FLORIDA ATLANTIC UNIVERSITY

COURSE CHANGE REQUEST
Graduate Programs

Department Electrical Engineering and Computer Science

College Engineering and Computer Science

UGPC Approval _____
UFS Approval _____
SCNS Submittal _____
Confirmed _____
Banner _____
Catalog _____

***Current* Course Prefix and Number**	***Current* Course Title**
CAP 5625	Computational Foundations of Artificial Intelligence

*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.*

Change title to:

Change prefix

From: **To:**

Change course number

From: **To:**

Change credits*

From: **To:**

Change grading

From: **To:**

Academic Service Learning (ASL) **

Add ☐ **Remove** ☐

* See Definition of a Credit Hour.
** Academic Service Learning statement must be indicated in syllabus and approval attached to this form.

Change description to:

Change prerequisites/minimum grades to:
Graduate standing

Change corequisites to:

Change registration controls to:

Please list existing and new pre/corequisites, specify AND or OR and include minimum passing grade.

Effective Term/Year for Changes:	**Terminate course? Effective Term/Year for Termination:**
Summer 2024	

Faculty Contact/Email/Phone Michael DeGiorgio / mdegiorg@fau.edu / 561-297-003

Approved by	***Date***
Department Chair Hai Kalva	1/15/2024
College Curriculum Chair Masoud Jahandar Lashaki	2/20/2024
College Dean M Cardei	3/4/2024
UGPC Chair Paul R Pinson	03/21/2024
UGC Chair Paul R Pinson	03/21/2024
Graduate College Dean Robert W Stackley	03/21/2024
UFS President	
Provost	

Email this form and syllabus to UGPC@fau.edu 10 days before the UGPC meeting.

CAP 5625-001
COMPUTATIONAL FOUDNATIONS OF AI

Days/Time: TBA
3 credits

Semester: TBA
Prof. Michael DeGiorgio
Office: Engineering East room 418
Office hours: TBA
Classroom: Computing Bldg room 125
Telephone: 561-297-003
Email: mdegiorg@fau.edu

TA name	TBA
Office	TBA
Office hours	TBA
Telephone	TBA
Email	TBA

Course Description

This course covers the mathematical and programming foundations of artificial intelligence (AI) and machine learning (ML) using contemporary programming languages and tools. As a result, students develop familiarity with mathematical methods (and associated notation, software packages and libraries) that are widely used in AI and ML projects and literature.

Instructional Method

This class is designated as “In-Person w/Recorded Lecture”. In-person class sessions will be automatically recorded and uploaded to Canvas up to 24 hours afterward. Student enrolled in may choose to attend in-person classes or view recordings.

Prerequisites/Corequisites

Graduate Standing

Course Objectives/Student Learning Outcomes

By the end of the course, students will be able to:

1. Understand the mathematical foundations of machine learning.
2. Demonstrate proficiency in solving machine learning problems.
3. Identify and apply statistical and computational models to machine learning problems.
4. Analyze the performance of particular machine learning models, and justify their use and limitations.

Course Evaluation Method

Four programming assignments	25% each
Total	**100%**

Homework assignments will consist of programming from scratch machine learning algorithms, training and testing them on example datasets, and visualization of the parameter behavior during training.

Course Grading Scale

Grade	Total (%)
A	[93 – 100]
A-	[90 – 93)
B+	[87 – 90)
B	[83 – 87)
B-	[80 – 83)
C+	[77 – 80)
C	[73 – 77)
C-	[70 – 73)
D+	[67 – 70)
D	[63 – 67)
D-	[60 – 63)
F	[0 – 60)

Note: Square brackets indicate inclusive and parentheses indicate exclusive

Policy on Makeup Tests, Late Work, and Incompletes

There will be no exams, and therefore no makeup exams, in this course.

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.

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.

Classroom Etiquette Policy

Students are required to comply with all requirements specified in the student code of conduct and not in any way disrupt the class or prevent other students from benefiting from the class. Students are to speak and behave respectfully to each other and to all FAU faculty and staff.

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

The Elements of Statistical Learning: Data Mining, Inference, and Prediction, by Trevor Hastie, Robert Tibshirani, and Jerome Friedman. Spring, 2009, 2nd Ed, ISBN-13: 978-0-3878-4857-0.

**** Free ebook** from author website https://web.stanford.edu/~hastie/ElemStatLearn/

Supplementary/Recommended Readings

An Introduction to Statistical Learning: with Applications in R, by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani. Springer, 2017, ISBN-13: 978-1-4614-7137-0.

**** Free ebook** from author website https://statlearning.com/

Pattern Recognitation and Machine Learning, by Christopher M. Bishop. Springer, 2006, ISBN-13: 978-0-3873-1073-2.

**** Free ebook** from author website
https://www.microsoft.com/en-us/research/people/cmbishop/prml-book

Course Topical Outline

Topic 1: Introduction
Topic 2: Introduction to regression
Topic 3: Linear and non-linear regression and model selection
Topic 4: Feature selection and regularization
Topic 5: Discriminant analysis
Topic 6: Logistic regression
Topic 7: Support vector machines
Topic 8: Neural networks
Topic 9: Random forests and boosting
Topic 10: Unsupervised learning
Topic 11: Advanced topics if time permits

Instructor reserves the right to adjust this syllabus as necessary