# Data Science,Visualization and Statistics for Machine Learning

# Course Outline

# Module 1 - Introduction to Data Science

What is Data Science?
Reasons to learn Data Science
AI,ML,Data Science and DL
Data Science and Data Analytics
Types of Data Analytics
Applications of Data Science
Life Cycle of a Data Science Project
Skills required for a Data Scientist
Data Analysis and Visualization Tools
Python Libraries for Data Science
Learning Path and Course Outline

# Module 2 - Python Libraries for Data Science and Visualization

Installation Guide-Anaconda and Jupyter Lab
Numpy
      Basics of Numpy Arrays
      Numpy Indexing and slicing and scalar operations
      Operations on Numpy array,use of where clause,generating random values
      Advanced concepts of Numpy
Pandas
      Series and dataframes
      Concat,merge and group by
      Multi-Indexing
      Reading CSV files
      Handling Missing Values

Matplotlib
        Histogram, Pie and Bar charts
Seaborn
        Different types of plotting
        Heatmaps
Scipy basics


## Module 3 - Statistics for Machine Learning

Inferential and Descriptive statistics
Population and Sample
Measures of Central Tendency- Mean, Mode , Median
Measures of Dispersion-Percentile, Range, IQR
Measures of Dispersion-Standard Deviation, Variance
Measure of Shape-Skewness and Kurtosis
Covariance,Correlation and Causality
Probability Basics
Conditional Probability
Bayes Theorem
Probability Density Function
Normal Distribution
Standard Normal Distribution
Sampling Distribution
Central Limit theorem
Confidence Interval
Hypothesis Testing
Null and Alternate Hypothesis
Significance Level
P Value


## Module 4 - Scikit Learn and Preprocessing
Introduction to Scikit Learn and Preprocessing
Handling Missing Values-Data Imputation
Categorical Encoding-Label Encoding and One Hot Encoding
Feature Scaling-Standardization and Normalization

**Module 5 - Linear Regression and Case Studies**

Introduction to Linear Regression
Evaluation Metrics
Simple/Univariate Linear Regression - Case Study 1
Simple/Univariate Linear Regression - Case Study 2
Multiple/Multivariate Linear Regression - Case Study 1
Data science/Multiple/Multivariate Linear Regression Case Study 2