

Artificial Intelligence Developer Foundations

**Python, machine learning, NLP, reasoning and
introductory project work**

FA-0759 · 7 days

Data & Analytics · Software Development

Introduction

Explore the foundations of AI development through Python data handling, machine learning, natural-language processing and selected reasoning techniques. Guided examples connect concepts to small implementation tasks.

This intensive seven-day course surveys a broad field. It develops introductory practical skills and conceptual understanding, not complete mastery of AI or a guarantee of externally accredited certification.

Learning outcomes

- Use Python, NumPy, pandas and basic visualisation in a data workflow.
- Prepare data and evaluate selected models with appropriate train/test separation.
- Explain learning types, model workflows, AI agents and practical limitations.
- Explore NLP tasks using selected spaCy or NLTK examples.
- Compare search, knowledge representation, logic and probabilistic reasoning concepts.
- Describe neural-network components and the distinction between introductory examples and deeper study.
- Build and review a small clustering or recommendation example and recognise data-mining tool roles.

Prerequisites

Basic computer, file-management and internet skills plus high-school-level algebra and an introductory understanding of linear and nonlinear relationships. Prior Python is helpful but the course starts with a focused refresher.

A compatible supported Python environment and authorised prepared datasets and dependencies. A hosted notebook account is needed only where selected for the lab; adequate installation permissions are sufficient.

Training outline

1. Day 1 — Python and data-science tools

- How to Install Python
- Python Variables
- Loops in Python
- Python collection Data Types
- OOPS concepts
- Exception Handling
- Regular Expression
- Python Numpy Arrays
- Matrix and its operation
- Functions in Python
- User Defined functions in Python
- Scope in Python
- Introduction to Methods
- Packages in Python and PIP
- Pandas and Data frames
- Import and Export data from CSV

Introduce Matplotlib for simple result visualisation; exercises use compatible package versions.

2. Day 2 — Data preparation and the learning workflow

- Import libraries and a prepared dataset; inspect quality and missing values.
- Split training and evaluation data before fitting imputation, categorical encoding or scaling.
- Machine-learning process, lifecycle, applications and learning types.

- Prepare the lab environment and review AI definitions, intelligent agents, advantages, disadvantages and challenges.

3. Day 3 — Natural-language processing and perception

- Part-of-speech tagging, named entities and semantics through selected spaCy/NLTK examples.
- Text classification and sentiment-analysis examples; model predictions are fallible and task-dependent.
- Communication and perception concepts, including the role of NLP.

4. Day 4 — Search, representation and planning

- What is Searching?
- Uninformed Search Algorithm
- Informed Search Algorithm
- Adversarial Search
- Constraint satisfaction problems

Knowledge representation

- Knowledge Representation
- Knowledge Representation Techniques
- Propositional Logic
- First Order Logic
- Rule-Based System

5. Day 5 — Probability, features and model families

- Basic Probability Concepts
- Markov and Hidden Markov Model
- Association rules
- Dimensionality reduction
- Feature selection and Feature Extraction

Machine-learning comparisons

- Types of Learning
- Clustering
- Classification

- Decision Tree
- Regression
- Support Vector Machine
- What is Reinforcement learning?

Applied mathematical ideas and algorithm trade-offs are introduced through examples rather than advanced mathematical derivations.

6. Day 6 — Neural networks and data-mining landscape

- What is a Neural Network?
- Types of Neural Network
- Neural Network Components
- Deep-learning and neural-network foundations, with a selected illustration of training and prediction.
- Overview of Altair AI Studio (formerly RapidMiner Studio), Weka, Orange, R and KNIME. Compare roles; these are not five separate full tool courses.

7. Day 7 — Project and assessment

- Installing Prerequisites
- Clustering using K-means in Python
- Collaborative Filtering Movie DB rating prediction

Review data preparation, evaluation and limitations of the selected project; assess concepts and implementation decisions.