All assignments must be submitted via E-learning unless specified otherwise. Assignment deadlines are rigid. **If you do not submit before the deadline or submit the wrong file, you will receive a zero.** Only the instructor has the authority to grant late submissions.

Exam (2)	45%
Quizzes (5)	10%
Homework (~5)	25%
Project	20%

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) Compare your solution to the solution posted on the website,
- (2) Within one week after your grade has been posted, e-mail the instructor stating your reasons and requesting a re-grading,
- (3) If you still have questions about your grade, to resolve the issue either go to the instructor's office hours or request an appointment.

Grading Policy

There may or may not be a curve at the end of the semester. This depends on the overall performance of the class throughout the semester.

Please keep in mind that this is a challenging and time-consuming course, and the percentage of As has historically been in the 10% range. You have to study hard and perform well in every course activity in order to deserve an A.

Please note that this is a restricted elective for ISE students. This means that you must earn, at a minimum, a C in order to satisfy the requirement.

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

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/>.

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.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in

Grade	Range	Grade Points
A	[93-100]	4.00
A-	[90-93)	3.67
B+	[87-90)	3.33
B	[83-87)	3.00
B-	[80-83)	2.67
C+	[77-80)	2.33
C	[73-77)	2.00
C-	[70-73)	1.67
D+	[65-70)	1.33
D	[60-65)	1.00
D-	[55-60)	0.67

connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session. Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

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 Conduct Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. 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
- Jennifer Nappo, Director of Human Resources, 352-392-0904, jpennacc@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: <https://counseling.ufl.edu>, 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/>.

COVID-19

- You are expected to wear approved face coverings at all times during class and within buildings even if you are vaccinated. Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.
- If you are sick, stay home and self-quarantine. Please visit the UF Health Screen, Test & Protect website about next steps, retake the questionnaire and schedule your test for no sooner than 24 hours after your symptoms began. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 (or email covid@shcc.ufl.edu) to be evaluated for testing and to receive further instructions about returning to campus.
- If you are withheld from campus by the Department of Health through Screen, Test & Protect, you are not permitted to use any on campus facilities. Students attempting to attend campus activities when withheld from campus will be referred to the Dean of Students Office.
- UF Health Screen, Test & Protect offers guidance when you are sick, have been exposed to someone who has tested positive or have tested positive yourself. Visit the [UF Health Screen, Test & Protect website](#) for more information.
- Please continue to follow healthy habits, including best practices like frequent hand washing. Following these practices is our responsibility as Gators.
- If you are not vaccinated, get vaccinated. Vaccines are readily available at no cost and have been demonstrated to be safe and effective against the COVID-19 virus. Visit this link for details on where to get your shot, including options that do not require an appointment: <https://coronavirus.ufhealth.org/vaccinations/vaccine-availability/>. Students who receive the first dose of the vaccine somewhere off-campus and/or outside of Gainesville can still receive their second dose on campus.

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://career.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://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

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