

BA 4844/5844 – ARTIFICIAL INTELLIGENCE STRATEGIES IN FINANCE
Tuesday and Thursday 12:40-13:55 @ G107

Instructor:	Dr. Berna N. YILMAZ
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Office Hours:	TBA
Course Web Page:	https://odtuclass.metu.edu.tr/
Course Description:	
This course examines the theoretical and strategic integration of Artificial Intelligence (AI) methodologies within financial markets and institutions. Unlike applied lab-based courses, this module focuses on the economic intuition, managerial implications, and systemic impact of AI. The course is designed to equip undergraduate business students with the analytical capabilities required to evaluate complex AI models from a corporate and regulatory perspective. By mastering these non-traditional, data-centric frameworks, graduates will secure a distinct competitive advantage in the job market, possessing a rare strategic skill set typically absent in traditional business administration cohorts. Topics include the strategic deployment of Deep Learning, Natural Language Processing (NLP), and Reinforcement Learning across portfolio management, risk assessment, algorithmic trading, and financial forecasting.	
Course Prerequisites:	
Students who have completed any one of the following courses with at least the stated semester grade are allowed to register for this course: BA 2802 (DD) or BA 2803 (DD) or BA 5802 (CC) or IAM 521 (CC) or BAS 381 (DD) or ECON 311 (DD) or ECON 312 (DD).	
Course Student Learning Objectives: (CSLOs)	
<i>Upon successful completion of this course, students should be able to:</i> <i>Course Specific Skills:</i> <i>Understand the strategic shift from traditional financial frameworks to data-driven artificial intelligence methodologies.</i> <i>Evaluate the impact of alternative data and digital footprints on chronological financial forecasting.</i> <i>Analyze how automated algorithms are transforming credit risk scoring and portfolio management.</i> <i>Assess the mechanics of algorithmic execution and High-Frequency Trading within the Limit Order Book.</i> <i>Discipline Specific Skills:</i> <i>Contrast classical deductive financial theories (e.g., CAPM) with modern inductive machine learning approaches.</i> <i>Identify critical quantitative errors in financial modelling, such as look-ahead bias and backtest overfitting.</i> <i>Understand the "Black Box" problem and the critical need for explainability (XAI) in consumer finance.</i> <i>Assess the systemic and operational risks associated with autonomous financial systems and market contagion.</i> <i>Navigate the legal and regulatory constraints of financial algorithms, including data privacy laws and SR 11-7.</i> <i>Personal and Key Skills:</i> <i>Develop a critical managerial mindset to audit algorithmic outputs and reject spurious financial correlations.</i> <i>Communicate algorithmic risk factors and model limitations transparently to non-technical stakeholders.</i> <i>Evaluate the broader ethical consequences of relying on automated decision-making in global capital allocation.</i>	

Learning and Teaching Methods:

This course follows a conceptual, case-driven approach. The pedagogical method is built around interactive lectures that combine advanced algorithmic theory with real-world financial and regulatory case studies. Each week, students will reinforce their learning by analyzing how artificial intelligence transforms traditional financial frameworks, focusing on model interpretation rather than writing code. The course structure is designed to build analytical skills incrementally, starting with machine learning intuition and culminating in the strategic evaluation of complex autonomous systems, such as high-frequency trading networks and credit scoring algorithms. Assessment includes a conceptual midterm exam to ensure mastery of the theoretical foundations, and a comprehensive final exam that requires students to synthesize course materials to critically evaluate algorithmic risk, systemic contagion, and ethical compliance in financial markets.

Required Reading:

1. Poole, D. L., & Mackworth, A. K. (2024). Artificial Intelligence: Foundations of Computational Agents (3rd ed.). Cambridge University Press.
2. Goodfellow, I., Bengio, Y., & Courville, A. (2016). Deep Learning. MIT Press.

Assessment and Grading:

Form of Assessment	% Contribution	Size of the assessment	CSLOs covered by the assessment	Feedback Method
Midterm Examination	30	75-minute in-class exam	1, 2, 3, 5, 6, 10	Written (via ODTUClass)
Analytical Case Assignments and Quizzes	30	3-4 short analytical memos (approx. 500 words each)	2, 3, 4, 6, 7, 8, 11	Written (via ODTUClass)
Final Examination	40	75-minute in-class exam	1-12	Written (via ODTUClass)

Makeup Examinations: There will be no make-ups for exams without a department-approved excuse. If you have a time conflict, please contact me ahead of time. There will be no make-ups for case assignments and quizzes under any circumstances.

Important Note About Re-sit (Bütünleme) Exams: Please note that re-sit exams are no longer given at METU, unless it is the graduation semester.

Course Policies:

STUDENT DISABILITIES: Any student, who, because of a disabling condition, may require special arrangements in order to meet course requirements, should contact the instructor as soon as possible. Students should present the appropriate documentation from the university's [Disability Support Office](#) (Engelsiz ODTÜ Birimi, ODTÜ Kütüphanesi, Solmaz İzdemir Salonu, Tel: 210.7196; engelsiz@metu.edu.tr) verifying their disability, and outlining the special arrangements required. Please note that no accommodations will be provided to the disabled students prior to the completion of this approved University process.

ACADEMIC DISHONESTY: The Department of Business Administration has no tolerance for acts of academic dishonesty. Such acts damage the reputation of METU, the department and the BA/MBA/MS degree and demean the honest efforts of the majority of the students. The minimum penalty for an act of academic dishonesty will be a zero for that assignment or exam.

