Course Syllabus

Code - Course Title	**BVA100 - Fundamentals of Machine Learning**
Course Type	II. SEMESTER
Laboratory + Practice	2+2
ECTS	**5.0**
Language of Instruction	Türkçe
Course Type	Required Courses
Course Instructor(s)	ÖĞR. GÖR. AHMET MÜCAHİD ARVASİ

Mode of Delivery	Face to face
Prerequisites	There are no prerequisites or corequisites for this course.

Course Syllabus

Weeks	Learning Outcomes	Topics	Teaching Methods
Week - 1		Introduction to Machine Learning: Basic Concepts, Differences from AI, and Learning Types	
Week - 2		Data Preprocessing 1: Understanding Datasets, Missing Data Analysis, and Data Cleaning	
Week - 3		Data Preprocessing 2: Feature Scaling, Categorical Data Encoding, and Splitting Datasets (Train/Test Split)	
Week - 4		Supervised Learning 1: Algorithm Selection and Linear Regression Fundamentals	
Week - 5		Supervised Learning 2: Classification Logic and Logistic Regression	
Week - 6		Supervised Learning 3: Decision Trees and Random Forest Algorithms	
Week - 7		Supervised Learning 4: Support Vector Machines (SVM) and the Kernel Trick	
Week - 8		Midterm Exam	
Week - 9		Model Evaluation and Metrics: Confusion Matrix, Precision, Recall, and F1-Score	
Week - 10		Model Validation and Improvement: Cross-Validation and Hyperparameter Optimization (Grid Search, Random Search)	
Week - 11		Unsupervised Learning 1: Clustering Fundamentals and K-Means Algorithm	
Week - 12		Unsupervised Learning 2: Hierarchical Clustering and Using Dendrograms	
Week - 13		Dimensionality Reduction Techniques: Principal Component Analysis (PCA) and Reducing Data Complexity	
Week - 14		Machine Learning Project Lifecycle: End-to-End Model Design, Reporting Findings, and Project Presentations	

Learning Outcomes

#	Learning Outcome
1	Upon successful completion of this course, students will gain the competence to understand the basic concepts of machine learning, learning types, and algorithm selection criteria to perform preprocessing steps such as missing data analysis, feature scaling, and data splitting on real-world datasets; successfully apply supervised learning algorithms like linear/logistic regression, decision trees, and support vector machines, as well as unsupervised learning models like K-means and hierarchical clustering; reduce data complexity using dimensionality reduction techniques while evaluating the performance of models with a scientific approach using confusion matrices, cross-validation, and hyperparameter optimization methods, ultimately developing end-to-end effective machine learning projects.

Sustainable Development Goals

No content has been provided.

Course Theme

No content has been provided.

AKTS Workload

Activity	Duration (Hour)	Count	Workload
Teorik Derse Katılım	0	0	0
Sınıf Dışı Çalışma (Ön Hazırlık & Pekiştirme Amaçlı)	0	0	0
Ödevler	0	0	0
Proje - Rapor - Sunum Hazırlama	0	0	0
Ara Sınav Hazırlığı (sınav süresi dahil)	0	0	0
Final Sınavı Hazırlığı (sınav süresi dahil)	0	0	0
Uygulama (Laboratuvar, Müzik/Enstrüman Uygulaması, Atölye/Saha Çalışması vb.)	0	0	0
Staj Uygulaması	0	0	0
		Calculated ECTS	**0**

Assessment Method and Passing Requirements

No content has been provided.