FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Undergraduate Programs

Department Electrical Engineering and Computer Science

College Engineering and Computer Science

*(To obtain a course number, contact **erudolph@fau.edu**)*

UUPC Approval 3-24-25
UFS Approval
SCNS Submittal
Confirmed
Banner Posted
Catalog

Prefix CAP

Number 4790

(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)

Lab Code

Type of Course: Lecture

Course Title: Introduction to Data Engineering for Non-majors

Credits *(See Definition of a Credit Hour)*: 3

Effective Date *(TERM & YEAR)*: Fall 2025

Grading *(Select One Option)*

Regular ◉

Sat/UnSat ○

Course Description *(Syllabus must be attached; see Template and Guidelines)*

This course provides an overview of data engineering and data science for students with no prior experience in computer science or programming. The topics include data cleaning, ETL (extract, transform, load) pipelines, databases, exploratory data analysis, data visualization, and introductory machine learning. By the end of the course, students will have a foundational understanding of how data drives decision-making in various fields and get hands-on skills to solve real-world challenges using a low-code environment. Students may not enroll in CAP 4790 if they have already taken CAP 5796.

Prerequisites, with minimum grade*

Corequisites

Registration Controls *(Major, College, Level)*: Major outside of EECS Department

Default minimum passing grade is D-.** **Prereqs., Coreqs. & Reg. Controls are enforced for all sections of course

WAC/Gordon Rule Course

☐ **Yes** ☑ **No**

WAC/Gordon Rule criteria must be indicated in syllabus and approval attached to proposal. See WAC Guidelines.

Intellectual Foundations Program (General Education) Requirement *(Select One Option)*

None

General Education criteria must be indicated in the syllabus and approval attached to the proposal. See Intellectual Foundations Guidelines.

Minimum qualifications to teach course

To have a Ph.D. degree in CS/Engineering or relevant disciplines.

Faculty Contact/Email/Phone

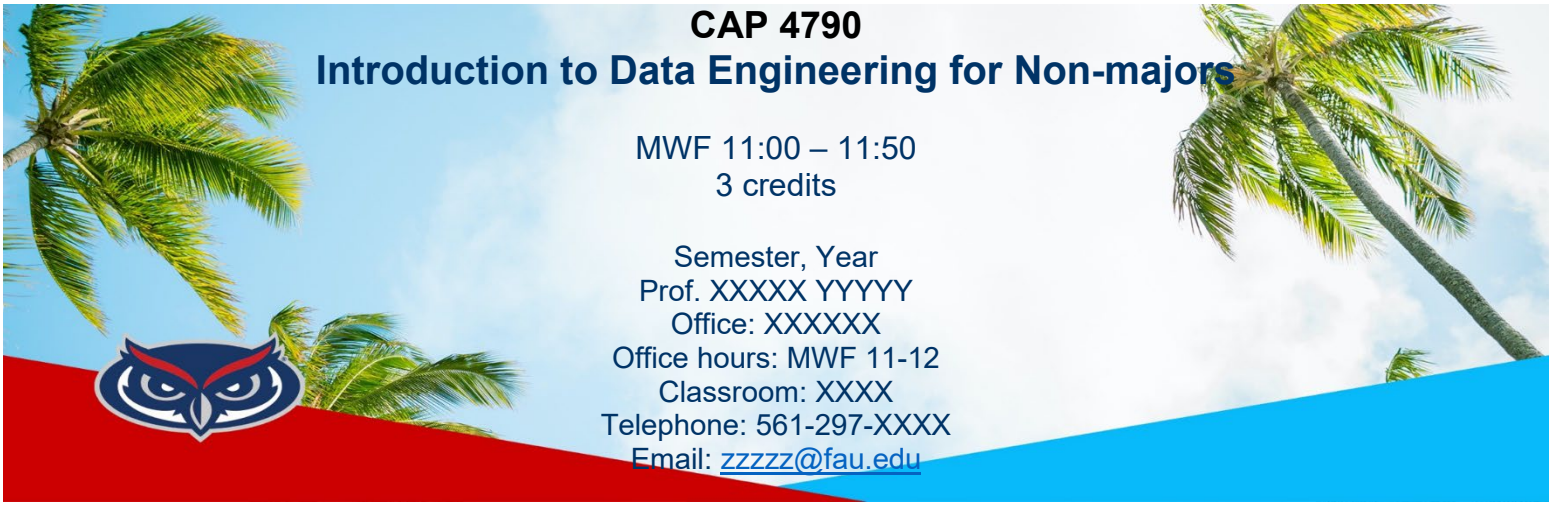
M. DeGiorgio / mdegiorg@fau.edu / 561-297-0003

