

ADA 440
COURSE SYLLABUS
Python for Data Science
(3 - 0) 3

Instructors: Assoc. Prof. Dr. Yıldırım Akbal
Course Description:
This course will introduce the fundamental concepts of Python programming language, its syntax, functions and packages to enable them to implement algorithms to manipulate, analyze and retrieve data. The course will also cover main packages such as Numpy, Pandas and Matplotlib.
Text Book:
Python for Data Analysis: Data Wrangling with pandas, NumPy, and Jupyter 3rd Edition (Wes McKinney)
Course Objectives:
The main objective of the course is to provide students with the basic concepts of Python, its syntax, functions and packages to enable them to write scripts for data manipulation and analysis. The course develops skills of writing and running a code using Python. The course covers various variables types and their features, basic operators and statements, loops, as well as the main packages for data science: NumPy, Pandas, Matplotlib. At the end of the course, students should be able to write short scripts to import, prepare and analyze data.
Course outcomes: Upon successful completion of this course students
1) Understand the programming principles such as control structures, data types, conditional statements;
2) Understand the principles of object-oriented programming,
3) Create own tools, rather than using ready-to-go ones,
4) Analyze data using Python programming language,
5) Infer information from data by visualizing it,
6) Design simple tests,
Course policy: For the first 5 – 6 weeks of the lecture we will be looking at the. This will form a solid background for the following weeks. We will then be looking at how to use Python and its packages efficiently.
Grading Policy:
1. ALE: 6 x (6%) (The number of ALE's may change – may be given as an HW) 2. Midterm: 25% 3. Final: 40 %
Neither Large Language Models nor AI tools should be used for the solutions of assignments, in the contrary case, you will be penalized accordingly.

COURSE CHART

WEEK	Dates	Course Topics	
1		Basic data types	
2		Functions, Modules	ALE0
3		Conditional Statements	
4		Loops – Exception Handling	
5		Object Oriented Programming	ALE1
6		Object Oriented Programming Cont'd -- Capstone Project (Text generation)	
7		Data visualization (Matplotlib – Seaborn)	ALE2
8		Operation with Arrays (Numpy) --- Stochastic Gradient Descent with Linear Regression !!!! --- KNN from scratch	
9		Midterm	MT1
10		Numpy cont'd – Pandas (data cleaning – some normalization, filling out missing values).	ALE3
11		Pandas cont'd	
12		Case study	ALE4
13		Introduction to SQL (Lite)	
14		SQL (Lite) cont'd	ALE5