Department: Data Science

I Year Advanced Diploma Program (Part Time) (PG)

Data Analytic Tools (Microsoft Power BI)

1. Title: Data Analytic Tools (Microsoft Power BI)
2. Year of Implementation: 2023-2024
3. Duration: One Year
4. Pattern: Semester
5. Medium of Instruction: English
6. Contact hours: 7 hours/week
7. Eligibility: Graduate (Science)
8. Structure of Course:

Syllabus Structure (PG)

Year	Semester	Paper No.	Paper Code	Contact Hours	Credits (1Credit=15 H)	Total Marks
1	I	CT I	ADDST 101	30	2	75
		CL I	ADDSL101	60	2	150
	II	CT II	ADDST 202	30	2	75
		CL II	ADDSL202	60	2	150
	Annual	CP I	ADDSP101	60	2	150
	Total			**240**	**10**	**600**
2	III	CT III	ADDST 303	30	2	75
		CL III	ADDSL303	60	2	150
	IV	CT IV	ADDST 404	30	2	75
		CL IV	ADDSL404	60	2	150
	Annual	CP II	ADDSP202	60	2	150
	Industrial and or Incubation and or Research and or Field Training			60	2	-
	Total			**300**	**12**	**600**
	Total			**540**	**22**	**1200**

 Total No. of Courses: Theory: 6, Practical: 3,
Project: 3 Number of Lectures per week: 08
Theory: Semester, Practical and Project: Annual

CT: Course Theory, CL: Course Lab, CP: Course Project, AD: Advance Diploma, *: Name of Subject,

Semester I

CT I: ADDST 101: Microsoft Power BI - I
(Contact Hrs. 30 Credits: 2)

Course Objectives: Students should be able to

1. Power BI: Introduce participants to the concept of business intelligence, data visualization, and analytics. Familiarize them with the purpose and capabilities of Power BI as a tool for data analysis and reporting.

2. Data Preparation and Transformation: Teach participants how to connect to various data sources, clean and transform data using Power Query Editor, and create an optimized data model for analysis.

3. Data Modeling and DAX: Cover the essentials of data modeling, including establishing relationships between tables, building hierarchies, and implementing calculations using Data Analysis Expressions (DAX).

4. Creating Interactive Reports: Show participants how to design and develop interactive reports and dashboards using various visualization types and custom visuals to represent data effectively.

5. Exploring Advanced Features: Introduce advanced features of Power BI such as time intelligence functions, advanced calculations, and the use of custom visuals to enhance data analysis and reporting.

Unit 1: Basic Introduction to Microsoft Power BI
What is Power BI and its purpose, understanding data visualization and analytics, Installing and setting up Power BI Desktop, connecting to data sources (Excel, SQL databases, etc.), Exploring Power BI's interface and features, Creating basic visualizations (tables, charts, maps, etc.)

Unit 2: Data Transformation and Modeling
Cleaning and shaping data using Power Query Editor, Working with relationships between data tables Understanding data modeling and the importance of data modeling, DAX (Data Analysis Expressions) basics for creating calculated columns and measures, Hierarchies and grouping data, implementing best practices for data modeling

Course Outcomes: Students will be able to…

1. Proficient in Power BI Usage: Participants will gain a solid understanding of Power BI's features, functionalities, and components, enabling them to navigate the tool confidently.
2. Data Connection and Transformation: Students will be able to connect to various data sources, transform and clean data using Power Query Editor, and create optimized data models for analysis.
3. Data Modeling and DAX Proficiency: Learners will grasp the concepts of data modeling and how to build relationships between tables. They will also be proficient in using Data Analysis Expressions (DAX) to create calculated columns and measures.
4. Advanced Analytical Techniques: Students will explore advanced features, including time intelligence functions, advanced calculations, and custom visuals, to perform complex data analysis.
5. Collaboration and Sharing: Learners will understand how to share their Power BI reports and dashboards securely with others using Power BI Service and Power BI Apps.

Reference Books:

1. Greg Deckler (Author), Brett Powell (Author), Leon Gordon (Author) Mastering Microsoft Power BI: Expert techniques to create interactive insights for effective data analytics and business intelligence Packt Publishing Limited 30 June 2022
2. Jeremey Arnold (Author) Learning Microsoft Power BI: Transforming Data into Insights Shroff/O'Reilly 5 October 2022
3. Jack A. Hyman (Author) Microsoft Power BI for Dummies | Wiley 23 January 2023
4. Chandraish Sinha (Author) Mastering Power BI 30 September 2021
5. Alberto Ferrari Analyzing Data With Microsoft Power Bi And Power Pivot For Excel 2019 Edition by Alberto Ferrari , PHI Learning PHI Learning January 2019

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CLI: ADDSL 101: **(Practical)**

(Contact Hrs.: 60 Credits: 02)

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Course Objectives: Students should be able to

1.Understanding Power BI: Introduce participants to the concept of business intelligence, data visualization, and analytics. Familiarize them with the purpose and capabilities of Power BI as a tool for data analysis and reporting.

