

 FLORIDA ATLANTIC UNIVERSITY	COURSE CHANGE REQUEST Undergraduate Programs	UUPC Approval <u>1/29/24</u> UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner Posted _____ Catalog _____
	Department Electrical Engineering and Computer Science College Engineering and Computer Science	
Current Course Prefix and Number CAP 4773	Current Course Title Introduction to Data Science and Analytics	
<i>Syllabus must be attached for ANY changes to current course details. See Template. Please consult and list departments that may be affected by the changes; attach documentation.</i>		
Change title to: Change prefix From: _____ To: _____ Change course number From: _____ To: _____ Change credits* From: _____ To: _____ Change grading From: _____ To: _____ Change WAC/Gordon Rule status** Add <input type="checkbox"/> Remove <input type="checkbox"/> Change General Education Requirements*** Add <input type="checkbox"/> Remove <input type="checkbox"/> <small>*See Definition of a Credit Hour.</small> <small>**WAC/Gordon Rule criteria must be indicated in syllabus and approval attached to this form. See WAC Guidelines.</small> <small>***GE criteria must be indicated in syllabus and approval attached to this form. See Intellectual Foundations Guidelines.</small>	Change description to: This course deals with the principles of data science and analytics. Topics covered include statistical analysis of data, measurement techniques and tools, machine learning methods, knowledge discovery and representation, classification and prediction models. Students may not enroll in both this course and CAP 5768 for credit. Change prerequisites/minimum grades to: Change corequisites to: Change registration controls to: Please list existing and new pre/corequisites, specify AND or OR and include minimum passing grade (default is D-).	
Effective Term/Year for Changes: Summer 2024	Terminate course? Effective Term/Year for Termination:	
Faculty Contact/Email/Phone Michael DeGiorgio / mdegior@fau.edu / 561-297-0003		
Approved by Department Chair <u>Hani Kdva</u> College Curriculum Chair <u>Hongbo Su</u> College Dean <u>[Signature]</u> UUPC Chair <u>Korey Sorge</u> Undergraduate Studies Dean <u>Dan Meeroff</u> UFS President _____ Provost _____	Date 1/15/2024 1-16-24 1/16/24 1/29/24 1/29/24 _____ _____	

Email this form and syllabus to mjenning@fau.edu seven business days before the UUPC meeting.

CAP-4773-001 CRN15054, 002 CRN 15055
INTRODUCTION TO DATA SCIENCE AND ANALYTICS

W 4:20PM – 7:00PM
3 credits

Spring, 2024
Juan Yepes, Ph.D.
Office: EE412

Office hours: R 4:00 pm - 6:50 pm
Classroom: EE Room 106
Telephone: 754-213-3829
Email: jyepes@fau.edu

Zoom:

<https://fau-edu.zoom.us/j/jyepes?pwd=bnpRNDMrT0ITSEJudzZHckZRYysxdz09>



TA name Sandeep Mandapati
Email smandapati2022@fau.edu
TA Office Hours:
Zoom:

Course Description

This course deals with the principles of data science and analytics. Topics covered include statistical analysis of data, measurement techniques and tools, machine learning methods, knowledge discovery and representation, and classification and prediction models. **Students may not enroll in both this course and CAP 5768 for credit.**

Instructional Method

In-Person.

Prerequisites/Corequisites

None

Course Objectives/Student Learning Outcomes

In this course, students will:

1. Learn fundamental principles of data science and its applications.
2. Use Python programming to wrangle, visualize, and analyze data.
3. Apply a variety of statistical learning techniques to data in Python.
4. Write a report describing the findings of a data analysis project.

Upon completion of this course, students will be able to:

1. Define and differentiate key terminology in data science, including predictors/features/independent variables and response/dependent variables, prediction and inference, bias and variance, model accuracy and interpretability, parametric and nonparametric methods, and supervised and unsupervised learning (ABET 1).

2. Perform data wrangling, visualization, and analysis in Python (ABET 1).
3. Apply a diversity of statistical learning techniques in Python, including linear regression, classification methods, nonlinear modeling approaches, tree-based methods, support vector machines, unsupervised learning, and resampling methods (ABET 1).
4. Select appropriate statistical learning techniques to address targeted questions in data science (ABET 6).
5. Present interpretations of findings from data analyses in a written report (ABET 6).

Course Evaluation Method

Grading Criteria

All assignments, homework, projects, programs, quizzes, and exams in this course must be INDIVIDUAL effort. Late submissions will not be accepted or graded. All assignments are individual work, the best way to learn is to complete your own assignments. Sharing code and sharing solutions is considered cheating, this includes posting completed work before the assignment official deadline onto sites such as GitHub, emailing work to other students, allowing any access to your work before the official deadline has passed. Other offenses include submitting another person's work as your own, this includes taking code and solutions off sites such as GitHub, Chegg, etc.

Modifying code and submitting it as your own is a fraudulent practice—specifically, plagiarism—and is no different than copying paragraphs of information from a book or journal article and calling it your own (make sure that you work independently and submit only your own code)

Please take the time to read the documentation. You are responsible for the information outlined in it. Please see the instructor, any teaching assistant, or Engineering Student Services tutoring for assistance. Check the Help Section on Canvas.

Assignments (75%)

There are four (4) assignments this semester.

Final Project (25%)

An individual final project with a topic selected by the student and approved by the instructor.

