



Gyanmanjari
Innovative University

Syllabus
Gyanmanjari Diploma Engineering College
Semester-5 (B.Tech)

Subject: Business Intelligence and Data Visualization – BETICE15330.

Type of course: Skill Enhancement Courses (SEC).

Prerequisite: Basic programming fundamentals, logical and problem-solving skills, mathematical logic, familiarity with Microsoft Excel, and a general understanding of computer components and data handling.

Rationale:

This course focuses on turning raw data into actionable insights using Power BI. Basic programming fundamentals help students write DAX and M expressions, while logical and problem-solving skills enable them to translate business questions into KPIs and debug issues. Mathematical logic supports aggregations, comparisons, and time-intelligence calculations. Familiarity with Open office accelerates understanding of tabular analysis and formula-based thinking. Finally, a general understanding of computer components and data handling prepares students to work with varied data sources effectively. These prerequisites ensure learners can concentrate on applying Power BI for business productivity rather than revisiting foundational skills.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks		Total Marks
CI	T	P	C	SEE	CCE	
0	0	4	2	50	50	100

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; SEE - Semester End Evaluation; CCE-Continuous and Comprehensive Evaluation.



Course Content:

Sr. No	Course Content	Hrs.	% Weightage
1	Enterprise BI Project Planning and Architecture <u>Theory Topics:</u> Enterprise Business Intelligence concepts and use cases; role of Power BI in modern data-driven organizations; comparison of traditional BI, Corporate BI, Self-Service BI, and Self-Service Visualization; Power BI ecosystem including Power BI Desktop, Power BI Service, Power BI Mobile, Dataflows, Gateways, Workspaces, Dashboards, Reports, Datasets/Semantic Models, and Apps; Power BI project lifecycle from requirement discovery to deployment and maintenance; requirement gathering techniques for BI projects; identifying business problems, stakeholders, KPIs, metrics, dimensions, and reporting objectives; Power BI roles and responsibilities including data analyst, dataset/semantic model designer, report developer, workspace admin, and business user; deployment mode selection based on organizational needs; licensing awareness including Free, Pro, Premium Per User, and Premium Capacity; introduction to BI governance, data ownership, data quality, access control, version management, and responsible data usage; basics of enterprise BI architecture including data sources, ETL layer, semantic model, report layer, and sharing layer; documentation standards and best practices for planning professional Power BI solutions. <u>Practical:</u> 1. Analyze an enterprise BI case study and identify the business problem, stakeholders, reporting objectives, KPIs, metrics, and expected decision outcomes. 2. Compare Traditional BI, Corporate BI, Self-Service BI, and Self-Service Visualization using a business scenario and justify the most suitable approach. 3. Explore Power BI Desktop, Power BI Service, Workspaces, Reports, Dashboards, Datasets/Semantic Models, Apps, and Gateways through a guided practical demonstration. 4. Prepare a Power BI project requirement document covering business objectives, data sources, users, KPIs, refresh needs, security needs, and expected reports. 5. Create a stakeholder mapping document for a BI project by defining roles such as data analyst, semantic model	12	20%



	designer, report developer, workspace admin, and business user. 6. Design a high-level Power BI solution architecture showing data sources, ETL layer, semantic model, report layer, workspace, and sharing layer. 7. Prepare a licensing selection table for different organizational scenarios using Free, Pro, Premium Per User, and Premium Capacity options. 8. Create a governance checklist for a Power BI project covering data ownership, data quality, access control, version control, naming standards, and responsible data usage. 9. Draft a BI project lifecycle plan from requirement gathering to deployment and maintenance for a selected domain such as Sales, HR, Finance, Education, or Healthcare. 10. Prepare a professional Power BI project planning file including scope, assumptions, deliverables, roles, risks, and documentation standards.		
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Evaluation Method:			
Sr. No.	Evaluation Method	SEE	CCE
1	Enterprise BI Project Discovery & Requirements Brief Students will analyse a given scenario and dataset to identify business questions, KPIs, data quality issues, assumptions, and success criteria.	05	-
2	Power BI Solution Architecture & Governance Case Students will design a high-level Power BI architecture and explain governance aspects such as access, ownership, version control, naming standards, and responsible usage.	05	-
3	Active Learning Activity (ALA):- Enterprise BI Project Planning and Role Mapping Students will prepare a basic Power BI prototype from a business scenario by identifying problems, KPIs, users, dataset, visuals, and decision value.	-	10
Total		10	10

