MERCURY

Data Science and Machine Learning Course

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Introduction

This Data Science and Machine Learning course provides a structured foundation in these fields and builds strong analytical and computational thinking skills. It introduces learners to modern techniques used in data-driven decision-making across industries. Participants will explore core concepts of statistics, programming, and algorithmic modeling in a practical learning path. The program emphasizes real-world applications of data science workflows and machine learning pipelines. It develops the ability to transform raw data into meaningful insights using structured methods. Learners will understand how AI and machine learning systems support prediction, classification, and intelligent automation.

Targeted Groups

This Data Science and Machine Learning training targets professionals seeking knowledge and skills:

- Data analysts entering advanced analytics.
- IT professionals are shifting to AI roles.
- Business intelligence specialists.
- Software developers expanding into ML.
- Engineers working with data systems.
- Graduates in technical or scientific fields.
- Decision-makers using data insights.

Course Objectives

Participants will achieve the following objectives by completing the Data Science and Machine Learning course:

- Understand core concepts of data science, machine learning, and AI systems.
- Develop skills in data preparation, cleaning, and transformation for analysis tasks.
- Apply statistical methods to interpret datasets and identify patterns.
- Build predictive models using supervised and unsupervised learning techniques.
- Gain practical knowledge of Python for data science and analytics workflows.
- Explore machine learning algorithms, including regression, classification, and clustering.
- Understand model evaluation techniques and performance optimization methods.
- Develop awareness of real-world applications in business, finance, and technology.

Targeted Competencies

Participants will gain the following competencies during the Data Science and Machine Learning program:

- Data handling and preprocessing skills for structured and unstructured data.
- Statistical reasoning for data interpretation and hypothesis evaluation.
- Programming ability in Python for analytics and machine learning tasks.
- Model development skills using regression, classification, and clustering methods.
- Data visualization techniques for clear communication of insights.

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- Problem-solving skills using predictive analytics approaches.
- Understanding of AI and the machine learning model lifecycle.

Studying Scenarios

In this Data Science and Machine Learning training, participants develop skills through the following scenarios:

- Analyzing customer behavior using data analytics training techniques.
- Building predictive models for sales forecasting and demand analysis.
- Cleaning and preparing large datasets for machine learning workflows.
- Applying classification models for risk detection and decision support.
- Using statistical methods to identify trends in business datasets.

Course Content

Unit 1: Foundations of Data Science

- Introduction to data science concepts.
- Role of data science in modern industries.
- Data types and data structures overview.
- Data science lifecycle explanation.
- Overview of AI and machine learning integration.
- Basics of data-driven decision making.
- Introduction to the data science tools ecosystem.
- Understanding structured and unstructured data.
- Key concepts in data analytics training.

Unit 2: Python for Data Science

- Python fundamentals for data science course.
- Variables, data types, and operators.
- Control structures and loops usage.
- Functions and modular programming basics.
- Working with NumPy for numerical data.
- Pandas for data manipulation and analysis.
- Data cleaning and preprocessing techniques.
- Data visualization with basic plotting tools.
- Handling real datasets using Python workflows.

Unit 3: Statistics for Data Science

- Descriptive statistics fundamentals.
- Measures of central tendency concepts.
- Variance and standard deviation analysis.
- Probability theory basics for ML.
- Probability distributions in data science.
- Correlation and relationship analysis.
- Hypothesis testing fundamentals.
- Sampling methods and data interpretation.
- Statistical reasoning for machine learning models.

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Unit 4: Machine Learning Fundamentals

- Introduction to machine learning course concepts.
- Supervised learning overview and use cases.
- Unsupervised learning and clustering methods.
- Regression models for prediction tasks.
- Classification algorithms in practice.
- Model training and validation process.
- Overfitting and underfitting concepts.
- Feature selection and engineering basics.
- Model evaluation metrics and accuracy.

Unit 5: Advanced Machine Learning and Deep Learning

- Introduction to deep learning basics.
- Neural network architecture overview.
- Activation functions and the learning process.
- Training deep learning models conceptually.
- Predictive analytics in business applications.
- AI and machine learning integration methods.
- Model optimization and tuning strategies.
- Real-world machine learning applications.
- Future trends in data science and AI systems.

Final Insights & Key Takeaways

This course builds a complete foundation in data science, machine learning, and predictive analytics for real-world applications. Learners gain structured knowledge that supports advanced AI and data-driven decision-making careers.