Note: The minimum grade required to pass this course is C.

Note: Extra credit assignments (if any) count ONLY after passing the class with a minimum of "C" grade.

Late work is not acceptable.

All assignments must be submitted on time via Canvas, unless otherwise noted.

Important Dates: TBD

Homework 1
Homework 2
Homework 3
Homework 4
Final Project

Course Grading Scale

Minimum grade of C is required to pass the course.

Score	Letter	Score	Letter	Score	Letter	Score	Letter	Score	Letter
93-100	A	85-89	B+	75-79	B-	68-71	C	50-59	D
90-92	A-	80-84	B	72-74	C+	60-67	C-	0-49	F

Policy on Makeup Tests, Late Work, and Incompletes (if applicable)

Late work is not acceptable.

Throughout the semester, multiple homework assignments will be posted via Canvas. For each assignment, you will have about 7-10 days to complete the assignment and submit your solution via Canvas. Please note that the due date for homework assignments will not be updated after the assignment is posted.

Incomplete grades are not awarded unless there is solid evidence of medical or otherwise serious emergency situation. Grades of Incomplete (“I”) are reserved for students who are passing a course but have not completed all the required work because of exceptional circumstances.

Special Course Requirements (if applicable)

N/A

Classroom Etiquette Policy (if applicable)

Disruptive behavior is defined in the FAU Student Code of Conduct as “... activities which interfere with the educational mission within classroom.” Students who disrupt the educational experiences of other students and/or the instructor’s course objectives in a face-to-face or online course are subject to disciplinary action. Such behavior impedes students’ ability to learn or an instructor’s ability to teach. Disruptive behavior may include, but is not limited to non- 5 approved use of electronic devices (including cellular telephones); cursing or shouting at others in such a way as to be disruptive; or, other violations of an instructor’s expectations for classroom conduct. For more information, please see the FAU Office of Student Conduct. One of the objectives of this course is to facilitate critical thinking and debate around topics, theories, and concepts where disagreement is not only anticipated, but encouraged. The ability to think critically, express your ideas clearly, and respond to the professor and other students civilly are the keystones of the academic experience. In this course, the professor will provide instruction in an objective manner and will remain open to a wide variety of viewpoints, so long as those viewpoints are evidence-based and presented in a respectful way. During class, the professor may take positions and make statements for the sole purpose of accomplishing an academic objective or enhancing the learning environment. Additionally, the adoption of class materials for this course does not imply an endorsement of the full content of those materials or the positions of the authors of those materials. Often the professor will provide materials as a point of departure for critical thinking and debate. Students should keep in mind that the ideas presented or discussed during class may not necessarily reflect the professor’s personal beliefs or opinions on the subject matter.

Policy on the Recording of Lectures (optional)

Because of a new Florida Statute in 2021, the following model language is suggested for inclusion in course syllabi, at the discretion of individual faculty:

Students enrolled in this course may record video or audio of class lectures for their own personal educational use. A class lecture is defined as a formal or methodical oral presentation as part of a university course intended to present information or teach students about a particular subject. Recording class activities other than class lectures, including but not limited to student presentations (whether individually or as part of a group), class discussion (except when incidental to and incorporated within a class lecture), labs, clinical presentations such as patient history, academic exercises involving student participation, test or examination administrations, field trips, and private conversations between students in the class or between a student and the lecturer, is prohibited. Recordings may not be used as a substitute for class participation or class attendance and may not be published or shared without the written consent of the faculty member. Failure to adhere to these requirements may constitute a violation of the University's Student Code of Conduct and/or the Code of Academic Integrity.

Attendance Policy

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

Counseling and Psychological Services (CAPS) Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to <http://www.fau.edu/counseling/>

Disability Policy

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.

Code of Academic Integrity

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high-quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [University Regulation 4.001](#).

Students are **NOT allowed to work together for** homework.
All submitted assignments must be the **original work** of the student.

Faculty Rights and Responsibilities

Florida Atlantic University respects the right of instructors to teach and students to learn. Maintenance of these rights requires classroom conditions which do not impede their exercise. To ensure these rights, faculty members have the prerogative:

- To establish and implement academic standards.
- To establish and enforce reasonable behavior standards in each class.
- To refer disciplinary action to those students whose behavior may be judged to be disruptive under the Student Code of Conduct.

The instructor reserves the right to adjust this syllabus as necessary.

Required Texts/Readings

Optional:

1. ISBN-10: 9780123814791

Data Mining: Concepts and Techniques (The Morgan Kaufmann Series in Data Management Systems) 3rd Edition

2. ISBN-13: 978-1119526810

Data Science Using Python and R (Wiley Series on Methods and Applications in Data Mining) 1st Edition by Chantal D. Larose (Author), Daniel T. Larose (Author)
Wiley publication

Supplementary/Recommended Readings (if applicable)

To be posted on Canvas.

Course Topical Outline

Core Topics

- Fundamentals of data science
- Introduction to Python for data science
- Foundations of hypothesis testing
- Estimation techniques, including bias, mean squared error (MSE), confidence intervals, and maximum likelihood estimation.
- Understanding and Preprocessing Data

- Linear regression
- Logistic regression
- Linear discriminant analysis
- Cross-validation
- Linear model selection
- Regularization
- Nonlinear modeling approaches
- Tree-based methods
- Support vector machines
- Unsupervised learning

Note: course material may be adjusted/modified depends on time