



Cloud Analytics

Topics Covered

Data Analytics with Cloud

Cloud Services for Data Analytics

Introduction to Cloud Computing

- Provides an overview of cloud computing, including its benefits, deployment models (public, private, hybrid), and service models (IaaS, PaaS, SaaS).
- Introduces major cloud service providers such as AWS (Amazon Web Services), Azure (Microsoft Azure), and GCP (Google Cloud Platform), highlighting their key features and offerings.
- Covers basic concepts of cloud storage and computing, including virtualization, scalability, elasticity, and pay-as-you-go pricing models.

Hands-on: Students set up a cloud environment (e.g., AWS Free Tier, Azure Free Account), exploring key services and functionalities offered by cloud providers.

Advanced Excel for Data Analytics

Introduction to Cloud Data Analytics and Advanced Excel

- Introduction to Microsoft Excel and its advanced features
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- Understanding data types and data formats
- Exploring Excel functions for data manipulation

Data Analysis Techniques in Excel

- Advanced data filtering and sorting methods
- Introduction to pivot tables and pivot charts
- Performing statistical analysis using Excel
- Data visualization techniques in Excel

Hands-on: Exercises on analyzing large datasets using Excel

Excel for Cloud Data Integration

- Importing and exporting data from cloud-based sources (e.g., Google Sheets, Microsoft Azure, AWS)
- Connecting Excel to cloud databases (e.g., SQL Server, MySQL, PostgreSQL)
- Using Power Query for data transformation and integration
- Automating data refresh and updates with Power Automate (formerly known as Microsoft Flow)

Advanced Excel for Predictive Analytics

- Introduction to predictive analytics concepts
- Building predictive models using Excel (e.g., regression analysis, time series forecasting)
- Evaluating model performance and accuracy
- Advanced data visualization for predictive analytics

Introduction to Data Analytics and Python

Introduction to Data Analytics

- Introduces the concept of data analytics, its significance in decision-making processes, and its application across various industries.
- The importance of data throughout its lifecycle, including data collection, storage, processing, analysis, and interpretation.
- Provides an overview of the data lifecycle stages, emphasizing the need for effective data management practices.

Hands-on: Explore real-world data sources, gaining insights into different types of data and their relevance in various contexts.

Introduction to Python for Data Analysis

- Introduces Python as a powerful programming language for data analysis, highlighting its simplicity, versatility, and extensive libraries.
- Covers fundamental data types and structures in Python, including integers, floats, strings, lists, tuples, dictionaries, and sets.
- Explains control structures such as loops (for, while) and conditionals (if-else), essential for implementing logic in Python programs.

Hands-on: Engage in basic Python exercises to reinforce their understanding of syntax, data types, and control structures.

Data Manipulation and Visualization with Python

- Focuses on data manipulation techniques using the Pandas library, including data loading, filtering, sorting, grouping, and aggregation.

- Introduces data visualization libraries like Matplotlib and Seaborn, enabling students to create various types of plots (e.g., line plots, scatter plots, histograms).

Hands-on Project: Apply knowledge to analyze and visualize real-world datasets, gaining proficiency in data manipulation and visualization with Python.

Advanced Python for Data Analytics

Advanced Data Manipulation with Pandas

- Explores advanced Pandas operations, such as merging datasets, reshaping data frames, and handling missing values and outliers.
- Covers techniques for cleaning and preprocessing data, ensuring data quality and consistency for further analysis.

Hands-on: Tackle advanced data manipulation exercises, dealing with complex data structures and scenarios commonly encountered in data analytics projects.

Statistical Analysis with Python

- Provides an overview of descriptive statistics, including measures of central tendency, dispersion, and distributional properties.
- Introduces inferential statistics and hypothesis testing, allowing students to make inferences about populations based on sample data.

Hands-on: Perform statistical analysis on datasets, conducting hypothesis tests and interpreting results to draw meaningful conclusions.

Introduction to Machine Learning with Python

- Introduces the fundamental concepts of machine learning, including supervised and unsupervised learning paradigms.

- Discusses various machine learning algorithms and their applications, such as regression, classification, clustering, and dimensionality reduction.
- Demonstrates the use of the scikit-learn library for implementing machine learning algorithms and evaluating model performance.

Hands-on Project: Students embark on a hands-on project where they apply machine learning algorithms to solve real-world problems, gaining practical experience in model development and evaluation.

Data Management with MySQL

Introduction to Relational Databases

- Provides an overview of relational databases, emphasizing their structure, advantages, and common use cases.
- Introduces SQL (Structured Query Language), starting with basic SELECT statements for querying data from tables.

Hands-on: Students practice writing basic SQL queries to retrieve, filter, and sort data from sample databases.

Advanced SQL and Database Management

- Explores advanced SQL topics, including JOIN operations for combining data from multiple tables and subqueries for complex data retrieval.
- Discusses database normalization principles to design efficient and scalable database schemas.
- Covers indexing and optimization techniques to improve query performance and database efficiency.

Hands-on Project: Students design and implement a relational database schema, applying normalization principles and optimizing query performance.

Data Visualization and Reporting with PowerBI

Introduction to PowerBI

- Introduces PowerBI as a leading business intelligence tool for data visualization and reporting.
- Covers data import and transformation processes in PowerBI, including connecting to various data sources and performing data cleaning and shaping operations.

Hands-on: Students learn to create basic visualizations (e.g., bar charts, line graphs) using imported data in PowerBI Desktop.

Advanced Visualization and Dashboard Creation

- Explores advanced visualization techniques in PowerBI, such as interactive visuals, custom visuals, and slicers for dynamic filtering.
- Focuses on building interactive dashboards by combining multiple visualizations and incorporating user interactivity.
- Introduces data modeling concepts and the DAX (Data Analysis Expressions) language for creating calculated columns, measures, and calculated tables.

Hands-on Project: Students create interactive dashboards in PowerBI, incorporating advanced visuals, user-driven interactivity, and custom calculations to convey insights effectively.

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Cloud-based Data Analytics

- Introduces cloud-based data analytics tools and services, such as AWS Glue, Azure Data Factory, Google BigQuery, and Databricks, for data ingestion, processing, analysis, and visualization.
- Provides hands-on experience with cloud-based data processing, demonstrating tasks such as data ingestion from various sources, data transformation using cloud-native services, and data analysis using serverless computing.
- Discusses data security and privacy considerations in the cloud, covering topics such as data encryption, access control, compliance, and best practices for securing cloud-based data analytics solutions.

Hands-on Project: Students implement data analytics solutions in the cloud environment, leveraging cloud services and tools to perform end-to-end data processing, analysis, and visualization tasks.

Capstone Project and Review

Capstone Project

- Project Kickoff: Students select a real-world data analytics project based on their interests or industry preferences, with guidance from instructors.

- **Project Implementation:** Students work independently or in groups to execute their projects, applying the knowledge and skills acquired throughout the course.
- **Project Presentation:** Students present their findings, methodologies, and insights obtained from the capstone projects to the class and receive feedback from peers and instructors.
- **Final Review:** Instructors conduct a comprehensive review of the course content, addressing any remaining questions or topics of interest raised by students.
- **Career Pathways Discussion:** Facilitates a discussion on various career pathways in dataanalytics, providing insights into job roles, industry trends, and further learning opportunities for aspiring data analysts.