**DATA VISUALIZATION & INTERPRETATION**

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| **Title of the Course: DATA VISUALIZATION & INTERPRETATION**B. Tech. (IT)- OPEN ELECTIVE | L | T | P | Cr |
| 03 | 00 | 00 | 04 |
| **Pre-Requisite Courses: Basic knowledge of Data types and Representation like scalar, vector, lists,structure and familiar with programming languages like C.**  |
| **Textbooks:1**Dr. Mark Gardner, Beginning R:statistical Programming Languages, Wrox (Amazon),Mar2013 2.Griffithas, Higham, Learning LATEX ,Amazon,2014 |
| **References:**Basic Data Analysis Tutorial, by Jacob Whitehill, Department of Computer Science, University of the Western Cape, 24/07/2009 [UWCDataAnalysisTutorial.pdf]2.NPTEL,edx,COURSERA (MOOC courses) |
| **Course Objectives :** 1. Explains how to turn your graphs from merely adequate to simply stunning.
2. Provides the ability to define complex analytical solution.
3. Demonstrates ways to make and rearrange data for easier analysis.
4. Shows how to typeset articles, reports and books using LATEX
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| **Course Learning Outcomes:**

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| **CO** | **After completion of the course student should be able to** | Bloom’s Cognitive  |
| level | Descriptor |
| **CO1** | Explain and Apply the key techniques and Theory used in visualization, including data models, graphical perception and techniques for visual encoding and interaction. | 2,3 | Understanding & Applying |
| **CO2** | Analyze data at multiple levels using appropriate visualizations | 4 | Analyzing |
| **CO3** | To generate articles, reports using Open source tool LATEX | 6 | Creating |

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| **CO-PO Mapping : Use H:** High **I:** Intermediate/Moderate **B:** Basic/Low **for mapping; Please do not tick**

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|  | **a** | **b** | **c** | **d** | **e** | **f** | **g** | **h** | **i** | **j** | **k** | **l** |
| **CO1** |  |  |  | 2 |  |  |  |  |  |  | 2 |  |
| **CO2** |  | 1 |  |  |  |  |  |  |  |  |  |  |
| **CO3** |  |  |  |  |  |  |  |  |  |  | 3 | 3 |

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|  **Assessments: Teacher Assessment:**Two components of In Semester Evaluation (ISE), One Mid Semester Examination (MSE) andone End Semester Examination (ESE) having 20%, 30% and 50% weights respectively.

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| Assessment | Marks |
| ISE 1 | 10 |
| MSE | 30 |
| ISE 2 | 10 |
| ESE | 50 |
| ISE 1 and ISE 2 are based on assignment/declared test/quiz/seminar etc.MSE: Assessment is based on 50% of course content (Normally first three modules)ESE: Assessment is based on 100% course content with60-70% weightage for course content(normally last three modules) covered after MSE. |

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| **Course Contents:**

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| **Module 1:**  | **Hrs.**  |
| **Introduction** Introduction to Data Science, Overview of the Data Science process, Introduction to Data Science technologies, Introduction to Machine Learning, Regressions, Classification, Clustering, Recommendation | **7** |
| **Module 2** :  | **Hrs.**  |
| **Working with Data.**Variables , Vectors, Matrices, lists & Data frames , Logical vectored operators Image data type, Image representation, categorical data using Factors in R. | **6** |
| **Module 3**  | **Hrs.**  |
| **Data/Image Visualization**Using graphs to visualize data, Basic plotting in R, Manipulating the plotting window, Advanced plotting using lattice library in R. Image visualization in using Image processing tools. | **7** |
| **Module 4**  | **Hrs.**  |
| **Models in Machine Learning**Regression Models, Classification Models, Unsupervised Learning Models, Recommendation Models. Models considered: – Linear regression: lm() – Logistic regression: glm() – Poisson regression: glm() – Survival analysis: Surv(), coxph() – Linear mixed models: lme() | **7** |
| **Module 5**  | **Hrs.**  |
| **Data Reporting using LaTex**LATEX Software installation , LATEX typesetting basics ,LATEX math typesetting, Tables and matrices, Mathematics in Latex. | **6** |
| **Module 6**  | **Hrs.**  |
| **Applying tools for Data analysis & Reporting** Thesis report preparation using Open source tool- LaTex. Demonstration of Using Azure ML for Machine Learning. | **6** |

 **Module wise Measurable Students Learning Outcomes :****1. Explain flow of data science and modeling.****2. How to read and write data in R****3. Create and customize visualizations using ggplot2****4. Perform predictive analytics using R.****5. Identify the syntax of Latex****6. Able to prepare documents for publishing Reports, book etc**  |
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