MERCURY

AI Data Skills for Analytics and Machine Learning

1 – 5 August 2027
Cairo (Egypt)



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Introduction

This AI Data Skills for Analytics and Machine Learning course builds strong foundations in AI data skills for analytics and machine learning, enabling learners to transform raw data into meaningful insights. It provides an understanding of how data supports artificial intelligence systems and modern analytical environments. Participants will explore core principles of data handling, statistical reasoning, and computational thinking used in data science and AI analytics. The program focuses on bridging theoretical knowledge with real-world analytical applications in business and technology contexts. Learners will gain clarity on how to develop, train, and evaluate machine learning models using high-quality data. Participants will understand and contribute to data-driven AI ecosystems with confidence.

Targeted Groups

This AI Data Skills for Analytics and Machine Learning training targets professionals seeking knowledge and skills:

- Data analysts aiming to strengthen AI data foundations for advanced analytics roles.
- Beginners in data science seeking structured learning in machine learning concepts.
- IT professionals transitioning into AI analytics and data-driven decision-making roles.
- Business analysts require improved skills in predictive modeling and data interpretation.
- Software developers interested in integrating machine learning into applications.
- Engineers working with data pipelines, automation, and AI-based systems.
- Graduates pursuing careers in data science, AI analytics, or machine learning fields.

Course Objectives

Participants will achieve the following objectives by completing the AI Data Skills for Analytics and Machine Learning course:

- Understand core principles of AI data skills, analytics, and machine learning workflows.
- Develop knowledge of data collection, cleaning, transformation, and preprocessing techniques.
- Analyze structured and unstructured data using statistical and computational approaches.
- Apply SQL and data handling techniques for efficient data management and querying.
- Build a foundational understanding of machine learning algorithms and model types.
- Explore feature engineering methods to improve model accuracy and performance.
- Interpret data visualization outputs to communicate insights effectively.
- Evaluate predictive models using performance metrics and validation methods.
- Understand the role of AI analytics in real-world business decision-making systems.

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Targeted Competencies

Participants will gain the following competencies during the AI Data Skills for Analytics and Machine Learning program:

- Ability to process and prepare datasets for AI and machine learning applications.
- Competence in applying data analytics techniques for structured decision-making.
- Skills in using SQL and data querying for efficient data extraction and management.
- Understanding of machine learning workflows, including training and testing models.
- Ability to perform feature selection and engineering for improved predictive accuracy.
- Competence in interpreting analytical results and visual data representations effectively.
- Understanding of AI-driven analytics systems and data science pipelines.

Studying Scenarios

In this AI Data Skills for Analytics and Machine Learning training, participants develop skills through the following scenarios:

- Cleaning and preparing real-world datasets for machine learning model training.
- Analyzing business data to identify patterns and generate actionable insights.
- Building structured SQL queries to retrieve and manage large datasets efficiently.
- Applying machine learning algorithms to solve predictive analytics problems.
- Evaluating model accuracy using performance metrics and validation techniques.

Course Content

Unit 1: Foundations of AI Data Skills and Analytics

- Introduction to AI data skills for analytics and machine learning environments.
- Understanding the role of data in AI systems and intelligent decision-making.
- Overview of the data science lifecycle from collection to model deployment stages.
- Core concepts of data analytics, AI analytics, and machine learning integration.
- Differentiating between structured, semi-structured, and unstructured data types.
- Basics of statistical thinking for data-driven insights and interpretation.
- Introduction to data pipelines and data flow in AI systems architecture.
- Understanding business intelligence and its relationship with AI analytics.

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Unit 2: Data Collection, Cleaning, and Preprocessing

- Techniques for effective data collection from multiple digital and enterprise sources.
- Understanding data quality issues and strategies for data cleaning and validation.
- Handling missing values, duplicates, and inconsistencies in datasets.
- Data transformation methods for improving analytical readiness and structure.
- Normalization and scaling techniques for machine learning data preparation.
- Encoding categorical variables for use in predictive modeling systems.
- Feature extraction techniques for improving dataset usability in AI models.
- Introduction to exploratory data analysis for pattern identification and insights.
- Preparing datasets for AI analytics and machine learning pipelines.

Unit 3: SQL, Data Engineering, and Big Data Foundations

- Introduction to SQL for data querying and relational database management.
- Writing advanced SQL queries for filtering, aggregation, and dataset manipulation.
- Understanding database structures and data storage optimization techniques.
- Introduction to data engineering concepts and ETL processes in AI systems.
- Working with large-scale datasets in big data environments and platforms.
- Data integration techniques from multiple structured and unstructured sources.
- Introduction to distributed computing for scalable data processing.
- Understanding cloud-based data storage systems for analytics workflows.
- Managing data pipelines for continuous AI and machine learning operations.

Unit 4: Machine Learning Fundamentals and Feature Engineering

- Introduction to machine learning concepts and supervised learning models.
- Understanding unsupervised learning techniques for pattern discovery.
- Overview of classification and regression models in predictive analytics.
- Feature engineering techniques for improving model accuracy and performance.
- Data splitting methods for training, validation, and testing datasets.
- Introduction to overfitting, underfitting, and model generalization concepts.
- Basic algorithms, including decision trees, clustering, and linear models.
- Model evaluation techniques using accuracy, precision, recall, and F1 score.
- Introduction to Python for data science and machine learning applications.

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Unit 5: AI Analytics, Predictive Modeling, and Visualization

- Understanding AI-driven analytics for advanced decision-making systems.
- Building predictive models for forecasting business and operational outcomes.
- Data visualization techniques for effectively interpreting AI analytics results.
- Introduction to dashboards and reporting tools for data communication.
- Evaluating machine learning models using performance metrics and validation.
- Applying ensemble methods for improving predictive model accuracy.
- Understanding real-world AI analytics applications in industries.
- Interpreting model outputs to support strategic business decisions.
- Integrating machine learning models into AI-powered workflows and systems.

Final Insights & Key Takeaways

This course builds a strong foundation in AI data skills for analytics and machine learning by connecting data handling, modeling, and interpretation into a unified learning pathway. Participants gain the ability to transform data into intelligent insights that support advanced analytical and AI-driven decision-making systems.