List/Attach comments from departments affected by new course

ITOM_support_CAP4790.pdf

Approved by		***Date***
Department Chair	Hai Kalva	3/12/2025
College Curriculum Chair	Galan Liu	3/13/25
College Dean		3/13/25
UUPC Chair	Korey Sorge	3-24-25
Undergraduate Studies Dean	Dan Moorhoff	3-24-25
UFS President		
Provost		

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



CAP 4790
Introduction to Data Engineering for Non-majors

MWF 11:00 – 11:50
3 credits

Semester, Year
Prof. XXXXX YYYYY
Office: XXXXXX
Office hours: MWF 11-12
Classroom: XXXX
Telephone: 561-297-XXXX
Email: zzzzz@fau.edu

TA name	xxxxxx xxxxxxxxx
Office	xxxxxxxx
Office hours	MWF xx:xx – xx:xx
Telephone	561-297-xxxx
Email	xxxxxx@fau.edu

Course Description

This course provides an overview of data engineering and data science for students with no prior experience in computer science or programming. The topics include data cleaning, ETL (extract, transform, load) pipelines, databases, exploratory data analysis, data visualization, and introductory machine learning. By the end of the course, students will have a foundational understanding of how data drives decision-making in various fields and get hands-on skills to solve real-world challenges using a low-code environment. Students may not enroll in CAP 4790 if they have already taken CAP 5796.

Instructional Method

This class is designated as "In-Person w/Recorded Lecture" (section XXX) or "Videotaped Class" (section YYY). In-person class sessions will be automatically recorded and uploaded to Canvas within 24 hours. Student enrolled in section XXX may choose to attend in-person classes or view recordings, whereas students enrolled in section YYY are only able to view recordings.

Prerequisites/Corequisites

N/A

Course Objectives/Student Learning Outcomes

By the end of this course, students will:

- Understand the roles of data engineering and data science in the data ecosystem.
- Learn the basics of data collection, transformation, storage, and visualization.
- Develop foundational skills in exploratory data analysis (EDA) and machine learning.
- Build and present a small project combining data engineering and data science concepts.

Course Evaluation Method

Weekly labs	40%
Quizzes	30%
Term project	30%
Total	**100%**

The course will be applying the following popular low-/no-code tools:

- Google AutoML : https://cloud.google.com/automl
- Google Teachable Machine : https://teachablemachine.withgoogle.com/
- Apache NiFi : https://nifi.apache.org/
- Orange Data Mining : https://orangedatamining.com/
- Obviously AI: https://www.obviously.ai/

Course Grading Scale

Grade	Total (%)
A	[93 – 100]
A-	[90 – 92)
B+	[87 – 89)
B	[83 – 86)
B-	[80 – 82)
C+	[77 – 79)
C	[73 – 76)
C-	[70 – 72)
D+	[67 – 69)
D	[63 – 66)
D-	[60 – 62)
F	[0 – 59)

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

Late work will not be accepted. All assignments will be posted well in advance, and students may submit assignments early. Any assignment not turned in by the due date will result in a zero.

Make-up tests are given only if there is solid evidence of a medical or otherwise serious emergency situation that prevented the student from participating in the exam.

Incomplete grades are against the policy of the department, and they will only be assigned if there is solid evidence of medical or otherwise serious emergency situation.

Policy on the Recording of Lectures

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.

Required Texts/Readings

N/A

Course Topical Outline

Week	Session	Content	Lab	Tools
1	Introduction to Data Engineering and Data Science	What are Data Engineering and Data Science? The Data Lifecycle and Ecosystem.		
2	Databases and Data Storage	Relational Databases (RDBMS): Basics and SQL. Introduction to NoSQL Databases	Querying data	SQLite or MySQL Google BigQuery
3	Introduction to ETL and Data Pipelines	The ETL Process: Extract, Transform, Load. Batch Processing vs. Stream Processing	A simple ETL pipeline	Apache NiFi
4	Data Cleaning and Basics of Exploratory Data Analysis (EDA)	Common Data Quality Issues: Missing, Inconsistent, Duplicate Data. Cleaning Techniques: Imputation, Filtering, and Normalization.	Cleaning and transforming data Performing EDA	LowCode tools
5	Introduction to Statistics and Machine Learning	Descriptive and Inferential Statistics Supervised vs. Unsupervised Learning Definitions	Hands on statistical calculations	
6	Regression	Simple Linear and Multiple Linear regression	Hands on calculations	LowCode tools
7	Supervised Learning	Simple classification models : KNN, SVM	Hands on calculations	LowCode tools
8	Unsupervised Learning	Simple clustering models : Kmeans, Hierarchical	Hands on calculations	LowCode tools
9	Data Visualization	Principles of Effective Data Visualization. Introduction to Visualization Dashboards		LowCode tools
10	Model Evaluation	Model Evaluation Metrics: Accuracy, Precision, and Recall. Confusion Matrix	Hands on calculations	LowCode tools
11	Term Project	Term Project for real-world applications of machine learning		