Shri Vile Parle Kelavani Mandal's

Dwarkadas J. Sanghvi College of Engineering

(Autonomous College Affiliated to the University of Mumbai)

Scheme and detailed Syllabus (DJS23)

Second Year B. Tech
in
Artificial Intelligence (AI) and Data Science
Honors Degree Program
in
Business Intelligence

(SEMESTER III)

Prepared by:- Board of Studies in Artificial Intelligence (AI) and Data Science

Recommended by:- Academic Council of Dwarkadas. J. Sanghvi College of Engineering

Approved by:- Governing Body of Dwarkadas. J. Sanghvi College of Engineering

With effect from the Academic Year: 2025-2026

Shri Vile Parle Kelavani Mandal's
DWARKADAS J. SANGHVI COLLEGE OF ENGINEERING
(Autonomous College Affiliated to the University of Mumbai)
NAAC Accredited with "A" Grade (CGPA : 3.18)

Scheme for Second Year Undergraduate Program in Artificial Intelligence (AI) and Data Science - Honors in Business Intelligence: SEM III (Autonomous)

Academic Year 2025-2026

Sr. No.	Course Code	Course	Teaching Scheme			Continuous Assessment (A)						Semester End Examination (B)						Aggregate (A+B)	Credits
			Theory (hrs.)	Practical (hrs.)	Tutorial (hrs.)	Term Test 1 (TT1) - a	Term Test 2 (TT2) - b	Assg/CP/GD/ Presentation/ Quiz) - c	Total (a+b+c)	Term work	CA Total	Duration	Theory	Oral	Pract	Oral & Pract	SEE Total		
SEM III																			
1	DJS23SH2201	Foundations of Business Intelligence and Analytics	4	--	--	15	15	10	40	--	40	2	60	--	--	--	60	100	4
SEM IV																			
2	DJS23SH2251	Advanced Tools and Techniques in Business Intelligence	3	--	--	15	15	10	40	--	40	2	60	--	--	--	60	100	3
	DJS23SH2251L	Advanced Tools and Techniques in Business Intelligence Laboratory	--	2	--	--	--	--	--	25	25	--	--	--	--	--	--	25	1
SEM V																			
3	DJS23SH2301	Advanced Business Intelligence and Decision Support	3	--	--	15	15	10	40	--	40	2	60	--	--	--	60	100	3
	DJS23SH2301L	Advanced Business Intelligence and Decision Support Laboratory	--	2	--	--	--	--	--	25	25	--	--	--	--	--	--	25	1
SEM VI																			
4	DJS23SH2351	Applied Business Intelligence and Advance Analytics	4	--	--	15	15	10	40	--	40	2	60	--	--	--	60	100	4
SEM VIII																			
5	DJS23SH2451P	Business Intelligence Capstone Project	--	4	--	--	--	--	--	25	25	2	--	--	--	50	50	75	2
Total			**14**	**8**	**0**	**60**	**60**	**40**	**160**	**75**	**235**	**10**	**240**	**0**	**0**	**50**	**290**	**525**	**18**

Prepared by | Checked by | Head of the Department | Vice Principal | Principal

Program: B.Tech in Artificial Intelligence (AI) and Data Science - Honors in Business Intelligence **S.Y. B.Tech** **Semester: III**

Course: Foundations of Business Intelligence and Analytics (DJS23SH2201)

Pre-requisite:

1. Fundamentals of Artificial Intelligence and Data Science

Course Objectives:

1. To provide a comprehensive understanding of Business Intelligence concepts, data management practices, and analytics techniques to support informed business decision-making.
2. To equip students with practical skills in data visualization, dashboard creation, and business performance evaluation using modern BI tools and Excel.

Course Outcomes: On successful completion of this course, student should be able

1. Explain the architecture and lifecycle of Business Intelligence systems and their role in strategic decision-making.
2. Apply data acquisition, preparation, and warehousing techniques to support analytics and BI processes.
3. Perform descriptive, diagnostic, and predictive analytics using appropriate tools and statistical methods.
4. Analyze business metrics to evaluate organizational performance and provide actionable recommendations based on data insights.
5. Design interactive dashboards and visualizations in Excel to monitor and communicate key business metrics effectively.
6. Develop and communicate data-driven solutions to business problems using analytics tools, predictive modeling, and regression analysis, while addressing ethical, privacy, and practical concerns.

Foundations of Business Intelligence and Analytics (DJS23SH2201)		
Unit	**Description**	**Duration**
1	**Introduction to Business Intelligence:** Overview of Business Intelligence, Evolution and Importance of BI in Organizations, Key Components and Architecture of BI Systems, BI vs. Data Science, Data-Driven Decision Making, Introduction to BI Tools, Overview of the BI Lifecycle, Challenges and Future Trends in BI	**08**
2	**Data Management for BI and Analytics** Data Sources and Acquisition: Internal vs. external sources, transactional systems, logs, APIs, web scraping, real-time vs. batch acquisition, Data Warehousing for BI: Data warehouse vs. operational database, OLTP vs. OLAP, star and snowflake schemas, fact and dimension tables, data marts, Introduction to ETL (Extract, Transform, Load) process, Data Storage and Modeling: Data lakes, columnar databases, NoSQL for BI, Data Preparation for Analytics: Handling	**10**

