MERCURY

Python for Machine Learning

13 – 17 June 2027
Cairo (Egypt)



Dubai - UAE: +971 4 450 5697
Istanbul - Türkiye: +90 539 599 1206
Amman - Jordan: +962 79 712 3347

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Ref: 16331_1016102 **Date:** 13 – 17 June 2027 **Location:** Cairo (Egypt) **Fees:** 3500 Euro

Introduction:

The "Python for Machine Learning" course equips professionals with the essential skills to harness Python's capabilities in the realm of machine learning. Participants will delve into the foundational concepts of machine learning, exploring both supervised and unsupervised learning techniques. Through hands-on experience with Python libraries such as scikit-learn, NumPy, and pandas, learners will gain practical insights into data preprocessing, model building, and evaluation.

This Python for Machine Learning training course emphasizes real-world applications, enabling learners to translate theoretical knowledge into practical solutions. This program serves as a stepping stone for those aiming to specialize in data science and machine learning. Participants will learn how to develop and deploy machine learning models effectively to address complex problems.

Targeted Groups:

This "Python for Machine Learning" training targets professionals seeking specialized knowledge and skills:

- Data Analysts aiming to transition into machine learning roles.
- Software Developers interested in integrating machine learning into applications.
- Business Analysts seeking to leverage data-driven decision-making.
- Researchers who desire to apply machine learning techniques in their studies.
- IT Professionals looking to expand their expertise into data science.
- Graduates aspiring to build a career in machine learning.
- Entrepreneurs want to incorporate AI into their business models.

Targeted Competencies:

Participants will gain the following competencies during the Python for Machine Learning program:

- Proficiency in Python programming tailored for machine learning applications.
- Ability to preprocess and clean datasets for analysis and interpretation.
- Skill in applying machine learning algorithms to solve problems.
- Competence in evaluating and interpreting model outcomes.
- Expertise in optimizing models for better performance.
- Understanding of the ethical implications of machine learning.
- Capability to deploy models in real-world settings.
- Aptitude for communicating technical results to non-technical stakeholders.
- Experience in collaborative projects and teamwork.
- Awareness of the latest developments and tools in the machine learning landscape.

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Course Objectives:

Participants will achieve the following objectives by completing the "Python for Machine Learning" course:

- Understand the fundamental principles of machine learning.
- Apply Python programming skills to machine learning tasks.
- Utilize libraries like scikit-learn, NumPy, and pandas effectively.
- Preprocess and clean data for machine learning applications.
- Implement supervised learning algorithms such as linear regression and decision trees.
- Explore unsupervised learning techniques, including clustering and dimensionality reduction.
- Evaluate model performance using appropriate metrics.
- Optimize models to enhance accuracy and efficiency.
- Address common challenges like overfitting and underfitting.
- Deploy machine learning models into production environments.
- Interpret and effectively communicate machine learning results accurately and clearly.
- Stay updated with emerging trends and technologies in machine learning.
- Develop a portfolio of machine learning projects to showcase skills.
- Collaborate with peers on machine learning initiatives.
- Adhere to ethical considerations and best practices in machine learning.
- Cultivate a problem-solving mindset applicable to real-world scenarios.
- Engage in continuous learning to advance in the field of machine learning.

Studying Scenarios:

In this Python for Machine Learning training, participants will develop their skills through the analysis of the following scenarios:

- Predicting housing prices based on various features.
- Classifying customer reviews as positive or negative.
- Segmenting customers into distinct groups for targeted marketing.
- Reducing the dimensionality of a dataset for visualization.
- Detecting anomalies in network traffic data.
- Recommending products to users based on their browsing history.
- Forecasting sales figures for the upcoming quarter.
- Identifying fraudulent transactions in financial data.
- Clustering documents into topics for content organization and management.
- Evaluating the performance of different machine learning models.

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Course Content:

Unit 1: Introduction to Machine Learning and Python:

- Overview of Machine Learning Concepts and Applications.
- Introduction to the Python programming language.
- Setting up the Python environment for machine learning.
- Understanding Data Types and Structures in Python.
- Utilizing libraries such as NumPy, pandas, and Matplotlib.
- Loading and exploring datasets.
- Data cleaning and preprocessing techniques.
- Handling missing values and outliers.
- Feature selection and engineering.

Unit 2: Supervised Learning Algorithms:

- Introduction to supervised learning.
- Linear regression and its applications.
- Logistic regression for classification tasks.
- Decision trees and random forests.
- Support vector machines SVM.
- Model evaluation metrics include accuracy, precision, recall, and F1-score.
- Cross-validation techniques.
- Hyperparameter tuning and grid search.
- Addressing overfitting and underfitting.

Unit 3: Unsupervised Learning Techniques:

- Understanding unsupervised learning.
- Clustering methods include K-means, DBSCAN, and hierarchical clustering.
- Dimensionality reduction: PCA, t-SNE.
- Anomaly detection techniques.
- Association rule learning.
- Evaluating clustering performance.
- Applications of unsupervised learning in real-world scenarios.
- Feature scaling and normalization.
- Handling categorical data in unsupervised learning.

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Unit 4: Model Deployment and Optimization:

- Introduction to model deployment.
- Saving and loading models using joblib.
- Deploying models using Flask for web applications.
- Introduction to cloud platforms for deployment.
- Model monitoring and maintenance.
- Performance optimization techniques.
- Scalability considerations in deployment.
- Security aspects in model deployment.
- Version control for machine learning models.

Unit 5: Advanced Topics and Emerging Trends:

- Introduction to deep learning concepts.
- Overview of neural networks and their components.
- Convolutional neural networks CNNs for image processing.
- Recurrent Neural Networks RNNs for Sequence Data.
- Introduction to reinforcement learning.
- Natural Language Processing NLP Basics.
- Ethical considerations in machine learning.
- Explainability and interpretability of models.
- Future Trends in Machine Learning and AI

Final Insights & Key Takeaways:

Upon completing the "Python for Machine Learning" course, participants will possess a robust understanding of machine learning principles and practices. They will be proficient in utilizing Python and its libraries to build, evaluate, and deploy machine learning models. The course emphasizes practical applications, ensuring that learners can apply their knowledge to solve real-world problems. With a focus on continuous learning, participants will adapt to the evolving landscape of machine learning technologies.