Examination Style:

- Enterprise BI Project Discovery & Requirements Brief (05 Marks):**
 - Students will be given a sample dataset and scenario. They must list primary business questions, define 5–7 KPIs, identify data quality risks via a short data profiling summary (nulls, duplicates, data types), and outline assumptions and success criteria. A 1–2 page write-up (or viva with worksheet) will be evaluated. This task assesses requirement gathering, analytical thinking, and readiness to scope a BI project.
- Power BI Solution Architecture & Governance Case (05 Marks):**
 - Students will be given a business scenario and must design a high-level Power BI solution architecture showing data sources, ETL layer, semantic model, report layer, workspace, and sharing layer. They must also prepare a short governance note covering data ownership,



	access control, version management, naming standards, and responsible data usage. The answer may be submitted as a diagram with explanation or demonstrated through viva. This task evaluates students' understanding of Power BI architecture, governance, and professional BI solution planning. 3. Active Learning Activity (ALA): BI Requirement-to-Prototype Challenge (10 Marks): Students will be given a real-world business scenario such as low sales performance, high employee attrition, poor student results, inventory delay, or hospital patient load. They must practically convert the scenario into a small Power BI prototype by identifying the business problem, selecting suitable KPIs, preparing/importing a small sample dataset, and creating a basic one-page report layout with at least three visuals. Students must also mention the selected BI approach, intended users, and expected decision value of the prototype. The final submission must include the Power BI file and a short explanation of the business problem, KPIs, dataset used, and report layout. This activity assesses students' ability to solve a business problem by converting requirements into a working Power BI prototype.		
2	Advanced Data Acquisition and Power Query ETL <u>Theory Topics:</u> Advanced data acquisition concepts in Power BI; connecting to multiple data sources such as Excel, CSV, Folder, Web, SQL database, SharePoint/OneDrive, and cloud-based sources; understanding structured, semi-structured, and unstructured data at awareness level; data loading strategies and source assessment; introduction to ETL process in Power BI; advanced Power Query Editor features; data profiling using column quality, column distribution, and column profile; handling missing values, duplicates, outliers, inconsistent formats, incorrect data types, and data quality issues; advanced transformation operations including split column, merge column, conditional column, custom column, replace errors, fill up/down, group by, pivot, unpivot, append queries, and merge queries; use of parameters for flexible data loading; applied steps management and query dependency; basic awareness of Power Query M language; transformation error identification and correction; preparing reusable and analysis-	12	20%



	ready datasets for enterprise reporting; best practices for query naming, step organization, data validation, and ETL documentation. <u>Practical:</u> 11. Connect Power BI with multiple data sources such as Excel, CSV, Folder, Web, SQL database, SharePoint/OneDrive, and cloud-based sources. 12. Import data from multiple files in a folder and combine them into a single structured dataset using Power Query. 13. Perform source assessment by identifying data structure, required columns, data types, refresh needs, and possible data quality issues. 14. Use Power Query Editor to perform advanced data profiling through column quality, column distribution, and column profile. 15. Clean datasets by handling missing values, duplicate records, incorrect data types, inconsistent formats, unwanted columns, and error values. 16. Apply advanced transformation operations such as split column, merge column, conditional column, custom column, replace errors, fill up/down, group by, pivot, and unpivot. 17. Combine two or more datasets using append queries and validate the final combined output. 18. Merge related datasets using suitable join types and verify matching and non-matching records. 19. Create parameters in Power Query to make data loading and filtering more flexible. 20. Review applied steps and correct transformation errors caused by wrong step order, deleted columns, changed source names, or incorrect data types. 21. Explore basic Power Query M code generated during transformations and identify how each applied step is recorded. 22. Create a reusable query transformation workflow for a selected dataset and document the major ETL steps performed. 23. Prepare a clean, validated, and analysis-ready dataset for advanced modeling and reporting. 24. Submit the Power BI file with a short ETL documentation note covering source details, profiling observations, cleaning steps, transformation logic, and final dataset readiness.		
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Evaluation Method:			
Sr. No.	Evaluation Method	SEE	CCE
1	Advanced Data Profiling and ETL Cleaning Task: Students will profile a raw dataset, identify data quality issues, clean the data, and explain the ETL steps performed in Power BI.	05	-
2	Power Query Transformation and Error Correction Task Students will debug Power Query errors, correct transformation issues, and complete operations such as append, merge, pivot, unpivot, and grouping.	05	-
3	Active Learning Activity (ALA):- Messy Data Repair Challenge using Power Query Students will clean and transform a messy dataset using Power Query and submit the Power BI file with a short before-after ETL summary.	-	10
Total		10	10
Examination Style:			
Advanced Data Profiling and ETL Cleaning Task (05 Marks): - Students will be given a raw dataset with common data quality issues such as missing values, duplicates, incorrect data types, inconsistent formats, and error values. They must perform data profiling, clean the dataset using suitable Power Query operations, and submit the Power BI file with a short explanation or viva demonstration. This task evaluates students' ability to identify and resolve data quality problems before modeling. Power Query Transformation and Error Correction Task (05 Marks): - Students will work on a partially transformed dataset containing Power Query errors such as wrong step order, missing columns, incorrect data types, failed merge operations, or error values. They must identify and correct the issues and complete the required transformations such			



