



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Computer Engineering / Computer Science & Engineering

Subject Code: DI05000161

Subject Name: Business Analytics

w. e. f. Academic Year:	2026-27
Semester:	5 th
Category of the Course:	MOPEC

Prerequisite:	Basic knowledge of computers, spreadsheets (MS Excel), and fundamental concepts of data handling.
Rationale:	In modern organizations, large volumes of data are generated from business activities such as sales, marketing, finance, and customer interactions. Business Analytics helps transform this data into meaningful insights that support effective decision-making and improve organizational performance. This course introduces students to the fundamental concepts of business analytics and data visualization using tools such as Microsoft Excel and Power BI. Students will learn basic techniques for data preparation, analysis, and dashboard creation to interpret business trends and performance. The course also provides an introductory understanding of Artificial Intelligence applications in business analytics, helping students develop analytical thinking and practical skills required for entry-level roles in data analysis and business intelligence.

Course Outcome:

After Completion of the Course, the student will be able to:

No	Course Outcomes	RBT Level
01	Identify key concepts and components of business analytics in organizational contexts	Understand
02	Organize business data and perform data preprocessing techniques for analysis.	Understand
03	Apply statistical techniques and business metrics for business data interpretation.	Apply
04	Apply data visualization techniques to represent business data using Excel and Power BI.	Apply



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05	Interpret the role of Artificial Intelligence in business analytics and its ethical implications.	Understand
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Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR	C	Theory		Tutorial / Practical		
				ESE (E)	PA(M)	PA(I)	ESE (V)	
2	0	2	3	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1	Fundamentals of Business Analytics • Introduction to Business Analytics • Evolution of Business Analytics • Business Analytics vs Data Analytics vs Data Science • Types of Analytics: Descriptive, Diagnostic, Predictive, Prescriptive • Business Analytics Lifecycle • Components of Business Analytics System • Applications of Business Analytics in Banking, Retail, Healthcare, and E-commerce	05	16
	Business Data and Data Management • Types of Data: Structured, Semi-structured, Unstructured • Sources of Business Data: ○ Internal Data Sources: sales records, customer databases, transaction data, ERP systems ○ External Data Sources: market research, social media, government datasets, third-party data	07	22



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	● Data Collection Methods: Surveys and questionnaires, Observations, Transaction/Financial records, Online data sources: Social media platforms, E-commerce websites, Government open data portals, Web analytics tools, Online survey platforms. Sensors: IoT devices, RFID systems, GPS trackers, Smart meters, Wearable devices ● Data Quality Issues in Business Data ○ Missing data ○ Duplicate data ○ Inconsistent data ○ Inaccurate data ● Data Cleaning and Data Preparation techniques: Handling missing data (deletion, imputation), removing duplicate records, handling inconsistent data (standardization, validation rules), data filtering and sorting, data type correction and formatting, outlier detection and treatment, data normalization and scaling, data encoding (categorical to numerical) ● Data Transformation and Data Integration techniques: Data aggregation and summarization, data normalization and standardization, data discretization (binning), feature construction and transformation, data merging and joining (multiple sources) ● Concept of Big Data in Business Analytics ● Data Warehouse: Definition and Characteristics ETL Process: Extract, Transform, Load		
3	Business Data Analysis and Metrics ● Introduction to Business Data Analysis ● Descriptive Statistics: Mean, Median, Mode, Standard Deviation ● Trend Analysis ● Correlation Analysis ● Business Metrics and KPIs: Revenue growth rate, profit margin, customer acquisition cost (CAC), customer lifetime value (CLV),	06	22



