22CA3T1: DATA SCIENCE

Course Name	Data Science		L	T	P	C	CIA	SEE	TM
Course Code	22CA3T1		4	0	0	4	30	70	100
Year of Introduction: 2021	Year of Offering: 2022	Year of Revision: 2022			Percentage of Revision: NIL				
L-Lecture, T-Tutorial, **P**-Practical, **C**-Credits, **CIA**-Internal Marks, **SEE**-External Marks, **TM**-Total Marks									

Course Description and Purpose: The course is intended to cover, Introduction to Tableau, Basic Visualization Design, Connecting to Data, Top 10 Chart Types (Uni-variate/Bi-Variate & Multi-variate Charts), Interacting with the Viewer, Tableau Maps, Creating Dashboards and Stories, Introduction to Power Bi, Power Pivot Model and Power BI Environment.

Course Objective: The course aims to equip participants with comprehensive skills in Tableau and Power BI, covering fundamental concepts, visualization design, data connection, diverse chart types, viewer interaction, mapping, dashboard and story creation, as well as Power Pivot modeling, empowering them to proficiently analyze and visualize data for insightful decision-making.

Course Objectives:

- To understand *Basics of Tableau*, *Visual Design and Connecting various Data Sources*.
- To know *Uni-variate Charts*, *Bi-variate Charts*, *Multi-variate Charts, Interacting with the Viewer.*
- To create *Tableau Maps* and *Creating Dashboards and Stories*.
- To implement *Data Operations* of *Power BI.*
- To implement *Power Pivot Model* and *Power BI Environment.*

Specific Objectives include:

CO1: Upon completing this Tableau course, participants will master the fundamentals of Tableau, including workbook management, basic visualization design, and advanced data connection techniques, enabling them to create visually compelling and interactive data visualizations, analyze complex datasets, and make data-driven decisions effectively.

CO2: Upon completing this course, participants will gain expertise in a wide range of chart types for univariate, bivariate, and multivariate data analysis, enabling them to effectively visualize and interpret complex datasets; additionally, they will acquire advanced skills in viewer interaction through various filtering techniques and actions, empowering them to create dynamic and insightful Tableau visualizations.

CO3: Upon completing this course, participants will master Tableau's mapping capabilities, including geocoding, custom geocoding, and advanced mapping techniques, allowing them to create visually appealing and insightful maps; furthermore, they will gain proficiency in crafting interactive and visually cohesive dashboards and stories, integrating various elements and actions for effective data communication and analysis.

CO4: Upon completion of this Power BI course, participants will acquire comprehensive knowledge and practical skills in utilizing Power BI, including data acquisition from diverse sources, implementing natural language queries, advanced data manipulation using functions, merging and transforming queries effectively, enabling them to create insightful data visualizations and analytics for informed decision-making and enhanced business intelligence.

CO5: Upon completing this course, participants will master Power Pivot and Power BI, enabling them to create robust data models, establish relationships, implement advanced querying and merging techniques, design compelling visualizations, and effectively utilize calculations and measures, empowering them to analyze complex data sets, create interactive dashboards, and perform in-depth data modeling for diverse applications, including detailed analysis of Corona Cases.

UNIT-I (12 Hours)

Introduction to Tableau: What is Tableau? - Opening Existing Workbooks - Creating New Workbooks.
Basic Visualization Design: Using Show Me - Choosing Mark Types - Color - Size - Shape and Label Options- Choosing Color Options - Setting Mark Size - Choosing Shapes - Text Tables and Mark Labels - Formatting Options - Evaluating Multiple Measures - Shared Axis Charts - Measure Names and Measure Values - Dual Axis Charts.
Connecting to Data: Connecting to Various Data Sources - The Data Source Page - Customizing Your View of the Data: Changing Data Type - Modifying Dimension / Measure Assignment - Hiding -Renaming and Combining Fields - Splitting Fields - Changing the Default Field Appearance - Organizing Dimensions in Hierarchies Using Table or Folder View - Saving and Sharing Metadata Extracting Data -Data Blending - Moving from Test to Production Database.

UNIT-II (12 Hours)

Top 10 Chart Types (Uni-variate/Bi-Variate & Multi-variate Charts): Bar Chart - Line/Area Chart - Pie Chart - Text Table / Crosstab - Scatter Plot - Bubble Chart - Bullet Graph - Box Plot - Tree Map - Word Cloud.
Interacting with the Viewer: Filtering Data - Include or Exclude from the Worksheet - Basic Filtering -Quick Filters - Parameters - Creating a Parameter - Displaying a Parameter - Using a Parameter in a Worksheet - Worksheet Actions - Filter Actions - Highlight Actions - URL Actions.

