Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
ECON152	Data Science with Python	2	0	0	3	3	4

Prerequisites	ECON151
Admission Requirements	ECON151

Language of Instruction	Turkish
Course Type	Compulsory
Course Level	Bachelor Degree
Objective	The aim of this course is to teach students how to apply economic data analysis processes in a hands-on manner through the Python programming language. Within the scope of the course, students will acquire skills to programmatically retrieve data from the data sources of national and international institutions such as TURKSTAT, CBRT, BRSA, OECD, the World Bank, and Eurostat; to clean, transform, and prepare raw data for analysis. Students in this course will not only learn data processing techniques but will also gain practical experience in converting nominal economic variables (GDP, wages, expenditure groups, etc.) into real values using price indices (CPI/PPI), converting economic time series into index series based on a selected base year (=100), and decomposing changes in nominal magnitudes into price effects and real effects. In this context, the course aims to combine theoretical economic knowledge with Python-based data processing and visualization tools in order to develop students' data literacy, analytical thinking, reproducible research production, and data-driven evaluation of economic policies at an advanced level. At the end of the course, students will be able to prepare dynamic reports that integrate code, analysis, and interpretation, and design independent data science projects addressing real-world economic problems.
Content	The course begins with the setup of the Python data science ecosystem and the Jupyter Notebook/Quarto environment. It then covers data import with pandas, basic data structures, data transformation, manipulation, and cleaning operations. Economics-specific data processing skills such as converting economic time series into real values, indexing, and nominal/real decomposition are emphasized. Exploratory data analysis and advanced visualization techniques using Matplotlib/Seaborn/Plotly are taught. Throughout the semester, data is retrieved via APIs from national and international institutions such as TURKSTAT, CBRT, and the World Bank, and applied analyses are conducted through three different case studies (Price Indices, Provincial Monthly Foreign Trade, Electricity Consumption).
References	1. Hathaway, J., & Larson, K. (2025). Py for Data Science. Open-access, foundational resource for data science with Python. https://byuidatascience.github.io/python4ds/ 2. VanderPlas, J. (2016). Python Data Science Handbook. O'Reilly Media. Comprehensive reference for the Python data science ecosystem. https://jakevdp.github.io/PythonDataScienceHandbook/ 3. Some datasets you may find useful: • World Bank Open Data (Development indicators): https://data.worldbank.org • OECD Data Explorer: https://www.oecd.org/en/data.html • Eurostat (European Union statistics): https://ec.europa.eu/eurostat/web/main/data/database • Penn World Table (PWT): https://www.rug.nl/ggdc/productivity/pwt • Turkish Statistical Institute (TURKSTAT): https://www.tuik.gov.tr • Central Bank of the Republic of Türkiye (CBRT EVDS): https://evds3.tcmb.gov.tr/anasayfa • T.R. Presidency Strategy and Budget Office (Economic and Social Indicators): https://www.sbb.gov.tr/ekonomik-ve-sosyal-gostergeler

Theory Topics

Week	Weekly Contents
1	Introduction to Data Science and Setting Up the Python Environment

Week	Weekly Contents
2	Data Input-Output and Basic Data Structures
3	Data Transformation and Manipulation
4	Data Cleaning and Merging
5	Exploratory Data Analysis
6	Midterm
7	Fundamentals of Data Visualization
8	Advanced Visualization and Exploratory Graphics
9	Data Collection from National and International Institutions
10	Case Study 1: Price Indices
11	Case Study 2: Provincial Monthly Foreign Trade
12	Case Study 3: Electricity Consumption in Türkiye
13	PROJECT PRESENTATIONS I
14	PROJECT PRESENTATIONS II