TURKISH NATIONAL POLICE ACADEMY INSTITUTE OF FORENSIC SCIENCES

Course Code	APİ-322
Name of the Course	Crime Prediction with Machine Learning
Required / Elective	Elective
Semester	Spring
Programme	ADLİ PSİKOLOJİ

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

- 1. To gain a comprehensive understanding of the machine learning process and its application in crime prediction.
- 2. To become proficient in using Python for machine learning tasks such as data preprocessing, data cleaning, data visualization, and model implementation.
- 3. To understand and apply various machine learning algorithms for crime prediction and classification

EVALUATION

Assignments: 50%, Mid-term Exam: 20%, Final Exam: 30%

Prerequisites:

- 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

Topics Covered:

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

- 7. Regression Algorithms for Crime Prediction
 - Linear Regression
 - Polynomial Regression
 - Support Vector Regression (SVR)
- 8. Deep Learning for Crime Prediction
 - Artificial Neural Networks (ANN)
 - Convolutional Neural Networks (CNN)
 - Recurrent Neural Networks (RNN)
 - Multi-Layer Perceptron (MLP) for Regression

Note:

- The syllabus is subject to change based on the progress of the class and availability of resources.
- Students are expected to attend <u>all sessions</u>, 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).