Day - 1

- **Overview of Databricks Platform**
  - Introduction to Databricks: Architecture, features, and key components
  - Databricks Workspaces: Notebooks, Repos, and Jobs
  - Databricks Runtime: Spark, MLflow, and integration with Apache Spark
  - Setting up your environment and clusters for machine learning
  - Hands-on Lab: Creating a Databricks workspace and setting up clusters.

- **Introduction to Machine Learning with Databricks**
  - Introduction to Machine Learning concepts: Supervised and unsupervised learning
  - Overview of MLflow: Model tracking, experimentation, and versioning
  - Data preparation and feature engineering in Databricks
  - Hands-on Lab: Loading datasets, exploring and preparing data for ML.

- **Supervised Learning Algorithms**
  - Regression vs Classification: Key differences and use cases
  - Implementing Linear Regression and Decision Trees using Spark MLlib
  - Hands-on Lab: Building a simple regression model using PySpark and Databricks.

- **Evaluating Model Performance**
  - Evaluation Metrics: Accuracy, Precision, Recall, F1-Score, AUC
  - Cross-validation and hyperparameter tuning
  - Hands-on Lab: Evaluating and tuning a classification model (Random Forest or Logistic Regression)

Day - 2

- **Unsupervised Learning and Clustering**
  - Introduction to Unsupervised Learning: Clustering, Dimensionality Reduction
  - K-Means Clustering and Principal Component Analysis (PCA)
  - Hands-on Lab: Implementing K-Means clustering for customer segmentation.

- **Advanced Machine Learning Techniques**
  - Gradient Boosting Machines (GBMs) and Random Forests
  - Introduction to XGBoost and LightGBM
  - Feature engineering for better model performance
  - Hands-on Lab: Building and tuning an XGBoost model in Databricks.

- **Introduction to MLflow for Model Tracking**
  - Overview of MLflow: Tracking experiments and managing models
  - Tracking parameters, metrics, and models in Databricks
  - Saving, loading, and versioning models in MLflow
  - Hands-on Lab: Tracking an experiment with MLflow and storing model artifacts.

- **Model Deployment Using Databricks**
  - Deploying ML models as REST APIs on Databricks
  - Introduction to Databricks Model Serving and serving models at scale
  - Hands-on Lab: Deploying a trained ML model using MLflow and serving it as an API.

Day - 3

- **Building End-to-End Machine Learning Pipelines**
  - Overview of an ML pipeline: Data processing, feature engineering, model building, evaluation
  - Using Databricks Workflows for pipeline orchestration
  - Automating and scheduling ML jobs with Databricks
  - Hands-on Lab: Building an end-to-end machine learning pipeline in Databricks using Spark and MLlib.

- **Hyperparameter Tuning and Model Optimization**
  - Introduction to hyperparameter optimization with GridSearchCV and RandomSearchCV
  - Automated machine learning with Databricks AutoML
  - Hands-on Lab: Tuning the hyperparameters of a classification model (e.g., Logistic Regression or Random Forest).

- **Model Interpretability and Feature Importance**
  - Techniques for understanding model predictions: Feature importance, SHAP, and LIME
  - Introduction to interpretability libraries in Python (SHAP, LIME)
  - Hands-on Lab: Interpreting a model's decision with SHAP in Databricks.

- **Databricks Certified Machine Learning Associate Exam Preparation**
  - Exam structure and preparation tips
  - Review of the exam topics and sample questions
  - Mock Exam: 30–40 questions simulating the actual certification exam.