FLORIDA ATLANTIC UNIVERSITY

NEW COURSE PROPOSAL
Graduate Programs

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

Department Finance

College Business

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

Prefix FIN **Number** 6596	*(L = Lab Course; C = Combined Lecture/Lab; add if appropriate)* **Lab Code**	**Type of Course** Lecture	**Course Title** Machine Learning (ML) and Artificial Intelligence (AI) Applications in Finance

Credits *(See Definition of a Credit Hour)*
3.0

Effective Date *(TERM & YEAR)*
Spring 2026

Grading *(Select One Option)*
Regular ◉
Sat/UnSat ○

Course Description *(Syllabus must be attached; see Template and Guidelines)*
The course provides an overview of machine learning (ML) and artificial intelligence (AI) methods applied in the financial sector, particularly in the investment management and financial services industries with an emphasis on the role of these methods in investment strategies and portfolio management, risk management, and financial decision making.

Prerequisites

Prerequisites, Corequisites and Registration Controls are enforced for all sections of course.

Academic Service Learning (ASL) course ☐
Academic Service Learning statement must be indicated in syllabus and approval attached to this form.

Corequisites

Registration Controls *(For example, Major, College, Level)*

Minimum qualifications needed to teach course:
Member of the FAU graduate faculty and has a terminal degree in the subject area (or a closely related field).

List textbook information in syllabus or here
1. Cao, L. ed., 2023. Handbook of artificial intelligence and big data applications in investments. CFA Institute Research Foundation.
2. de Prado, M.L.: Machine Learning for Asset Managers.

Faculty Contact/Email/Phone
David Jay/djavakhadze@fau.edu/7-

List/Attach comments from departments affected by new course

Approved by	***Date***
Department Chair Anita Pennathur	
College Curriculum Chair Robert Pinsker	9/17/2025
College Dean Marc Rhorer	9/17/2025
UGPC Chair	
UGC Chair	
Graduate College Dean	
UFS President	
Provost	

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

FLORIDA ATLANTIC UNIVERSITY

FIN 6596

Machine Learning (ML) and Artificial Intelligence (AI) Applications in Finance

Date: TBD
Building: TBD **Room:** TBD
3 Credit(s)
TBD

Instructor Information

TBD
Email: TBD
Office Hours: TBD

Phone: XXX-XXX-XXXX

Course Description

The course provides an overview of machine learning (ML) and artificial intelligence (AI) methods applied in the financial sector, particularly in the investment management and financial services industries with an emphasis on the role of these methods in investment strategies and portfolio management, risk management, and financial decision making.

Additional Course Information

Students will work on case studies and a class project to analyze and demonstrate how ML and AI models are used to enhance forecasting, trading strategies, and portfolio management. Both benefits and potential issues, including ethical issues, of adopting the new technologies will be discussed.

It is recommended that students are familiar with the foundations of statistics and basic linear algebra. Similarly, an understanding of financial capital markets and financial concepts is desirable; however, we will provide a review of these concepts. Basic knowledge of Python or some other modern programming language is recommended, although the objective of the course is not specifically to learn programming, but to understand how ML/AI models work and how to use and adapt them to various applications and decisions in the financial sector.

Instructional Method

In-Person /Hybrid/TBD

Required Texts/Materials

The course is not strictly based on a single textbook. Instead, each lecture is accompanied by curated readings aimed at expanding the students' understanding and exposing them to a range of viewpoints. These materials are drawn from the texts listed below.

Financial Applications:

1. Cao, L. ed., 2023. *Handbook of artificial intelligence and big data applications in investments*. CFA Institute Research Foundation.
2. de Prado, M.L.: Machine Learning for Asset Managers. Elements in Quantitative Finance. Cambridge University Press, Cambridge (2020)

Other Recommended Books and Readings:

1. Deisenroth, Faisal, and Ong (2020), Mathematics for Machine Learning. The companion website has very good supporting material and videos.
2. Gareth et al. (2023), An Introduction to Statistical Learning with Applications in Python, Springer.
3. Bartram, S.M., Branke, J. and Motahari, M., 2020. *Artificial intelligence in asset management*. CFA Institute Research Foundation.
4. https://rpc.cfainstitute.org/themes/technology
5. https://rpc.cfainstitute.org/research/reports/2025/investment-perspective-tokenization-part-ii
6. Harvey, C.R., Ramachandran, A. and Santoro, J., 2021. *DeFi and the Future of Finance*. John Wiley & Sons.