	as append, merge, pivot, unpivot, conditional column, or group by. This task evaluates students' ability to debug Power Query workflows and prepare an accurate analysis-ready dataset. 3. Active Learning Activity (ALA) Messy Data Repair Challenge using Power Query (10 Marks): Students will be given a deliberately messy dataset containing missing values, duplicate records, incorrect data types, inconsistent formats, extra spaces, error values, wrongly merged columns, and unnecessary fields. They must practically clean and transform the dataset using Power Query Editor and produce an analysis-ready output. Students must use appropriate operations such as replace values, remove duplicates, change data types, split/merge columns, conditional column, append/merge, pivot/unpivot, and error handling wherever required. The final submission must include the Power BI file and a short before-after cleaning summary, which shall be uploaded by students on the GMIU Web Portal.		
3	Advanced Data Modeling and DAX Analytics <u>Theory Topics:</u> Advanced data modeling concepts in Power BI; importance of semantic model design for accurate and scalable reporting; understanding fact tables, dimension tables, primary keys, foreign keys, cardinality, and relationship direction; star schema and snowflake schema concepts; role of Date table in time-based analysis; creating and managing relationships in Model View; handling one-to-many, many-to-many, and inactive relationships; difference between calculated columns, measures, and calculated tables; introduction to DAX evaluation context; row context and filter context; use of important DAX functions such as SUMX, COUNTX, AVERAGEX, CALCULATE, FILTER, ALL, RELATED, RELATEDTABLE, IF, SWITCH, DIVIDE, and DISTINCTCOUNT; time intelligence concepts such as YTD, MTD, QTD, previous period comparison, and growth calculation; KPI development for business analytics; common DAX errors and debugging techniques; optimization practices for data models and DAX measures; best practices for naming, organizing, and documenting measures in enterprise Power BI reports.	12	20%



