

School/Faculty/Institute	Faculty of Economics and Administrative Sciences		
Program	BA in Economics	Elective	
	All other FEASS undergraduate programs		

Course Code				
Course Title in English	Machine Learning in Decision Making			
Course Title in Turkish	Karar Verme Sürecinde Makine Öğrenimi Yöntemleri			
Language of Instruction	English			
Type of Course	Lab (Flipped Classroom)			
Level of Course	4			
Semester	Spring			
Contact Hours per Week	Lecture: 0	Recitation: 0	Lab: 3	Other: 0
Estimated Student Workload	135 hours per semester.			
Number of Credits	5 ECTS			
Grading Mode	Standard letter grade			
Pre-requisites	ECON 337			
Expected Prior Knowledge	Basics of R programming			
Co-requisites	None			
Registration Restrictions	Undergraduate FEASS students only			
Overall Educational Objective	Learn the basics of Machine Learning tools and basic data-handling procedures.			
Course Description	In this course, students will learn how to solve business problems effectively by using machine learning. This course is an introductory level course.			
Course Description in Turkish	Bu derste öğrenciler, makine öğrenimini kullanarak iş problemlerini etkili bir şekilde çözmeyi öğreneceklerdir. Bu ders başlangıç seviyesinde bir derstir.			
Course Learning Outcomes and Competences	<p>Upon successful completion of the course, the learner is expected to be able to:</p> <ol style="list-style-type: none"> 1. understand fundamentals of R programming language; 2. analyze data by using visual methods; 3. understand fundamentals concepts of machine learning; 4. model building and validation using tree based machine learning models; 5. model building and validation in support vector machines; 6. solve business problems by using machine learning and big data analytics. 			

Relation to Program Outcomes and Competences: N=None S=Supportive H=Highly Related		
Program Outcomes and Competences	Level	Assessed by
	N/S/H	Exam, Project, HW, Lab, Presentation, etc.
1. Has a broad understanding of economics with a deep exposure to other social sciences and mathematics.	S	Quizzes, Flipped Learning Activities
2. Demonstrates knowledge and skills in understanding the interactions of different areas of economics.	N	
3. Displays a sound comprehension of microeconomic and macroeconomic theory.	N	
4. Applies economic concepts to solve complex problems and enhance decision-making capability.	H	Exams, Flipped Learning Activities
5. Uses quantitative techniques to analyze different economic systems.	H	Flipped Learning Activities
6. Applies theoretical knowledge to analyze issues regarding Turkish and global economies.	N	
7. Demonstrates proficiency in statistical tools and mainstream software programs to process and evaluate economic data.	H	Exams, Assignments
8. Behaves according to scientific and ethical values at all stages of economic analysis: data collection, interpretation and dissemination of findings.	S	Exams, Assignments
9. Uses written and spoken English effectively (at least CEFR B2 level) to exchange scientific information.	S	Exams, Assignments
10. Exhibits individual and professional ethical behavior and social responsibility.	S	Exams, Assignments
11. Displays learning skills necessary for further study with a high degree of autonomy	S	Exams, Assignments
Prepared by and Date	Dr. Narod Erkol, 03.12.2022	
E-mail	erkoln@mef.edu.tr	
Semester	2022-2023, Spring	
Name of Instructor	Dr. Narod Erkol	
Course Contents	Week	Topic
	1.	Introduction to Machine Learning and R
	2.	Data Structures I: Vectors, Matrices
	3.	Data Structures I: Data Frames, Lists, Loops and Flow Control
	4.	Data Visualization
	5.	Building Linear Regression & Classification Models
	6.	Linear Model Selection
	7.	Midterm
	8.	Fundamental concepts in Machine Learning: Bias/Variance tradeoff and Cross-Validation.
	9.	Model Building and Validation in decision tree models and bagging.
	10.	Model Building and Validation in random forest models and boosting.
	11.	Model Building and Validation in Support Vector Machines.
	12.	Machine learning application: predicting sales and demand
	13.	Machine learning application: improving marketing strategy
	14.	Machine learning application: improving marketing strategy
	15.	Final examination period
	16.	Final examination period
Required/Recommended Readings	Tibshirani, R., James, G., Witten, D., & Hastie, T. (2013). An Introduction to Statistical Learning with Applications in R. New York: Springer.	

	Throughout the course, we will use two online resources: Datacamp platform and "Doing economics" by CoreEcon project. The modules will be announced via Blackboard.								
Teaching Methods	Active learning								
Homework and Projects	Assignments: There will be at least 2 assignments during the term. No credits will be given for late projects. Plan ahead and finish the project before the given deadline.								
Laboratory Work	The course is a lab-based.								
Computer Use	The course is a lab-based.								
Other Activities	Assignments								
Assessment Methods	<p>Course grades are determined on a relative basis (curve). Cumulative total score for the grade is determined by the following weights:</p> <table> <tr> <td>Pre-lecture datacamp assignments</td> <td>20%</td> </tr> <tr> <td>In-lecture assignments</td> <td>20%</td> </tr> <tr> <td>Midterm exam</td> <td>30%</td> </tr> <tr> <td>Final exam</td> <td>30%</td> </tr> </table>	Pre-lecture datacamp assignments	20%	In-lecture assignments	20%	Midterm exam	30%	Final exam	30%
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In-lecture assignments	20%								
Midterm exam	30%								
Final exam	30%								
Course Administration	<p>Course Instructor: Dr. Narod Erkol – erkoln@mef.edu.tr</p> <p>Lecture time and place: TBA</p> <p>Attendance/participation: Students are expected to prepare for the lecture via assigned videos and reading materials. Students are responsible to follow the announcements, course materials available on Blackboard system.</p> <p>Formal use of e-mails: Students are expected to use their @mef accounts for email traffic. The instructor is only responsible for the information sent/received through Blackboard system and emails using @mef account. The course instructor assumes that any information sent through email will be received in 24 hours, unless a system problem occurs.</p> <p>Grading and evaluation: Evaluation will be based on the student learning outcomes. It is strongly recommended to complete all the work in a timely fashion. Late submissions will not be accepted.</p> <p>Missing midterm exam: No make up unless a legitimate proof of absence is presented.</p> <p>Missing quizzes: No make up</p> <p>Academic integrity: All students of MEF University are expected to be honest and comply with academic integrity. Students are expected to do their own work and neither give nor receive unauthorized assistance. Disciplinary action will be taken in case of suspicion.</p> <p>Improper behavior, academic dishonesty and plagiarism: YÖK Disciplinary Regulation</p>								

ECTS
Student
Workload
Estimation

	No/Weeks per Semester (A)	Preparing for the Activity (B)	Spent in the Activity Itself (C)	Completing the Activity Requirements (D)		
Lecture					0	$A*(B+C+D)$
Lab etc.	12	2	3		60	
Midterm(s)	1	15	2		17	$A*(B+C+D)$
Assingment, Project, Presentation	3		12		36	$A*(B+C+D)$
Final Examination	1	20	2		22	$A*(B+C+D)$
Total Workload					135	
Total Workload/25					5,4	
ECTS					5	