



IT Elective 4 (ITE104L)  
**Business Intelligence**

**Capstone Project**  
**DATA-DRIVEN BUSINESS INTELLIGENCE PROJECT USING TABLEAU PUBLIC**

**GENERAL DESCRIPTION:**

The Capstone Project in Business Intelligence serves as the culminating requirement for ITE104L. It integrates all the major topics covered in the course—data warehousing, ETL, modeling, KPI design, visualization, and dashboard development—into a full BI workflow applied to a real-world organizational or societal problem. The final output consists of:

- A cleaned and documented dataset
- A BI model with fact and dimension tables
- Interactive dashboards built in Tableau Public
- A set of business metrics and KPIs
- A research-based written report (IMRAD format)
- A project presentation

**CHAPTER 1: INTRODUCTION**

**1.1 Background of the Study**

Provide an overview of the chosen business domain (e.g., retail, education, logistics, healthcare, public sector). Explain:

- How data is generated in the domain
- The increasing need for Business Intelligence
- The importance of data-driven decision-making
- Common challenges: data quality, siloed systems, lack of dashboards, etc.

**1.2 Statement of the Problem**

Identify a **specific business problem** that BI can address. Examples:

- Low sales visibility
- Declining student performance
- Poor logistics route optimization
- High customer churn
- Inventory inconsistencies
- Poor KPI monitoring

Clearly state:

- What needs to be analyzed
- What decisions the organization struggles to make
- What insights are needed

**1.3 Objectives of the Study**

**General Objective:**

To develop a complete Business Intelligence solution using Tableau Public that provides data insights for decision-making.

**Specific Objective:**

1. To source and prepare a structured dataset relevant to a real-world business problem.



2. To clean, transform, and integrate datasets using ETL principles.
3. To design a BI data model using fact and dimension tables.
4. To compute business metrics and KPIs relevant to the problem.
5. To develop interactive dashboards for insights communication.
6. To interpret results and provide data-driven recommendations.

### 1.4 Scope and Limitations

Scope may include:

- Dataset coverage (years, categories, metrics)
- BI concepts used (ETL, modeling, KPIs, dashboards)
- Tools used: Tableau Public, Excel/Google Sheets
- Analytical approach (descriptive, diagnostic)

Limitations may include:

- Data incompleteness
- No predictive analytics
- Tableau Public storage restrictions
- Free-tool limitations (no private dashboards)

### 1.5 Significance of the Study

Explain who benefits from the BI solution:

- Managers
- Administrators
- Policy makers
- Customers
- Students
- Researchers

Emphasize value such as improved decision-making, faster reporting, increased visibility, enhanced operational efficiency, and KPI alignment.

## CHAPTER 2: REVIEW OF RELATED LITERATURE

### 2.1 Theoretical Background

Discuss all BI concepts covered in the syllabus:

- Business Intelligence Architecture
- ETL: Extract, Transform, Load
- Data Warehousing (OLTP vs OLAP)
- Star & Snowflake Schema
- Data Quality Dimensions
- Data Governance principles
- KPI Theory: leading and lagging indicators
- Visualization theory (storytelling, chart selection)

### 2.2 Related Studies

Summaries may include:

- BI adoption in companies (retail, healthcare, banking)
- Tableau case studies
- Examples of KPI-driven dashboards
- Academic uses of BI for education analytics
- Studies emphasizing the impact of data quality on analytics



## 2.3 Synthesis

Compare all reviewed studies and explain:

- What methodologies they used
- What data they processed
- What gaps remain
- How your BI project continues or improves past approaches

## CHAPTER 3: METHODOLOGY

This is the **technical backbone**—it must show everything from dataset selection to dashboard development.

### 3.1 Domain Selection

Describe the chosen field:

- Operations
- Roles
- Data flows
- Business processes
- Why BI is important in this domain
- Typical KPIs used in the industry

### 3.2 Dataset Description

Provide a detailed dataset profile:

- Dataset name
- Source (open data, synthetic data, scraped, institutional data, etc.)
- Number of records
- Number of tables
- Field descriptions (each column and its meaning)
- Data types (numeric, date, categorical)
- Primary Keys / Foreign Keys
- Fact table vs Dimension tables

This section **must show a table schema** similar to:

Field	Description	Type
Transaction_ID	Unique ID	Integer
Date_ID	FK	Date
Product_ID	FK	Categorical
Quantity	Units Sold	Numeric

### 3.3 Data Preparation and Cleaning

During ETL:

- Removal of duplicates
- Handling missing values
- Standardizing formats (dates, capitalization, numeric formats)
- Creating computed fields
- Filtering irrelevant records
- Splitting/merging columns



- Consistency checks
- Data validation process

Tools Used:

