Course Name	Essential Maths & Statistics for Machine Learning
Course Duration	3 Day (24 hours)
Target Audience	Data Analyst, Business Analysts, Data Scientist
Course Outcomes	Gain a solid understanding of math's role in machine learning.
	Apply statistical concepts for data analysis in machine learning
	Utilize algebra & calculus for model optimization
	Apply probability & descriptive statistics in machine learning
	Make decisions using inferential statistics in machine learning

Module	Content
Need for Maths & Statistics	Mathematics: Fundamental for ML algorithms and models.
	Statistics: Data analysis, Model evaluation, Data Handling, Model Selection, Model Interpretation.
Basic Algebra	Algebraic Equations
	Quadratic Equations
	Functions
Calculus	Basics of Calculus
	Differentiation and Derivatives
	Derivative Rules and Operations
	Double Derivatives and finding Maxima
	Double Derivatives example
	Partial Derivatives and Gradient Descent
	Integration and Area Under the Curve
Linear Algebra	Vector Basics - What is a Vector and vector operations
	Matrix Foundation
	Identity, Inverse, Determinant and Transpose Matrix
	Matrix Transformation
	Change of Basis and Axis using Matrix Transformation
	Eigenvalues and Eigenvectors
Probability Foundation	Understanding probability in simple terms
	Conditional Probability
	Random Processes and Random Variables
Descriptive Statistics	Understanding the Data and its elements.
	Measure Central Tendency using Mean, Median, mode
	Measure of Dispersion using Standard Deviation and variance
	Hands on - Get Statistical Summary
	Measure of Dispersion using Percentile, Range and IQR
Data Visualization	Importance of Data Visualization and different Charts
	Understanding Boxplot for Numerical Data
	Matplotlib - Plotting Basics
	Create your first Bar Chart
	Create Histogram of Data
	Plotting Boxplot
	Data Visualization for Categorical Data

		Pie Charts
		Scatter Plots
		Matplotlib Figures for creating multiple plots
		Subplots for plotting multiple plots in one figure
		Customization of Plot elements
Inferential Statistics, Distributions & Hypothesis		Understand Population Vs Samples
		Concept of Sample Bias
		Concept of Correlation and Causality
		Concept of Covariance and Covariance Matrix
		Probability Density Function and Distributions
		Normal Distributions
		Standard Normal Distributions
		Sampling Distributions
		Central Limit Theorem
		Confidence Intervals
		Concept of Hypothesis & Null Vs Alternate Hypothesis
		Concept of Statistical Significance
		Hypothesis Testing Examples