CHEATING: All university, faculty/institute, and department principles on academic honesty will be strictly enforced. The usual consequence for academic dishonesty is failure of the course and referral of the case to the Dean of the Faculty/Institute for additional disciplinary action. Examinations are individual and are to be completed without outside assistance of any sort. Persons observed cheating during examinations will receive a failing grade in the course. Homework assignments are individual, unless otherwise specified

by the instructor, and are to be completed without outside assistance of any sort, as well. Persons observed cheating in their homework assignments will receive a score of zero for the portion of the semester grade that is allocated to such assignments.

PLAGIARISM: The instructor assumes that students will do their own work. By placing their names on assignments (individual or team), students are affirming that the contents are their original work. Any previous work available from files or past students, as well as materials available on the internet may be used only as a suggestive model. Violation of this provision will be considered as unethical behavior, subject to disciplinary action. If you have any doubt about the use of a specific material, see the instructor ahead of time. Any material used from outside sources should be referenced appropriately. Persons observed to plagiarize while preparing assignments will be referred to the Graduate School of Social Sciences for additional disciplinary action and also, they will receive a score of zero for the portion of the semester grade that is allocated to such assignments.

Please read the following documents carefully:

Turkish: https://oidb.metu.edu.tr/sites/oidb.metu.edu.tr/files/ODTUAkademikDurustluk-Kilavuzu-7.3.2016.son_.pdf

English: <http://oidb.metu.edu.tr/sites/oidb.metu.edu.tr/files/Academic%20Integrity%20Guide%20for%20Students.pdf>

Turkish: http://oidb.metu.edu.tr/sites/oidb.metu.edu.tr/files/ODTU%20Sinav%20Kurallari-Kilavuz-7.4.2016.son_.pdf

English: <http://oidb.metu.edu.tr/sites/oidb.metu.edu.tr/files/Guide%20for%20Rules%20to%20Be%20Followed%20In%20an%20Examination%20Environment.docx>

METU HONOR CODE

Every member of METU community adopts the following honor code as one of the core principles of academic life and strives to develop an academic environment where continuous adherence to this code is promoted.

"The members of the METU community are reliable, responsible and honorable people who embrace only the success and recognition they deserve, and act with integrity in their use, evaluation and presentation of facts, data and documents."

Students arrive on time. Timely arrival ensures that classes are able to start and finish at the scheduled times. Timely arrival shows respect for both fellow students and faculty and it helps to create a better learning environment by reducing avoidable distractions.

Students are fully prepared for each class. Much of the learning in this course takes place during classroom discussions. When students are not prepared, they cannot contribute to the learning process. This affects not only the individual but also the classmates who count on them.

Students respect the views and opinions of their colleagues. Disagreement and debate are encouraged; however, intolerance for the views of others is unacceptable.

STUDENT EXCUSES: Unless you inform me in advance, I will not excuse you from any of the grade requirements. At the same time, this does not mean that I will allow you to miss a test or an assignment with any excuse that you present to me. Please note that the excuse is acceptable for only the most extreme circumstances and only after stringent verification and approval by the Department.

KNOW YOUR RIGHTS AND RESPONSIBILITIES! <http://oidb.metu.edu.tr/en/academic-rules-and-regulations>

NOTE THE IMPORTANT DATES ON THE ACADEMIC CALENDAR! <https://oidb.metu.edu.tr/en/academic-calendar>

Notes:

- Usage of cell phones is strictly prohibited during class. Please be courteous to your classmates and me and make sure that your phones are on silent mode before the class begins.

- Please arrive on time and do not enter the classroom if I already have closed the classroom doors. If you have to leave early, please inform me in advance, but note that there will be no make-up or compensation for in-class assignments missed due to leaving early.
- You are encouraged to drop by my office during office hours for questions, concerns, or suggestions. Outside the office hours, please make an appointment with me in advance, before or after the class, via phone or e-mail. For quick questions that you may have, note that e-mailing is a very effective means of communicating with me.

The instructor assumes that students who attend the next class have understood and accepted to agree with all the requirements and rules of this course.

Don't be Trashy. Recycle.

Do not throw items away in the trash that should go into the recycling bin.

Show a little class.

REFUSE, REDUCE, REUSE, REPURPOSE, RECYCLE!



The following table gives the tentative schedule for the semester. The lectures will stress the most important and/or most difficult material. Appendices are required only if they are assigned. The students are required to read the chapters and appendices before they are covered in class.

Tentative Course Schedule				
Month	Week	Topic	Reading/ Assignment	CSLO
September	1	Strategic Foundations of AI in Finance & Economics of Artificial Intelligence	Various	1, 5
October	1			
	2	Financial Data Architecture and Alternative Data Strategies	Various	2, 10
	3	AI in Credit Scoring and Risk Assessment	Various	3, 7
	4	AI Applications in Macroeconomic Forecasting	Various	6, 10
November	5	Text Analysis and Market Sentiment	Various	2, 11
	6	Generative AI and Automating Financial Research	Various	10, 11
	7	MIDTERM EXAMINATION	Various	1, 2, 3, 5, 6, 10
	8	Reinforcement Learning (RL) and Autonomous Agents in Finance	Various	8, 10
December	9	Synthetic Financial Data and AI Risk Simulation	Various	8, 11
	10	Systemic Risk and Global Financial Networks	Various	8, 12
	11	Algorithmic Execution, Market Microstructure, and High-Frequency Trading	Various	4, 8
	12	Ethical AI and the "Black Box" Problem in Banking	Various	7, 12
January	13	Algorithmic Governance, Regulatory Compliance, and Ethics	Various	9, 11
	14	FINAL EXAMINATION	Various	1-12