A 5-case course case pack must be purchased:

1. Egan, M., 2024. Data-Driven Denim: Financial Forecasting at Levi Strauss, Harvard Business School Case, 9-224-029.
2. Cohen, Malloy, Powley, 2018. Artificial Intelligence and the Machine Learning Revolution in Finance: Cogent Labs and the Google Cloud Platform, 218080-PDF-ENG.
3. Wang, C.Y., Thomas, K., 2021. New Constructs: Disrupting Fundamental analysis with Robo-Analysts, Harvard Business School Case, 9-118-068.
4. Chiyachantana, Ding, Prasarnphanich, Chan, 2022. Robowealth: Bringing Investment Opportunities to the Masses, SMU026-PDF-ENG.
5. Appel, Ian, Sesia, Also, 2023. Upstart's Upshot: Is Fintech Lending Fair? UV Darden case, UV8787.

Readings and associated videos will be available on the Canvas course platform.

Course Objectives/Student Learning Outcomes

- Obtain, organize, and prepare data from financial databases for financial data analysis and risk assessment.
- Comprehend supervised and unsupervised learning models and how they can be used in financial decision making.
- Use ML and AI driven solutions for portfolio management, investment analysis, and financial forecasting.
- Assess the effectiveness of ML and AI techniques in Fintech domains like credit evaluation, fraud detection, algorithmic trading, and chatbots.
- Compare generative AI applications in finance, including industry-specific models like BloombergGPT and their impact on research and financial decision making.

Course Evaluation Method

The graded course components and the maximum available points are as follows:

Quizzes	20%
Homework	15%
Group Case projects	30%
Class Participation	15%
Final Individual project	20%

Course Topical Outline

. 1. Introduction and Financial Concepts I
- Financial instruments, assets, and markets
- Overview of AI and ML in finance
- Regulatory environment

2. Financial Concepts II
- Portfolio theory and financial time series analysis
- Types and sources of financial data
- Data visualization techniques for financial data

3. Supervised Learning in Financial Prediction
- Credit risk management, fraud detection, and price prediction
- Model evaluation and selection in financial contexts
- Linear regression, logistic regression, and regularization
- Naïve Bayes and K-Nearest Neighbors (KNN)

4. Unsupervised Learning for Pattern Recognition
- Clustering and dimensionality reduction
- Outlier detection and anomaly detection
- Applications to emerging financial threats

5. Neural Networks and Deep Learning in Finance
- Feedforward neural networks, backpropagation
- Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs)
- Attention mechanisms and Transformers
- Reinforcement learning: value & policy iteration, Q-learning, and deep RL
- Applications to AI-powered trading and portfolio management

6. Ensemble Methods and Advanced ML Techniques
- Decision trees, random forests, bagging, and boosting
- Support Vector Machines (SVMs) and kernel methods
- Gaussian processes and generative models for vision (finance-specific applications)

7. Natural Language Processing in Finance
- Text mining and sentiment analysis
- Automated summarization for financial reports
- Chatbots and virtual assistants for financial tasks
- Pretraining, fine-tuning, and in-context learning for financial NLP

8. AI in Financial Decision Making
- AI-driven stock valuation
- Risk management applications
- Integrating ML models into financial decision pipelines

9. Advanced Data Management & Big Data in Finance
- Data storage, processing, and retrieval for large-scale financial datasets
- Big data technologies and cloud computing applications

10. Learning Theory and Ethical Considerations
    - Learning theory fundamentals (bias-variance tradeoff, overfitting, generalization)
    - Algorithmic bias, model fairness, and interpretability
    - Regulatory compliance and ethical challenges in financial AI
11. Future Directions in Financial AI
    - Emerging trends: generative AI, pretraining/fine-tuning, in-context learning
    - AI governance, transparency, and future regulatory considerations

Faculty Rights and Responsibilities

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

• Establish and implement academic standards.

• Establish and enforce reasonable behavior standards in each class.

• Recommend disciplinary action for students whose behavior may be judged as disruptive under the Student Code of Conduct University Regulation 4.007.

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.

A note on plagiarism

Plagiarism takes many forms, including but not limited to:

- Direct copying (including 3 words in a row) without using quotations.
- Failure to use citations when an idea is not yours
    - Copying material without quotation marks is always plagiarism, even if you cite the source.
    - Providing references in the reference section without using citations is still plagiarism.

