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| **Semester: 4** | | | | |
| **Programme: Data Science** | | | | |
| **Course: Introduction to Tableau and Power BI** | | | | |
| **Paper code: S2DS250311P** | | | **Credits: 3** | |
| **Hours/week: 4** | | | | |
| **Category: Core/MDC/SEC/VAC: Skill** | | | | |
| **Theory / Practical / Composite: Practical** | | | | |
| **No of Module: 2** | | | | |
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| **Course Outcome:** | | | | |
| 1. **Remember** the fundamental terminology, interface layouts, and basic functionalities of Tableau and Power BI, including various data connection methods, storage modes, and chart types. | | | | |
| 2. **Understand** the cognitive and perceptual design principles that distinguish effective data visualizations from misleading ones, including the impact of bias and "visual lies" on human perception. | | | | |
| 3. **Apply** essential data preparation and ETL techniques, such as Power Query transformations (pivot/unpivot), table calculations, and parameter settings, to structure data for analysis. | | | | |
| 4. **Analyze** complex datasets using advanced visual analytics, including clustering, time series analysis, and predictive modeling, to identify meaningful patterns and business trends. | | | | |
| 5. **Evaluate** dashboards and reports against established best practices for accessibility, design efficiency, and strategic requirements to ensure the accurate and inclusive communication of insights. | | | | |
| 6. **Create** sophisticated, interactive dashboards and strategic storytelling presentations by synthesizing optimized data models, DAX formulas, and publishing workflows for professional delivery | | | | |
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| **SYLLABUS** | | | | |
| **Module** | **CONTENT** | **HOURS or NUMBER OF CLASSES** | **CO Mapping** | **COGNITIVE LEVEL** |
| **Module 1** | **Tableau** | | | |
| | **Unit 1: Introduction**<br><br>Importance of data visualization. Getting to know Tableau (Tableau Public versus Tableau Desktop; connecting to data; navigating a Tableau sheet; creating visualizations). Understanding Bias in Data Visualization. Best practices for | **4** | **CO1, CO2, CO5, CO6** | **K1, K2, K5, K6** |

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| | accessible dashboards. Publishing a dashboard. | | | |
| | **Unit 2: Essential design principles**<br><br>Human brain and data visualization. Cognitive versus perceptual design distinction. Recognizing ineffective visuals. Design best practices. Exploratory analysis. Data, relationships and design. Static versus interactive visualizations. Visual lies and cognitive bias. | **6** | **CO2** | **K2** |
| | **Unit 3: Visual analytics**<br><br>Charting (types of charts; colours, shapes and sizes; tool tips). Dates. Table calculations (calculated fields; filters; parameters). Analytics (clustering; predictive visualizations). | **8** | **CO1, CO3, CO4** | **K1, K3, K4** |
| | **Unit 4: Creating dashboards and storytelling with Tableau**<br><br>Preparing data in Tableau (filters; aliases; data type conversions). Strategic visualization planning (gathering requirements; RACI chart). Translating requirements into dashboard design. Best practices of visualization. | **8** | **CO3, CO5, CO6** | **K3, K5, K6** |
| **Module 2** | **Power BI** | | | |
| | **Unit 1: Introduction**<br><br>Data analysis in business (roles and responsibilities of the data analyst; gathering the right data; getting to know the Power BI interface; workflow in Power BI). | **2** | **CO1** | **K1** |
| | **Unit 2: The ETL Process**<br><br>Data sources (setting up a flat data source; storage modes in Power BI; connectors; triggers; actions). Transforming data in Power BI (power query and its interface; unpivot and pivot columns; combining tables; staging area; data profiling; reference queries). | **8** | **CO1, CO3** | **K1, K3** |
| | **Unit 3: Data modelling** | **6** | **CO3, CO6** | **K3, K6** |

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| | Concepts (data models; schemas; cardinality). Data Analysis Expressions (formulas; functions; filters). Optimizing a model for performance (identifying and reducing cardinality levels; DirectQuery connections) | | | |
| | **Unit 4: Data analysis and visualization**<br><br>Creating reports (analysis for business intelligence; common visualizations; creating a basic report; creating charts). Navigation and accessibility (themes; report hierarchies; report drill-through). Bringing data to the user (creating dashboards; publishing reports). Identifying patterns and trends (statistical summary; clustering; grouping data; time series analysis). | **10** | **CO4, CO5, CO6** | **K4, K5, K6** |

**Text Books**

1. Practical Tableau: 100 Tips, Tutorials, and Strategies from a Tableau Zen Master by Ryan Sleeper. 1st edition. O'Reilly Media.
2. Mastering Tableau 2023: Implement Advanced Business Intelligence Techniques, Analytics, and Machine Learning Models with Tableau by Marleen Meier. 4th edition. Packt Publishing.
3. Storytelling with Data: A Data Visualization Guide for Business Professionals by Cole Nussbaumer Knaflic. 1st edition. Wiley.
4. Power BI Cookbook by Brett Powell. 2nd edition. Packt Publishing.

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| **Evaluation** | Continuous Assessment |

**Course outcomes (COs) and Cognitive Level Mapping**

| **COs** | **CO Description** | **Cognitive levels** |
|---|---|---|
| **CO1** | **Remember** the fundamental terminology, interface layouts, and basic functionalities of Tableau and Power BI, including various data connection methods, storage modes, and chart types. | K1 |
| **CO2** | **Understand** the cognitive and perceptual design principles that distinguish effective data visualizations from misleading ones, including the impact of bias and "visual lies" on human perception. | K2 |

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| **CO3** | **Apply** essential data preparation and ETL techniques, such as Power Query transformations (pivot/unpivot), table calculations, and parameter settings, to structure data for analysis. | K3 |
| **CO4** | **Analyze** complex datasets using advanced visual analytics, including clustering, time series analysis, and predictive modeling, to identify meaningful patterns and business trends. | K4 |
| **CO5** | **Evaluate** dashboards and reports against established best practices for accessibility, design efficiency, and strategic requirements to ensure the accurate and inclusive communication of insights. | K5 |
| **CO6** | **Create** sophisticated, interactive dashboards and strategic storytelling presentations by synthesizing optimized data models, DAX formulas, and publishing workflows for professional delivery | K6 |