UNIT-III (12 Hours)

Tableau Maps: Geocoded Fields - Geographic Hierarchies and Ambiguity - Custom Geocoding - Background Maps and Layers - Navigating Maps and Selecting Marks - Map Options - Web Map Services - Mapping and Mark Types - Custom Background Images - Generating Your Own Coordinate System - Adding a Custom Background Image.
Creating Dashboards and Stories: Creating a Simple Dashboard - Setting Dashboard - Size - Adding Sheets - Associated Worksheet Elements - Supplementary Dashboard Features - Layout Container - Blank Text - Image - Webpage - Setting Dashboard and Element - Sizes - Dashboard Actions - Highlight Action - Filter Action - URL Action.

UNIT-IV (12 Hours)

Power Bi: Get Knowing Power Bi - Getting Data from Existing Systems - Data Sources of Power Bi - Natural Language Queries - Getting data from web - Importing Data from Northwind ODATA feed T3_IMF - Functions & list Dates in Power Bi - Group By and unpivot in Power Bi - Merging Queries in Power Bi - IPL Statistics in Power Bi

UNIT-V (12 Hours)

Power Pivot Model: Creating Data Model - Explain what a Data Model is, Create Relationships between Tables in the Model, Create and use a Star Schema - Merging Queries in Power Bi - Data Compute in Power Bi - Append Query in Power Bi - Charts in Power Bi - Data Modeling in Power Bi - Charts in Power Bi - Data Modeling in Power Bi.
Power BI:
Power BI Environment: Adding Calculations and Measures - Importing Graphs - User Graphs, Dash boards - Dashboard for Corona Cases analysis.

Prescribed Text Books			
	Author	Title	Publisher
1	George Peck	Tableau 9 - The Official Guide	McGraw Hill, 2016
2	Dan Clark	Beginning Power BI: A Practical Guide to Self Service Data Analytics with Excel 2016 and Power BI Desktop	O'Reilley, Second Edition

Reference Text Books			
	Author	Title	Publisher
1	Ashutosh Nandeshwar	Tableau Data Visualization Cookbook	Packt Publishing Ltd, 2013
2	Rob Collie & Avi Singh	Power Pivot and Power BI : The Excel User's Guide to DAX Power Query, Power BI & Power Pivot in Excel 2010-2016	Holy Macro! Books, 2016
3	Daniel G. Murray	Tableau Your Data! Fast and Easy Visual Analysis with Tableau Software Second Edition	John Wiley & Sons

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M.C.A DEGREE EXAMINATIONS

THIRD SEMESTER

DATA SCIENCE

SYLLABUS W.E.F 2022-2023

Time 3 Hours **Max.Marks: 70**

SECTION-A

Answer ALL questions **(5×4 = 20 Marks)**

1. (a) What is *Tableau*? Explain its role in Industry (CO1,L1)
   (or)
   (b) How do you change *Data Type* in Tableau. (CO1,L1)

2. (a) What is *Tree Map*? (CO2,L1)
   (or)
   (b) What is *Quick Filter*? (CO2,L1)

3. (a) Name any two *Web Map Services*. (CO3,L1)
   (or)
   (b) Name any two features of *Supplementary Dashboard*. (CO3,L1)

4. (a) Explain Natural Language Processing. (CO4,L2)
   (or)
   (b) Explain Functions used in Power Bi. (CO4,L2)

5. (a) What is *Star Schema*? Explain (CO5,L1)
   (or)
   (b) What are the advantages of *Dashboard*? (CO5,L1)

Answer Five Questions Choosing One Question from Each Unit.
All Questions Carry Equal Marks. **(5×10 = 50 Marks)**

6. (a) Explain *Shape and Label Options* and *Formatting Options* in *Tableau*. (CO1,L2)
   (or)
   (b) Illustrate how data sources connected to *Tableau*. (CO1,L2)

7. (a) Build Uni-variate Charts. (CO2,L3)
   (or)
   (b) Experiment with *Basic Filters* and *Quick Filters*. (CO2,L3)

8. (a) Compare any two types of *Tableau Maps*. (CO3,L4)
   (or)
   (b) Examine the procedure to create Simple Dashboard. (CO3,L4)

9. (a) Explain how import data from various existing data sources. (CO4,L5)
   (or)
   (b) Explain how to merge queries and operations on IPL dataset. (CO4,L5)

10. (a) Create Relationships between Tables in the Model (CO5,L6)
    (or)
    (b) Discuss how to import Graphs in Power BI. (CO5,L6)
    (c) Discuss creating Measures in Power BI. (CO5,L6)