	<u>Practical:</u> 25. Import multiple related tables such as Sales, Customers, Products, Categories, and Date into Power BI and prepare them for data modeling. 26. Identify fact tables, dimension tables, primary keys, foreign keys, and relationship fields from the given dataset. 27. Create a star schema model by connecting fact and dimension tables in Model View. 28. Create and configure a Date table for time-based analysis and connect it with the main fact table. 29. Create one-to-many relationships and verify the relationship output using table, matrix, and chart visuals. 30. Demonstrate many-to-many relationship handling using a suitable sample dataset. 31. Create and test inactive relationships and use them in analysis where required. 32. Create calculated columns, calculated tables, and measures, and compare their usage through practical examples. 33. Create DAX measures using SUMX, COUNTX, AVERAGEX, DISTINCTCOUNT, DIVIDE, IF, and SWITCH. 34. Create advanced DAX measures using CALCULATE, FILTER, ALL, RELATED, and RELATEDTABLE. 35. Create time-intelligence measures such as YTD Sales, MTD Sales, QTD Sales, Previous Month Sales, and Sales Growth Percentage. 36. Develop business KPIs such as Total Revenue, Total Profit, Profit Margin, Customer Count, Average Order Value, and Growth Rate. 37. Identify and correct DAX errors related to wrong aggregation, filter context, relationship issues, and blank results. 38. Optimize a data model by removing unnecessary columns, hiding unused fields, organizing measures, and applying proper naming conventions. 39. Prepare a model documentation note explaining tables, relationships, measures, KPIs, and modelling decisions.		
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Evaluation Method:			
Sr. No.	Evaluation Method	SEE	CCE
1	Advanced Data Modeling and Relationship Design: Students will design a proper Power BI data model by identifying tables, keys, relationships, cardinality, and relationship direction.	05	-
2	Advanced DAX Measures and KPI Analytics: Students will create advanced DAX measures and business KPIs, display them through suitable visuals, and verify the results.	05	-
3	Active Learning Activity (ALA) :- Broken Model and DAX Repair Challenge Students will identify and fix modeling and DAX errors in a Power BI file and submit the corrected file with a short repair summary.	-	10
Total		10	10
Examination Style: Advanced Data Modeling and Relationship Design Task (05 Marks): - Students will be provided with multiple related tables and must design a proper data model in Power BI. They need to identify fact tables, dimension tables, primary keys, foreign keys, relationship fields, cardinality, and relationship direction. Students must create relationships in Model View and verify the model output using simple table, matrix, or chart visuals. This task evaluates students' ability to design accurate relationships and prepare a reliable data model for analytical reporting. Advanced DAX Measures and KPI Analytics Task (05 Marks): - Students will create advanced DAX measures using functions such as SUMX, COUNTX, AVERAGEX, CALCULATE, FILTER, ALL, DIVIDE, IF, SWITCH, RELATED, and DISTINCTCOUNT. They must develop business KPIs such as Total Revenue, Total Profit, Profit Margin, Customer Count, Average Order Value, YTD Sales, MTD Sales, and Growth Percentage. Students			



	should display these KPIs using suitable visuals and verify the correctness of results. This task evaluates students' ability to apply DAX functions for advanced KPI development and business analytics. 3. Active Learning Activity (ALA): Broken Model and DAX Repair Challenge (10 Marks): Students will be given a Power BI file or multiple related tables containing modeling and DAX issues such as incorrect relationships, duplicate keys, inactive relationships, wrong aggregation, incorrect measures, missing Date table, or blank KPI outputs. Students must identify the errors, correct the data model, create or repair relationships, build required DAX measures, and verify the corrected output using visuals. The final submission must include the corrected Power BI file and a short explanation of the issues found and fixes applied. This activity assesses students' ability to troubleshoot semantic model and DAX problems in a practical Power BI environment.		
4	Advanced Dashboard Design and Storytelling <u>Theory Topics:</u> Advanced data visualization concepts in Power BI; role of analytical dashboards in business decision-making; selection of suitable visuals for comparison, trend analysis, ranking, distribution, contribution, geographical analysis, and KPI tracking; advanced formatting and report theme customization; dashboard layout planning for executive, operational, and analytical reports; use of slicers, filters, drill-down, drill-through, bookmarks, buttons, page navigation, tooltip pages, and dynamic interactions; designing multi-page reports with logical storytelling flow; data storytelling techniques for presenting insights, trends, exceptions, and recommendations; dashboard UX principles including clarity, consistency, alignment, spacing, visual hierarchy, readability, and accessibility; identifying misleading visuals, wrong chart selection, poor aggregation, and over-designed reports; introduction to performance-aware report design; mobile layout and responsive report design; best practices for building professional, interactive, and decision-focused Power BI dashboards.	12	20%



