Data Analytics for ISE
ESI 5613 Section 2397
Class Periods:
T, Period 9-10, (4:05 PM - 6:00 PM)
R, Period 10 (5:10 PM - 6:00 PM)
Location: Zoom
Academic Term: Fall 2024

Instructor:
Alexander Semenov
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(850)-460-9903, Office location: REEF 132
Office Hours: TBA

Teaching Assistant:
Please contact through the Canvas website
- Tan Yu, yutan@ufl.edu
- Office Hours: TBA

Course Description
Provides an understanding of the skills necessary for managing and analyzing data for ISE applications. The concepts that will be covered in this class include Python basics, exploratory data analysis, data manipulation, data cleaning, data wrangling, and machine learning. All the technical skills will be motivated by different examples involving data (3 credits).

Course Pre-Requisites / Co-Requisites
None

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 to manage data and apply proper models

Materials and Supply Fees
None

Required Textbooks and Software
Course notes developed by the instructor

Recommended Materials
- Title: The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Second Edition
  - Authors: Trevor Hastie, Robert Tibshirani, Jerome Friedman
  - 2nd Edition, 2009
  - ISBN: 978-0387848570
- Title: An Introduction to Statistical Learning: with Applications in Python (Springer Texts in Statistics)
  - Authors: Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, Jonathan Taylor
  - 1st ed, 2023
  - ISBN: 978-3031387463

Required Computer
UF student computing requirement: *https://news.it.ufl.edu/education/student-computing-requirements-for-uf/*

Course Schedule

Week	Dates	Topics	Assignments
Week 1	Aug 22 – 24	Introduction to Course Topics	
Week 2	Aug 26 – 31	Jupyter Installation and Setup Python Basics	
Week 3	Sep 3 – 7	Data Manipulation and Cleaning	Quiz 1
Week 4	Sep 9 – 14	SQL Basics	Quiz 2
Week 5	Sep 16 – 21	Data Transformation	
Week 6	Sep 23 – 28	Plotting & Visualization	Quiz 3 Homework 1
Week 7	Sep 30 – Oct 5	Introduction to ML	Quiz 4
Week 8	Oct 7 – 12	Linear Regression	Exam 1
Week 9	Oct 14 – 19	Classification	Quiz 5
Week 10	Oct 21 – 26	Classification Model Selection and Evaluation	Homework 2 Project Proposal
Week 11	Oct 28 –Nov 2	Model Selection and Evaluation	Quiz 6
Week 12	Nov 4 – 9	Moving Beyond Linearity Tree-Based Methods	Quiz 7
Week 13	Nov 12 – 16	Tree-Based Methods Unsupervised Learning	Quiz 8 Homework 3
Week 14	Nov 18 – 23	Deep Learning	Project Submission Exam 2
Week 15	Nov 24 – 30	Holiday	
Week 16	Dec 2 – 4	Review	Project Presentations

Important Dates
10/8/2024   Exam 1
11/23/2024   Project Due
11/19/2024   Exam 2

Attendance Policy, Class Expectations, and Make-Up Policy
- Attendance is not required; however, it is strongly recommended. Students will be responsible for all material covered in class. Makeup quizzes or exams are not offered. Excused absences must be consistent with university policies in the Graduate Catalog (https://catalog.ufl.edu/graduate/regulations) and require appropriate documentation. Additional information can be found here: https://gradcatalog.ufl.edu/graduate/regulations/

Assignments

Quizzes and Homework (35%): There will be weekly or biweekly quizzes and/or homework assignments throughout the semester. The material will be drawn from the material covered in class.

Quizzes and homework assignments must be done individually, and their due dates will be announced in advance. Late submission penalty of 25 p.p. per day (2 days maximum allowance) will be applied to late submissions. If the grades have been released/assignments have been evaluated, your assignment is excessively late, a zero will be given.

Exams (40%): There will be two exams, exams will be conducted in-person. 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/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%): You are required to work on a data analytics project to practice the skills acquired during the semester. This is a team project where teams will consist of 3 to 4 students. You can work on a topic of your choice. 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, the title of the project, project description, and data source, 2) final report (no longer than 20 pages, 12-point font, single-spaced) including project objectives, background and motivation, methodology, data collection, results, findings, discussion, and references, 3) data, 4) code (Jupyter Notebook), 5) presentation

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Quizzes (8)	25 each	20%
Homework (3)	50 each	15%
Exam 1	200	20%
Exam 2	200	20%
Project	250	25%
Total	1000	100%

Grading Policy

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at:
UF Graduate Catalog
Grades and Grading Policies

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/.

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 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 Honor 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. 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 varied perspectives and lived experiences within our community and is committed to supporting the University's core values, including the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of race, creed,

color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information, and veteran status.

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 Coordinator
• HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
• Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@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.
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> **Counseling and Wellness Center:** https://counseling.ufl.edu, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.
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> **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://elearning.ufl.edu/.
>
> **Career Connections 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: *https://distance.ufl.edu/getting-help/*; *https://distance.ufl.edu/state-authorization-status/#student-complaint*.