**BCAC 0051: Application of Mathematics in Data Science**

**Objective:** *The objective of this course* ***t****o introduce the application of statistics in the field of data science and how businesses are using these concepts to attain their objective and getting the growth in the business.*

**L-T-P-J: 3-0-0-0**

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| **Module No.** | **Content** | **Teaching Hours** |
| **I** | 1. Various Research Methods    1. Introduction to Several Statistical Study Materials    2. Learn the positives and negatives of each 2. Visualizing Data    1. Take your data and display it to the world    2. Create the interpret histograms, bar charts, and frequency plots 3. Central Tendency 4. Create and Interpret the 3 measures of center for distributions: the mean, median, and mode 5. Variability    1. Quantify the spread of data using the range and standard deviation    2. Identify outliers in data sets using the concept of the interquartile range 6. Standardizing    1. Convert distributions into the standard normal distribution using the Z-Score    2. Compute proportions using standardized distributions 7. Normal Distribution    1. Use normalized distributions to compute probabilities    2. Use the Z-table to look up the proportions of observations above, below, or in between values 8. Sampling Distributions 9. Apply the concepts of probability and normalization to sample data sets. | 20 |
| **II** | 1. Estimation    1. Estimate population parameters from sample statistics using confidence intervals    2. Estimate the effect of a treatment 2. Hypothesis Testing 3. How to determine is treatment has changed the value of a population parameter. 4. T-tests    1. How to test the effect of a treatment    2. Compare the difference in means for two groups when there are small sample sizes. 5. ANOVA 6. Learn how to test whether or not there are differences between three or more groups 7. Correlation 8. Learn how to describe and test the strength of a relationship between two variables 9. Regression 10. How changes in one variable are related to changes in a second variable 11. Chi-Squared Tests 12. Learn how to compare and test frequencies for categorical data. | 20 |

**Text Books:**

* Allen B. Downey, **Think Stats**. ’O’ Reilly
* Peter Bruce and Andrew Bruce ,**Practical Statistics for Data Scientists**, ’O’ Reilly

**Reference Books**

**K**en Black, Business Statistics: For Contemporary Decision Making,

**Outcome:** After completion of Lab, student will be able to:

* CO1: List different kind of statistics for data analysis.
* CO2: Differentiate measure of central tendency and measure of variability.
* CO3: Define Normalization and Standardization.
* CO4: Conceptualize Probability distribution
* CO5: Apply statistics in various research methods.

**Mapping of Course Outcomes (COs) with Program Outcomes (POs) and Program Specific Outcomes (PSOs):**

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| **COs** | **POs/PSOs** |
| CO1 | PO1/PSO3 |
| CO2 | PO2,PO3/PSO1 |
| CO3 | PO4/PSO1,PSO3 |
| CO4 | PO2,PO3/PSO4 |
| CO5 | PO2,PO4/PSO4 |
| CO6 | PO1/PSO2,PSO4 |