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	customer retention rate, churn rate, conversion rate, return on investment (ROI), sales growth, average order value (AOV), inventory turnover ratio, market share ● Role of Analytics in Business Decision Making ● Data-Driven Strategic Planning		
4	Data Visualization and Power BI ● Introduction to Data Visualization and its Importance in Business Analytics ● Principles of Effective Data Visualization ● Charts and Graphs in Business Analytics (Conceptual Study) ○ Bar Chart: concept, structure, advantages, and business applications ○ Line Chart: concept, use in trend analysis and time-series data ○ Pie Chart: concept, representing proportions and percentage distribution ○ Histogram: concept, representation of frequency distribution ○ Scatter Plot: concept, identifying relationships and correlation between variables ● Selection of Appropriate Chart Types ○ When to use different charts ○ Comparison of chart types for business data ● Introduction to Microsoft Power BI ● Components of Power BI: Power BI Desktop, Power BI Service, Power BI Mobile ● Power BI Architecture ● Data Sources in Power BI ● Data Import and Data Transformation ● Creating Visualizations	07	22



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	● Dashboards and Reports		
5	Applications of Business Analytics and AI ● Business Analytics in Decision Making ● Financial Analytics and Supply Chain Analytics ● Introduction to Artificial Intelligence in Business Analytics ● Role of AI in Business Decision Making ● AI Applications: Recommendation Systems, Customer Behaviour Analysis, Fraud Detection, Chatbots ● Ethical Issues in AI and Data Analytics ● Data Privacy and Security	05	18
	Total	30	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
10	60	30	00	0	0

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Business Analytics – James Evans, Pearson
2. Data Science for Business – Foster Provost & Tom Fawcett, O'Reilly
3. Business Intelligence Guidebook: From Data Integration to Analytics – Rick Sherman
4. Data Analytics Made Accessible – Anil Maheshwari
5. Data Analysis with Microsoft Power BI - Brian Larson, O'Reilly

(b) Open-source software and website:

Open-Source Software



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1. **Python (Anaconda Distribution / Jupyter Notebook)** – For data analysis and visualization.
2. **NumPy and Pandas Libraries** – For numerical computation and data manipulation.
3. **Matplotlib / Seaborn** – For data visualization in Python.
4. **KNIME Analytics Platform** – Open-source tool for data analytics and workflow-based analysis.
5. **Orange Data Mining** – Visual programming tool for data mining and machine learning.
6. **LibreOffice Calc** – Open-source alternative to MS Excel for spreadsheet analysis.

Websites / Learning Platforms

1. <https://powerbi.microsoft.com>
2. <https://www.kaggle.com>
3. https://www.tutorialspoint.com/power_bi/index.htm
4. <https://learn.microsoft.com/en-us/training/powerplatform/power-bi>

Suggested Course Practical List

1. Explore business datasets and perform basic data analysis using Microsoft Excel.
2. Use Excel functions to calculate mean, median, standard deviation and correlation.
3. Create Pivot Tables and Pivot Charts for sales data analysis.
4. Visualize business data using Excel charts (Bar, Line, Pie).
5. Import a dataset into Power BI and perform basic data transformation.
6. Create visualizations in Power BI (bar chart, pie chart, line chart).
7. Create an interactive dashboard in Power BI for sales or marketing data.
8. Analyze customer behavior dataset using Python.
9. Perform KPI visualization using Power BI.
10. Create financial performance dashboard using Power BI.
11. Create filters and slicers in Power BI to enable interactive data analysis.
12. Analyze a dataset related to supply chain or marketing analytics using Power BI.
13. Perform sales forecasting in Power BI using time-series forecasting on monthly sales data.
14. Build a complete business analytics report combining Excel, Python and Power BI outputs.
15. Publish a Power BI report to Power BI Service and share the dashboard for business reporting.



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List of Laboratory/Learning Resources Required:

1. Computer system with a minimum of **8 GB RAM**
2. Operating system: Windows / Linux
3. **Microsoft Excel**
4. **Microsoft Power BI Desktop**
5. **Python environment (Anaconda / Jupyter Notebook / Google Colab)**
6. Internet access for datasets

Suggested Activities for Students:

1. Mini project on Business Analytics using Power BI.
2. Analyze real-world datasets (sales, marketing, finance).
3. Prepare presentation on AI applications in business analytics.
4. Participate in data analytics competitions or hackathons.
5. Encourage students to enroll in MOOCs related to data analytics and business intelligence