- Excel
- Google Sheets
- Tableau Prep (optional)
- Tableau Public Data Interpreter

Before Modeling:

- Converting tables into clean dimensions
- Aggregating transactional data
- Creating surrogate keys
- Ensuring consistency across related tables

### 3.4 Data Modeling and Relationship Building

Model Components:

- Fact and dimension tables
- Star schema (required)
- Snowflake schema (optional)
- Granularity
- Hierarchies (Year → Quarter → Month → Day)
- Relationship strengths (Inner/Left Join, Many-to-One)

Required Deliverables:

- A diagram of your BI schema
- Explanation of relationships
- Rationale for choosing fact tables

### 3.5 Analytical Procedures

Metrics and KPI Calculations

Examples of mandatory computations (depending on dataset):

- Profit Margin = (Profit / Revenue)
- Conversion Rate = Leads Won / Leads Total
- Retention Rate
- Average Processing Time
- Total Sales
- Year-over-Year Growth
- Customer Lifetime Value
- Delivery Delay Difference
- Grade Distribution Metrics

Tableau Calculated Fields

Explain:

- Logical calculations (IF, CASE)
- Date functions
- Level of Detail (LOD) Expressions (optional but encouraged)
- Aggregations (SUM, AVG, MIN, MAX)



### 3.6 Data Visualization and Dashboard Construction

Charts Required:

- Bar chart
- Line chart
- Pie/donut chart
- Scatterplot
- Geographic map (if applicable)
- KPIs with indicator-style cards

Dashboard Requirements:

- Filters
- Highlights
- Interactive actions
- Layout consistency
- Color theory
- Storytelling principles

Explain:

- Why specific charts were chosen
- How the dashboard supports decision-making
- How KPIs are displayed
- How end users will interact with it

## CHAPTER 4: RESULTS AND DISCUSSION

### 4.1 Analytical Results

- Summaries
- Tables
- Extracted insights
- KPI results
- Behavior patterns
- Trend analysis
- Outliers
- Performance comparisons

Examples:

- Revenue increased by 18% compared to the previous year.
- Students improved in math performance but dropped in English proficiency.
- Delivery delays are most frequent in Region III.
- Product Category B generates the highest profit margins.

### 4.2 Interpretation of Results

- Why did performance rise or fall?
- What patterns suggest issues?
- What KPIs reveal potential strategies?
- Which segments are underperforming?
- How can decisions be improved?

### 4.3 Implications for Decision-Making

List actionable insights:



- Improve promotions for low-performing products
- Reassign resources to high-demand regions
- Enhance student support strategies
- Reduce delays for logistics bottlenecks
- Improve customer retention strategies

## CHAPTER 5: SUMMARY, CONCLUSION, AND RECOMMENDATIONS

### 5.1 Summary of Findings

- Dataset
- BI workflow
- Major findings
- Observed KPI patterns

### 5.2 Conclusion

Give clear, data-backed conclusions:

- What problem was addressed
- Whether objectives were met
- High-level insights discovered

### 5.3 Recommendations

Provide specific, actionable, realistic recommendations based on your BI findings.

### REFERENCES:

Follow APA format. Include:

- Dataset sources
- Articles or studies
- Tableau tutorials referenced
- Books from the syllabus
- Websites consulted

### APPENDICES:

Include:

- Dataset screenshots
- Cleaning logs
- Tableau modeling screenshots
- Dashboard captures
- Calculated field list
- Schema diagrams

### OUTPUT COMPONENTS

1. BI Dashboard Output
  - a. Tableau Public link
  - b. PDF screenshot of dashboard (for backup)
2. Research Paper
  - a. IMRAD format
  - b. DOCX or PDF
3. Project Presentation
  - a. PPTX





- b. 10–15 slides (minimum)
- 4. Supporting Files
  - a. Cleaned dataset
  - b. Excel/CSV files
  - c. Modeling diagrams

#### EVALUATION CRITERIA

Criteria	Description	Points
<b>Dataset Relevance &amp; Preparation</b>	Appropriate domain, complete cleaning documentation	10
<b>Data Modeling &amp; Schema Design</b>	Correct fact/dimension modeling, schema clarity	10
<b>ETL &amp; Integration Quality</b>	Proper transformation, merging, validation	10
<b>KPI Computation &amp; Metrics Analysis</b>	Accuracy of formulas, relevance of KPIs	10
<b>Dashboard Quality &amp; Storytelling</b>	Clarity, interactivity, design principles applied	10
<b>Interpretation, Insights &amp; Decision-making</b>	Depth and usefulness of insights	10
<b>Documentation (IMRAD) &amp; Professionalism</b>	Completeness, formatting, organization	10
<b>Presentation &amp; Defense</b>	Clarity, confidence, accuracy	10
<b>Total</b>		<b>80 pts</b>

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