As a student, you are to avoid all types of plagiarism. For example, you must cite the textbook where you paraphrase a definition or concept from it. Failure to paraphrase and/or cite correctly your sources can result in dismissal from the class and the University. Saying you worked on project together and used the same references is not an excuse. Everyone must turn in their own individual paper which follows the correct APA formatting including proper referencing. If you are unsure about the correct ways to paraphrase concepts and definitions, contact the campus academic advisor, or the Business Communications Department on the Boca Raton campus, for further assistance.

Anti-plagiarism Software

Written components of any assignment or project may be submitted to anti-plagiarism software to evaluate the originality of the work. Any students found to be submitting work that is not their own will be deemed in violation of the University's honor code discussed above.

Use of generative AI and AI-assisted technologies

ML/AI tools for class projects are allowed as per instructor directions for purpose of the course topics.

Outside of this, where students use generative AI and AI-assisted technologies in the writing process, these technologies should only be used to improve the readability and language of the work. Applying the technology should be done with human oversight and control, and students should carefully review and edit the result because AI can generate authoritative-sounding output that can be incorrect, incomplete, or biased. The students are ultimately responsible and accountable for the contents of the work.

Students should disclose in their manuscript the use of AI and AI-assisted technologies. Declaring the use of these technologies supports transparency and trust and facilitates compliance with the terms of use of the relevant tool or technology.

Attendance Policy Statement

Students are expected to attend all 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.

Religious Accommodation Policy Statement

In accordance with the rules of the Florida Board of Education and Florida law, students have the right to reasonable accommodations from the University in order to observe religious practices and beliefs regarding admissions, registration, class attendance, and the scheduling of examinations and work assignments. University Regulation 2.007, Religious Observances, sets forth this policy for FAU and may be accessed on the FAU website at www.fau.edu/regulations.

Any student who feels aggrieved regarding religious accommodations may present a grievance to the executive director of The Office of Civil Rights and Title IX. Any such grievances will follow Florida Atlantic University's established grievance procedure regarding alleged discrimination.

Time Commitment Per Credit Hour

For traditionally delivered courses, not less than one (1) hour of classroom or direct faculty instruction each week for fifteen (15) weeks per Fall or Spring semester, and a minimum of two (2) hours of out-of-class student work for each credit hour. Equivalent time and effort are required for Summer Semesters, which usually have a shortened timeframe. Fully Online courses, hybrid, shortened, intensive format courses, and other non-traditional modes of delivery will demonstrate equivalent time and effort.

Course Grading Scale

This course uses a point system for grading. The grades are completely transparent on Canvas. To be fair to all students, there will be no individual adjustment of any tests or assignment; grades are assigned based on actual performance only.

Letter Grade	Letter Grade
A	930 - 1000
A-	900 - 929
B+	870 - 899
B	830 - 869
B-	800 - 829
C+	770 - 790
C	730 - 769
C-	700 - 729
D+	670 - 699
D	630 - 669
D-	600 - 629
F	Below 600

Grade Appeal Process

You may request a review of the final course grade when you believe that one of the following conditions apply:

• There was a computational or recording error in the grading.

• The grading process used non-academic criteria.

• There was a gross violation of the instructor's own grading system.

University Regulation 4.002 of the University Regulations contains information on the grade appeals process

Policy on Make-up Tests, Late work, and Incompletes

All lesson assignments should be submitted by the specified deadline. No assignments will be regraded because of one's failure to follow instructions, including, but not limited to, not having everything required or submitting the wrong file.

Late submissions of in-class assignments will NOT be accepted, except for the work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations, participation in religious observance, or participation in university-approved activities. University-approved reasons for absences include participating on an athletic or academic team, musical and theatrical performances, and debate activities. The students are responsible for giving the instructor notice 24 hours before 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 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.

Unless specified in the assignment description, all assignments should be completed individually. Any inclusion of other people's work (such as from classmates, previously submitted files, or answers found online), as well as AI-generated will be treated as academic integrity violation, resulting a zero (0) for that submission.

A student who is passing a course but has not completed all work due to exceptional circumstances may, with consent of the instructor, temporarily receive a grade of incomplete ("I"). The assignment of the "I" grade is at the discretion of the instructor, but it is allowed only if the student is passing the course.

