

TURKISH NATIONAL POLICE ACADEMY INSTITUTE OF SECURITY SCIENCES	
NAME OF THE COURSE (ENG)	İAI-812 Crime Prediction with Machine Learning
NAME OF THE COURSE (TR)	Makine Öğrenmesiyle Suç Tahmini
SEMESTER	Spring
INSTRUCTOR	Prof. Dr. Coşkun TAŞTAN
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PROGRAMME	Department Of Security Strategies And Management - Master's Degree Program In Intelligence Studies

COURSE DESCRIPTION
This course will introduce students to the basics of machine learning and its application in crime prediction. Students will learn how to use Python programming language to perform various tasks such as data preprocessing and cleaning, data visualization, and implementing machine learning algorithms. The course will also cover libraries such as Pandas, Numpy, and Matplotlib.
COURSE OBJECTIVES
<ul style="list-style-type: none"> - To gain a comprehensive understanding of the machine learning process and its application in crime prediction - To become proficient in using Python for machine learning tasks such as data preprocessing, data cleaning, data visualization, and model implementation - To understand and apply various machine learning algorithms for crime prediction and classification
EVALUATION
<ul style="list-style-type: none"> - Basic understanding of statistical concepts and ability to think statistically - Basic understanding of programming concepts - Familiarity with Python programming language is recommended but not mandatory <ul style="list-style-type: none"> • Assignments: 50% • Mid-term Exam: 20% • Final Exam: 30%

COURSE ORGANIZATION

1. Week	Introduction to Python Programming Language Identifiers, Variables, Lists, Arrays, Tuples, Dictionaries
2. Week	Concatenation, List Methods, String Methods, Conditional Statements
3. Week	Operators, Loops
4. Week	Functions, Classes, Constructors
5. Week	Introduction to Pandas, Numpy, and Matplotlib Libraries
6. Week	Data Preprocessing and Cleaning Data Visualization Applications of Crime Prediction in Different Countries
7. Week	Classification Algorithms for Crime Prediction Logistic Regression K-Nearest Neighbor (KNN) Support Vector Machines (SVM)

8. Week	Classification Algorithms for Crime Prediction-continued Decision Trees Random Forest
9. Week	Regression Algorithms for Crime Prediction Linear Regression Decision Tree Regression Random Forest Regression
10. Week	Regression Algorithms for Crime Prediction-continued Neural Network Regression (CNN and RNN regression) Bayesian Regression Support Vector Regression (SVR)
11. Week	Deep Learning for Crime Prediction Artificial Neural Networks (ANN) Convolutional Neural Networks (CNN)
12. Week	Deep Learning for Crime Prediction-continued Recurrent Neural Networks (RNN)
13. Week	Multi-Layer Perceptron (MLP) for Regression
14. Week	Deep Learning for Crime Prediction-continued Student project presentations-final exam

NOTE:

- The syllabus is subject to change based on the progress of the class and availability of resources.
- Students are expected to attend all sessions, complete assignments, and take exams as scheduled. If you think you are most likely to miss any of the sessions due to your work conditions, please consult the instructor before registering the course (only unforeseen valid excuses like health issues will be treated as exceptions).

READINGS:

- 1) Matthes, E. (2023). Python Crash Course - A Hands-On, Project-Based Introduction to Programming (San Francisco: No Starch Press)
- 2) Dedov, F. (2020). The Python Bible (Publisher not specified)
- 3) Blair, S. (2019). Python Data Science (Publisher not specified)
- 4) Brownlee, J. (2016). Machine Learning Mastery with Python (Publisher unspecified)
- 5) Brownlee, J. (2016). Master Machine Learning Algorithms (MachineLearningMastery.com)
- 6) Paper, D. (2020). Hands-on Scikit-Learn for Machine Learning Applications: Data Science Fundamentals with Python (Logan: Apress)