# **Course Outline - Statistics for ML**

## **Week1:**

1. Variables and Data Types

2. Population and Sample

3. Sampling Techniques

4. Descriptive Statistics

5. Measures of Central Tendencies

6. Measures of Variation

7. Five Number Summary, Boxplots, and other plots

8. Correlation Analysis

9. Probability Basics

10. Probability Rules

11. Marginal Probability

12. Conditional Probability and Bayes Theorem

## **Week2:**

1. Random Variable

2. Probability Distribution

a. Discrete Probability Distribution

i. Binomial Distribution

b. Continuous Probability Distribution

i. Normal Distribution

ii. Standard Normal Distributions

5. Sampling Distributions

6. Central Limit Theorem

7. Applications of the Central Limit Theorem

# **Week3:**

1. Theory of Estimation

a. Point estimation

b. Sampling error

c. Interval estimation-Confidence Intervals

2. Hypothesis Testing

a. Terminologies

b. Decision-making method

c. Test based on Z statistic

d. One Sample Z test

e. Test based on *t* statistic

f. One-Sample *t-*test

g. Errors in hypothesis testing

# **Week4:**

1. Large Samples Test

a. Two Sample Z test

2. Small Samples Test

a. Two Sample t-test for unequal variances

b. Two Sample t-test for equal variances

3. Chi-square test

a. Goodness of Fit

b. Independence of Attributes

4. Analysis of variance

a. One way ANOVA

b. Post-Hoc Test for ANOV