The specific time required to make up an incomplete grade is at the discretion of the instructor. However, the College of Business policy on the resolution of incomplete grades requires that all work required to satisfy an incomplete ("I") grade must be completed within a period not exceeding one calendar year from the assignment of the incomplete grade. After one calendar year, the incomplete grade automatically becomes a failing ("F") grade.

Special Course Requirements

Required technological skills

- Basic Skills in computer use
- Access to the internet
- Basic Canvas LMS skills
- Basic Skills for Office programs (word processing and presentation programs)

Required Software

- Microsoft 365 Suite Link to download
- Reliable web browser (recommended Chrome or Firefox)
- Mobile App: Instructions on how to download the Canvas App on an iOS device (Link for iOS Instructions) or Android device (Link for Android instructions).

Internet Connection

- Recommended: Broadband (high-speed) Internet connection with a speed of 4 Mbps or higher
- To function properly, Canvas requires a high-speed Internet connection (cable modem, DSL, satellite broadband, T1, etc.). The minimum Internet connection speed to access Canvas is a consistent 1.5 Mbps (megabits per second) or higher.
- To check your Internet speed, click here.

Minimum Technical Skills Requirements

The general and course-specific technical skills a student must have to succeed in the course include but are not limited to:

1. Accessing Internet.
2. Using Canvas (including taking tests, attaching documents).
3. Using email with attachments.
4. Creating and submitting files in commonly used word processing program formats such as Microsoft Office Tools.
5. Copying and pasting functions.
6. Downloading and installing software.
7. Using presentation, graphics, and other programs.
8. Posting and commenting in an online discussion.
9. Searching the FAU library and websites.

Computer Requirement - Basic computer specifications for Canvas Link to Specifications

Operating System

- A computer that can run Mac OSX or Win 7.0 or higher.

Peripherals

- A backup option should be available to minimize the loss of work, such as an external hard drive, a USB drive, cloud storage, or your folder on the FAU servers.

Software

- Once logged in to Canvas, make sure your Internet browser is compatible.
- Other software may be required for specific learning modules. If so, the necessary links to download and install will be provided within the applicable module.

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.

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/

Student Support Services and Online Resources

- Center for Learning and Student Success (CLASS)
- Counseling and Psychological Services (CAPS)
- FAU Libraries
- Math Learning Center
- Office of Information Technology Helpdesk
- Center for Global Engagement

- Office of Undergraduate Research and Inquiry (OURI)
- Science Learning Center
- Speaking Center
- Student Accessibility Services
- Student Athlete Success Center (SASC)
- Testing and Certification
- Test Preparation
- University Academic Advising Services
- University Center for Excellence in Writing (UCEW)
- Writing Across the Curriculum (WAC)

Weekly Assignments	Topics
Week I	Financial Concepts I: Financial instruments, assets, and markets. Overview of ML and AI in the financial sector. Regulatory environment.
Week II	Financial Concepts II. Portfolio Theory, time series analysis in finance, types and sources of financial data, data visualization for financial data.
Week III	Supervised Learning I in Financial Prediction: Credit risk management, fraud detection, price prediction. Model evaluation and selection.
Week IV	Supervised learning II: Linear regression logistic regression, regularization. Naïve Bayes and KNN.
Week V	Case Discussion I. Class individual project assignment discussion. Catch up if needed.
Week VI	Unsupervised Learning: Clustering, outliers, anomalies, financial threats application.
Week VII	Neural Networks and Deep Learning: CNN, RNN, reinforcement learning, applications to AI-powered trading and portfolio management.
Week VIII	Ensemble Methods and Advanced ML Techniques: decision trees, random forests, SVMs, finance-specific applications of Gaussian processes and generative models.

Week IX	Case Discussion II. Class project student update. Catch up if needed.
Week X	Natural Language Processing: Text mining, sentiment analysis, automated summarization of financial reports, chatbots and VAs, learning for financial NLP.
Week XI	AI in Financial Decision Making: AI-driven stock valuation, risk management applications, integrating ML models in financial decisions.
Week XII	Advanced Data Management and Big Data in Finance: Data storage, processing, retrieval for large-scale financial data, big data and cloud computing.
Week XIII	Case Discussion III and IV.
Week XIV	Learning Theory and Ethical Considerations: learning theory fundamentals, algorithmic bias, model fairness, regulatory compliance and ethical challenges in financial AI.
Week XV	Case Discussion V.
Week XVI	Future Directions in Financial AI: generative AI, pretraining/fine-tuning, AI governance, transparency, future regulatory considerations.