

# AI in Data Analysis

Course code: PYTHON\_DATAN\_AI

This course focuses on the practical use of artificial intelligence (AI) in the day-to-day work of data analysts and data scientists. You will combine Python, Pandas and SQL with large language models (LLMs) and AI agents to retrieve, clean, explore, visualise and interpret data, and to build machine learning models. LLMs and AI agents are presented as practical everyday tools for analysts. You will learn how to formulate analytical tasks, review AI-generated code, validate results, and integrate AI into analytical and machine learning workflows. The course places particular emphasis on reproducibility, secure data handling and keeping the analyst in control throughout the process.

| Affiliate  | Duration | Course price | ITB |
|------------|----------|--------------|-----|
| Praha      | 5        | 34 900 Kč    | 50  |
| Brno       | 5        | 34 900 Kč    | 50  |
| Bratislava | 5        | 1 390 €      | 50  |

The prices are without VAT.

## Course terms

| Date | Duration | Course price | Type | Course language | Location |
|------|----------|--------------|------|-----------------|----------|
|------|----------|--------------|------|-----------------|----------|

The prices are without VAT.

### Who is the course for

This course is designed for data analysts, data scientists and other professionals who already use Python and Pandas to analyse data and want to extend their skills with the practical use of artificial intelligence (AI).

### Required skills

This course assumes knowledge at the level of the PYTHON\_DATAN – Data Analysis (Pandas) course, or equivalent experience with Python and the Pandas library. The machine learning part builds on a basic understanding of the standard ML workflow; ML is not taught from scratch. The course builds on your existing data analysis skills and extends them by adding AI in three roles: an assistant, a critical reviewer and an agent working under the analyst's supervision. This course is not a substitute for courses such as Introduction to GenAI, How LLMs Work or AI Agents, which have a different focus. Here, LLMs and agents are used as tools for analytical tasks, and their internal architecture is not covered.

### Course outline

Day 1 – AI in Data Analysis

Translating business requirements into analytical questions, hypotheses and KPIs

Understanding the data model and selecting relevant variables with AI support

Designing an analytical plan and workflow in Python or SQL

Exploratory data analysis with Pandas and AI: descriptive statistics, distributions, correlations, segmentation, time series and outliers

Verifying AI-suggested hypotheses with calculations in Python

Hands-on exercise: from a business question through the analysis of an unfamiliar dataset to a verified conclusion

Day 2 – AI in Data Preparation and Data Quality

Checking for missing values, categories, duplicates, data types, extreme values and dates

Designing and validating data quality rules and business rules

**GOPAS Praha**  
Na Strži 2097/63  
140 00 Praha 4 - Krč  
Tel.: +420 226 201 390  
[info@gopas.cz](mailto:info@gopas.cz)

**GOPAS Brno**  
Nové sady 996/25  
602 00 Brno  
Tel.: +420 530 513 590  
[info@gopas.cz](mailto:info@gopas.cz)

**GOPAS Bratislava**  
Dr. Vladimíra Clementisa 10  
Bratislava, 821 02  
Tel.: +421 902 903 132  
[info@gopas.sk](mailto:info@gopas.sk)



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# AI in Data Analysis

Designing a transformation workflow with AI and implementing it in Python

Reviewing generated code: preserving the meaning of data, handling NaN values and outliers, and avoiding the risk of data leakage

Combining CSV, Excel, SQL and API sources; checking schemas, keys and joins

Hands-on Dirty Data Challenge: building a reproducible data-cleaning workflow

Day 3 – Exploratory Analysis, Visualisation and Storytelling

Finding trends, seasonality, segments, correlations, anomalies and changes in behaviour

Distinguishing between facts, findings, hypotheses and interpretations; validating analytical conclusions

Choosing a visualisation to test a specific hypothesis

Generating and reviewing visualisation code in Plotly or Matplotlib

Translating findings into business impacts and recommendations for management

Hands-on exercise: five findings, three visualisations, an executive summary and recommendations, with facts, AI interpretations and hypotheses clearly labelled

Day 4 – AI in Machine Learning

Designing an ML experiment: target variable, input features, preprocessing, algorithms, validation strategy and metrics

Identifying data leakage and reviewing the experiment design

Building and reviewing a Python pipeline for data preparation, feature engineering, model training and evaluation

Comparing Logistic Regression, Random Forest and XGBoost models

Interpreting accuracy, precision, recall, F1 score, ROC AUC, RMSE, MAE and the confusion matrix

Explaining models with SHAP and using LLMs to formulate business explanations

Hands-on exercise: a complete AI-assisted ML experiment, from the business problem to a recommendation

Day 5 – AI Agent in the Work of a Data Analyst

Delegating parts of the analytical work to an agent with access to Pandas, SQL, ML and visualisations

A multi-step workflow: from data exploration through Python or SQL and hypothesis testing to a final report

Analyst checkpoints and evidence-based decision-making

Working with data securely: cloud LLMs, personal data, trade secrets, anonymisation and pseudonymisation

Reviewing AI-generated code, auditability, reproducibility, hallucinated conclusions, data leakage and prompt injection through external data

Final project: analysing production data, downtime, quality and costs; identifying problems, building a predictive model and proposing corrective measures

Combining Python, Pandas, SQL, visualisations, ML, LLMs and an analytical AI agent in a single project

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