	<u>Practical:</u> 40. Create advanced visuals for comparison, trend analysis, ranking, contribution, distribution, geographical analysis, and KPI tracking using a given dataset. 41. Design KPI cards and summary visuals for executive-level reporting, including Total Sales, Profit Margin, Growth Rate, Target Achievement, and Customer Count. 42. Apply advanced formatting and report theme customization to maintain consistent colors, fonts, titles, labels, and layout style. 43. Create slicers and filters for interactive analysis based on date, region, category, product, customer segment, or department. 44. Apply drill-down and drill-through features to move from summary-level data to detailed-level analysis. 45. Create tooltip pages to display additional information without overcrowding the main report page). 46. Use bookmarks, buttons, and page navigation to design an interactive multi-page Power BI report. 47. Design separate report pages for overview, detailed analysis, trend analysis, and recommendation summary. 48. Build a storytelling dashboard flow that presents business problem, KPIs, trends, exceptions, and key insights. 49. Identify and correct misleading visuals caused by wrong chart selection, poor scaling, unnecessary colors, overcrowded layout, or incorrect aggregation. 50. Improve dashboard UX by applying alignment, spacing, grouping, visual hierarchy, readability, and accessibility principles. 51. Create a mobile-friendly report layout using Power BI mobile layout view. 52. Review dashboard performance by reducing unnecessary visuals, removing unused fields, and simplifying report pages where required. 53. Prepare a professional analytical dashboard and present insights, observations, and recommendations through viva or demonstration.		
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Evaluation Method:			
Sr. No.	Evaluation Method	SEE	CCE
1	Advanced Dashboard Design and Interaction: Students will design an interactive Power BI report using suitable visuals, KPI cards, slicers, filters, navigation features, and proper visual formatting.	05	-
2	Visual Debugging, Storytelling and Insight Presentation: Students will improve a poorly designed Power BI report by correcting visual issues, layout problems, navigation, storytelling flow, and insight presentation.	05	-
3	Active Learning Activity (ALA) :- Unleashing DAX Power – KPIs, Time Intelligence & Insights Students will create an advanced interactive Power BI dashboard with KPIs, visuals, slicers, drill features, bookmarks, navigation, insights, and recommendations.	-	10
Total		10	10
Examination Style: Advanced Dashboard Design and Interaction Task (05 Marks): - Students will be given a dataset and business scenario for which they must design an advanced Power BI report page or multi-page report. The report must include suitable visuals, KPI cards, slicers, filters, drill-down or drill-through, bookmarks, buttons, tooltip pages, or page navigation as required by the scenario. Students must apply proper formatting, alignment, spacing, visual hierarchy, and theme consistency. This task evaluates students' ability to create interactive and user-friendly analytical reports based on business requirements. Visual Debugging, Storytelling and Insight Presentation Task (05 Marks): - Students will be given a poorly designed or incomplete Power BI report containing issues such as wrong chart selection, poor scaling, unclear titles, unnecessary colors,			



	overcrowded visuals, weak navigation, incorrect aggregation, or missing insight flow. Students must identify the problems, correct the visuals and layout, and present the improved dashboard with clear insights and recommendations. This task evaluates students' ability to debug visual design issues, apply storytelling principles, and communicate analytical findings effectively. 3. Active Learning Activity (ALA): Unleashing DAX Power – KPIs, Time Intelligence & Insights (10 Marks): Students will create an advanced interactive Power BI dashboard using a real or provided dataset from domains such as Sales, Finance, HR, Education, Healthcare, or Retail. The dashboard must include executive KPIs, suitable analytical visuals, slicers, filters, drill-down or drill-through, tooltip pages, bookmarks, buttons, and page navigation where applicable. Students must design the report in a storytelling flow by presenting the business problem, summary KPIs, trends, exceptions, detailed analysis, and final insights or recommendations. The final submission must include the Power BI file and a short dashboard explanation covering the design approach, interactions used, key insights, and decision-making value, which shall be uploaded by students on the GMIU Web Portal.		
5	Power BI Service, Security and Enterprise Deployment <u>Theory Topics:</u> Power BI Service concepts and its role in enterprise BI deployment; difference between Power BI Desktop and Power BI Service; publishing reports and managing workspaces; understanding reports, dashboards, semantic models, apps, dataflows, and workspaces; sharing reports and dashboards with users; workspace roles and access permissions; Row-Level Security (RLS) and Object-Level Security awareness; data refresh concepts including scheduled refresh, incremental refresh awareness, and gateway usage for on-premise data sources; Power BI app creation and report distribution; performance optimization concepts including model size reduction, removing unused columns, optimizing visuals, improving DAX measures, and reducing unnecessary interactions; integration awareness with Excel, SharePoint/OneDrive, SQL, Web/API sources, and basic	12	20%