	missing values, outlier detection (basic), normalization, data encoding, data partitioning (train/test split)	
3	**Fundamentals of Business Analytics** Introduction to Business Analytics – Types, scope, and applications in various industries. Business Intelligence vs Business analytics, understanding Business Data – Data types, sources, quality, and preparation. Descriptive Analytics, Diagnostic Analytics, Predictive Analytics, Prescriptive Analytic, Analytics Process & Tools, Ethics, Privacy & Case Studies	**08**
4	**Business metrics and performance analysis** Introduction to Business Metric and KPI's, difference between metrics, measures, and KPIs, Types of metrics: financial, operational, customer-related, Financial Performance Metrics - Revenue, profit, and growth analysis, Key ratios: ROI, ROE, Gross Margin, Cash flow and liquidity management, financial forecasting techniques, Operational Performance Metrics - Efficiency metrics: productivity, cost per unit, defect rates, introduction to Lean and Six Sigma methodologies, Impact of automation and technology on operations, Customer-Centric Metrics -Customer satisfaction (CSAT), Net Promoter Score (NPS), Retention rate and churn analysis, Lifetime value (LTV) and acquisition cost (CAC), selecting SMART KPIs aligned with business goals; industry-specific examples, analyzing performance trends and variances, Key challenges in business performance analysis, best practices for implementing metrics in strategic planning	**10**
5	**Data Visualization and Dashboards with advanced Excel** Introduction: Types of charts and their applications, visual communication strategies for Excel dashboards, Excel Visualization Techniques: Introduction to Excel as a data visualization tool, creating dynamic charts with named ranges and formulas, conditional formatting with data bars, colour scales, and icon sets sparklines and mini charts for trend analysis, combo charts and dual-axis charts, Building Interactive Dashboards: Introduction to dashboard components: KPIs, filters, slicers, timelines, using form controls (dropdowns, checkboxes) in dashboards, data validation and dynamic data linking, Excel functions for interactivity (e.g., INDEX, MATCH, OFFSET, INDIRECT), best practices in layout and visual design Case study: Creating a Sales/Marketing/Operations Dashboard	**09**
6	**Business Problem Solving with Analytics** The Role of Analytics in Business Decision Making, How to Connect Business Problems to Analytics?, Statistics to Make you an 'Expert', How to Evaluate Analytics (Prediction) Models and their Impact on Business?, Managing Pilots: When No Data is Available, How to Evaluate Analytics (Prediction) Models and their Impact on Business, Packaging Insights into Story Telling: Tips in Logical Business Communication, Applying Regression to a Business Problem: Explaining vs Predicting, real-world case studies	**07**
	Total	**52**

Books Recommended:

Reference Books:

1. *Davenport, T. H., & Harris, J. G., Competing on Analytics: The New Science of Winning, Harvard Business Review Press, Revised Edition, 2017.*
2. *Albright, S. C., & Winston, W. L., Business Analytics: Data Analysis & Decision Making, Cengage Learning, 8th Edition, 2024.*
3. *Knaflic, C. N., Storytelling with Data: A Data Visualization Guide for Business Professionals, Wiley, 1st Edition, 2015.*
4. *Ramesh Sharda, Dursun Delen, Efraim Turban, Business Intelligence: A Managerial Perspective on Analytics, 4th Edition,2017.*
5. *The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling, 3rd Edition Released July 2013,Publisher(s): Wiley ISBN: 9781118530801 6.*
6. *Seven NoSQL Databases in a Week By Sudarshan Kadambi , Xun (Brian) Wu.*
7. *Architecting Data Lakes, 2nd Edition, by Ben Sharma Released April 2018 Publisher(s): O'Reilly Media, Inc. ISBN: 9781492032991*
8. *W. L. Winston, Microsoft Excel Data Analysis and Business Modeling (Office 2021 and Microsoft 365), 6th ed., Pearson, 2021.*
9. *B. Marr, Key Business Metrics: The 25+ KPIs Every Manager Needs to Know. Pearson Education, 2015.*
10. *K. Berman and J. Knight, Financial Intelligence for Entrepreneurs: What You Really Need to Know About the Numbers. Boston, MA: Harvard Business Review Press, 2008.*
11. *J. Heizer and B. Render, Operations Management, 12th ed. Boston, MA: Pearson, 2016.*

Web Links:

1. *https://online.iima.ac.in/course/course-v1:IIMA+ODSFC101x+2024_06/*
2. *https://onlinecourses.nptel.ac.in/noc24_cs65/preview*
3. *https://www.coursera.org/specializations/excel*
4. *https://www.coursera.org/learn/business-intelligence-essentials?specialization=bi-analyst*

Evaluation Scheme:

Semester End Examination (A):

Theory:

i. Question paper based on the entire syllabus total comprising of 60 marks.
ii. Total duration allotted for writing the paper is 2 hrs.

Continuous Assessment (B):

Theory:

i. Term Test 1 (based on 40 % syllabus) of 15 marks for the duration of 45 min.
ii. Term Test 2 (on next 40 % syllabus) of 15 marks for the duration of 45 min.
iii. Assignment / course project / group discussion /presentation / quiz/ any other for 10 marks

Prepared by | Checked by | Head of the Department | Vice Principal | Principal