Course Syllabus: Data Visualization

Course Name: Data Visualization

Course Code: T3842

Credits: 2

Total Teaching Hours: 30

Semester: 3

Tools Used: Python (Jupyter), Power BI

Target Audience: 2nd Year Bachelors – Computer Studies

UNIT 1: Introduction to Data and Visualization Concepts

Hours: 6

- What is data? Structured vs. unstructured
- Data types: categorical, numerical, time-series, etc.
- Why visualize data? Role in ML, AI, business, research
- Matching data types to visualizations
- Real-world use cases (finance, marketing, social data)
- Overview of datasets: CSV, Excel, SQL

UNIT 2: Data Preparation and Visualization using Python

Hours: 6

- Introduction to Python ecosystem: Jupyter Notebook, Pandas
- Data loading and cleaning (handling nulls, formatting)
- Using Matplotlib: bar, line, scatter, histograms
- Using Seaborn: heatmaps, box plots, pair plots
- Introduction to Plotly for interactive visualizations
- Lab: Create basic plots using real-world datasets

UNIT 3: SQL for Visualization + Connecting to Data

Hours: 4

- Basic SQL: SELECT, WHERE, GROUP BY
- Overview of relational databases (MySQL/PostgreSQL)
- Connecting Python and Power BI to databases
- Importing data from Excel/CSV/SQL
- Data transformation and basic aggregation
- Lab: Execute SQL queries and import result into Python

UNIT 4: Visualization and Dashboards with Power BI

Hours: 8

- Power BI Desktop setup
- Importing and shaping data (Power Query basics)
- Creating visualizations: bar, pie, map, cards
- Using slicers, filters, date hierarchies
- Layout, themes, formatting
- Lab: Create 2 interactive dashboards

UNIT 5: Project Work and Dashboard Storytelling

Hours: 6

- Design thinking for dashboards
- Choosing KPIs and metrics
- Mini Project: Create and present dashboard (Python or Power BI)
- Peer review and feedback
- Final report and presentation
- Lab: Group work and mentoring sessions