	Python/R visual integration; documentation and version management for enterprise reports; final capstone project planning covering data acquisition, ETL, 15odelling, DAX KPIs, dashboard design, publishing, security awareness, insight presentation, and professional project delivery. <u>Practical:</u> 54. Publish a completed Power BI report from Power BI Desktop to Power BI Service and verify the published report output. 55. Create and manage a workspace for organizing reports, dashboards, semantic models, and related project files. 56. Explore Power BI Service components such as reports, dashboards, semantic models, apps, dataflows, and workspaces. 57. Share a report or dashboard with selected users and assign suitable access permissions based on a given scenario. 58. Create a simple Power BI dashboard in Power BI Service by pinning important visuals from a published report. 59. Configure basic scheduled refresh settings and explain refresh requirements for a selected dataset. 60. Demonstrate gateway usage awareness for on-premise data sources using a simple case scenario. 61. Create and test Row-Level Security using a sample dataset, such as region-wise, department-wise, or branch-wise access control. 62. Demonstrate basic Object-Level Security awareness by identifying sensitive fields that should be restricted in a business report. 63. Optimize a Power BI report by removing unused columns, hiding unnecessary fields, reducing excessive visuals, and improving report page structure. 64. Review and improve DAX measures for readability, naming conventions, and basic performance efficiency. 65. Connect Power BI with integration sources such as Excel, SharePoint/OneDrive, SQL, Web/API source, or Python/R visual at awareness level. 66. Create a Power BI app or prepare a basic report distribution plan for end users. 67. Prepare complete project documentation covering data sources, ETL steps, model design, DAX measures, dashboard pages, security settings, publishing details, and insights. 68. Develop and present a final capstone Power BI project covering data acquisition, transformation, 15odelling.		
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DAX analytics, dashboard design, publishing, security awareness, optimization, and insight presentation.			
Evaluation Method:			
Sr. No.	Evaluation Method	SEE	CCE
1	Power BI Service, Security and Report Optimization :- Students will demonstrate Power BI Service usage, sharing permissions, basic RLS, sensitive data handling, and report optimization techniques.	05	-
2	Final Enterprise Capstone Project and Viva Demonstration :- Students will develop and present a complete Power BI capstone project covering ETL, modeling, DAX KPIs, dashboard design, security, optimization, and insights.	05	-
3	Active Learning Activity (ALA):- Enterprise Deployment Fix and Optimization Challenge:- Students will improve a completed Power BI report by fixing deployment issues, optimizing visuals, preparing documentation, planning security, and applying basic RLS.	-	10
Total		10	10
Examination Style:			
1. Power BI Service, Security and Report Optimization Task (05 Marks):			
Students will be given a Power BI report or scenario and must demonstrate Power BI Service usage, sharing settings, access permissions, and basic security awareness. They must create or explain Row-Level Security using a simple case such as region-wise, department-wise, or branch-wise access control. Students should also identify sensitive fields, unused columns, excessive visuals, poor layout, or inefficient report elements and suggest suitable optimization steps. This task evaluates students' understanding of Power BI Service, security controls, and report performance improvement.			



	2. Final Enterprise Capstone Project and Viva Demonstration (05 Marks): - Students will develop a final enterprise-level Power BI capstone project using a real or provided dataset. The project must cover the complete BI workflow, including data acquisition, Power Query transformation, data modelling, DAX KPI development, dashboard design, interaction features, publishing/exporting, basic security awareness, optimization, documentation, and insight presentation. Students must present the project through viva or demonstration and explain the business problem, data sources, ETL steps, model design, KPIs, dashboard pages, key insights, security considerations, and decision-making value. This task evaluates students' ability to integrate all major Power BI concepts into a complete professional BI solution. 3. Active Learning Activity (ALA): Enterprise Deployment Fix and Optimization Challenge (10 Marks): - Students will be given a completed Power BI report with deployment-related issues such as unused columns, heavy visuals, poor naming, missing documentation, unclear sharing plan, sensitive fields, absent RLS logic, or refresh-related concerns. They must practically improve the report by optimizing fields and visuals, organizing measures, preparing documentation, creating a basic sharing/security plan, and implementing simple Row-Level Security where applicable. The final submission must include the improved Power BI file/exported report and a short deployment readiness note, which shall be uploaded by students on the GMIU Web Portal.		
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Suggested Specification:

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage %	NA	NA	NA	NA	NA	NA



Course Outcome:

After learning the course the students should be able to:	
CO1	Analyze BI requirements and plan enterprise Power BI solutions.
CO2	Apply Power Query and ETL techniques to acquire, clean, transform, and document data.
CO3	Develop semantic models, relationships, data tables, and DAX measures for analytics.
CO4	Create interactive Power BI dashboards using advanced visuals and UX principles.
CO5	Deploy, secure, optimize, document, and present an enterprise Power BI project.

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory.

The internal evaluation will be done on the basis of Active Learning Assignment.

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Reference Books:

- [1] Brett Powell, *Mastering Microsoft Power BI*, Packt Publishing, 2nd Edition, 2022.
- [2] Daniil Maslyuk, *Mastering DAX: Power BI, Excel, and Analysis Services*, Microsoft Press, 2021.
- [3] Reza Rad & Leila Etaati, *Pro Power BI Architecture: Sharing, Security, and Deployment Options for Microsoft Power BI Solutions*, Apress, 2019.
- [4] Greg Deckler, *Learn Power BI: A Beginner's Guide to Developing Interactive Business Intelligence Solutions Using Microsoft Power BI*, Packt Publishing, 2nd Edition, 2022.
- [5] Philip Seamark, *Beginning DAX with Power BI*, Apress, 2018.



Suggested Assessment Guidelines:**Module-1: Enterprise BI Project Planning and Architecture**

Enterprise BI Planning and Architecture Assessment (10 Marks)		
Criteria	Description	Marks
Enterprise BI Project Discovery & Requirements Brief	Proper identification of business questions, KPIs, data quality risks, assumptions, assumptions, and success criteria from the given business scenario and dataset.	5
Power BI Solution Architecture & Governance Case	Clear design of Power BI architecture with data sources, ETL layer, semantic model, report layer, workspace, sharing layer, and governance points.	5
Total		10

Module-2: Advanced Data Acquisition and Power Query ETL

Advanced Data Profiling and ETL Assessment (10 Marks)		
Criteria	Description	Marks
Advanced Data Profiling and ETL Cleaning	Correct profiling of raw data and proper cleaning of missing values, duplicates, incorrect data types, inconsistent formats, unwanted fields, and error values.	5
Power Query Transformation and Error Correction	Accurate identification and correction of Power Query errors with suitable transformations such as append, merge, pivot, unpivot, conditional column, and group by.	5
Total		10

Module-3: Advanced Data Modeling and DAX Analytics

Advanced Data Modeling and DAX Assessment (10 Marks)		
Criteria	Description	Marks
Advanced Data Modeling and Relationship Design	Proper identification of fact tables, dimension tables, keys, relationship fields, cardinality, and relationship direction in Power BI Model View.	5
Advanced DAX Measures and KPI Analytics	Correct creation of DAX measures and business KPIs using suitable DAX functions and verification of results through appropriate visuals.	5
Total		10



Module-4: Advanced Dashboard Design and Storytelling

Dashboard Design and Insight Presentation Assessment (10 Marks)		
Criteria	Description	Marks
Advanced Dashboard Design and Interaction	Effective design of an interactive Power BI report using suitable visuals, KPI cards, slicers, filters, drill features, bookmarks, buttons, and navigation.	5
Visual Debugging, Storytelling and Insight Presentation	Proper correction of visual design issues with improved layout, chart selection, navigation, storytelling flow, insights, and recommendations.	5
Total		10

Module-5: Power BI Service, Security and Enterprise Deployment

Power BI Deployment and Capstone Assessment (10 Marks)		
Criteria	Description	Marks
Power BI Service, Security and Report Optimization	Correct demonstration of Power BI Service, sharing permissions, basic RLS, sensitive data handling, and report optimization techniques.	5
Final Enterprise Capstone Project and Viva Demonstration	Complete presentation of an enterprise Power BI project covering ETL, modeling, DAX, dashboard, security, optimization, documentation, and insights.	5
Total		10