2.Data Preparation and Transformation: Teach participants how to connect to various data sources, clean and transform data using Power Query Editor, and create an optimized data model for analysis.

3.Data Modeling and DAX: Cover the essentials of data modeling, including establishing relationships between tables, building hierarchies, and implementing calculations using Data Analysis Expressions (DAX).

4.Creating Interactive Reports: Show participants how to design and develop interactive reports and dashboards using various visualization types and custom visuals to represent data effectively.

5.Exploring Advanced Features: Introduce advanced features of Power BI such as time intelligence functions, advanced calculations, and the use of custom visuals to enhance data analysis and reporting.

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List of Practical's

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1. Introduction & Setup
2. Connecting to Data Sources: Learn how to connect Power BI to various data sources, such as Excel, SQL Server, SharePoint, and more. Power BI Dashboard and Power BI Visualization
3. Data Transformation: Explore data transformation techniques, including cleaning, shaping, and combining data from different sources using Power Query Editor. Creating worksheet and operate it

4. Data Modeling: Create relationships between tables, define measures, and create calculated columns using DAX (Data Analysis Expressions) language.
5. Creating Visualizations: Practice building different types of charts and visualizations, such as bar charts, line charts, pie charts, maps, and others.

Course Outcomes: Students will be able to…

1. Proficient in Power BI Usage: Participants will gain a solid understanding of Power BI's features, functionalities, and components, enabling them to navigate the tool confidently.

2. Data Connection and Transformation: Students will be able to connect to various data sources, transform and clean data using Power Query Editor, and create optimized data models for analysis.

3. Data Modeling and DAX Proficiency: Learners will grasp the concepts of data modeling and how to build relationships between tables. They will also be proficient in using Data Analysis Expressions (DAX) to create calculated columns and measures.

4. Advanced Analytical Techniques: Students will explore advanced features, including time intelligence functions, advanced calculations, and custom visuals, to perform complex data analysis.

5. Collaboration and Sharing: Learners will understand how to share their Power BI reports and dashboards securely with others using Power BI Service and Power BI Apps.

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3. Jack A. Hyman (Author) Microsoft Power BI for Dummies | Wiley 23 January 2023

4. Chandraish Sinha (Author) Mastering Power BI 30 September 2021

5. Alberto Ferrari Analyzing Data With Microsoft Power Bi And Power Pivot For Excel 2019 Edition by Alberto Ferrari , PHI Learning PHI Learning January 2019

Semester II

CT II: ADDSL 202: Microsoft Power BI - II
(Contact Hrs. 30 Credits: 2)

Course Objectives: Students should be able to…

1. Power BI: Introduce participants to the concept of business intelligence, data visualization, and analytics. Familiarize them with the purpose and capabilities of Power BI as a tool for data analysis and reporting.

2.Data Preparation and Transformation: Teach participants how to connect to various data sources, clean and transform data using Power Query Editor, and create an optimized data model for analysis.

3.Data Modeling and DAX: Cover the essentials of data modeling, including establishing relationships between tables, building hierarchies, and implementing calculations using Data Analysis Expressions (DAX).

4.Creating Interactive Reports: Show participants how to design and develop interactive reports and dashboards using various visualization types and custom visuals to represent data effectively.

5.Exploring Advanced Features: Introduce advanced features of Power BI such as time intelligence functions, advanced calculations, and the use of custom visuals to enhance data analysis and reporting.

 Unit I: Advanced Data Visualization   (15)
  Creating interactive reports and dashboards, using advanced visualization types (drill-down, scatter plots, KPIs, etc.), Applying themes and customizing the look and feel of reports, Utilizing slicers and filters for interactivity, Building and formatting custom visuals, Exploring Power BI service and publishing reports

 Unit II: Power BI for Business Insights   (15)
Using Power BI for business analytics and decision-making, creating time-based analysis (date functions, time intelligence), Creating time-based analysis (date functions, time intelligence), Power BI datasets and using them across multiple reports, Introducing Power BI Apps and their deployment, Best practices for performance optimization and report maintenance

Course Outcomes: Students will be able to …

1.Proficient in Power BI Usage: Participants will gain a solid understanding of Power BI's features, functionalities, and components, enabling them to navigate the tool confidently.
2. Data Connection and Transformation: Students will be able to connect to various data sources, transform and clean data using Power Query Editor, and create optimized data models for analysis.
3. Data Modeling and DAX Proficiency: Learners will grasp the concepts of data modeling and how to build relationships between tables. They will also be proficient in using Data Analysis Expressions (DAX) to create calculated columns and measures.
4. Advanced Analytical Techniques: Students will explore advanced features, including time intelligence functions, advanced calculations, and custom visuals, to perform complex data analysis.
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CL II ADDSL 202: (Practical):
(Contact Hrs.: 60 Credits: 02)

Course Objectives: Students will be able to…

1.Understanding Power BI: Introduce participants to the concept of business intelligence, data visualization, and analytics. Familiarize them with the purpose and capabilities of Power BI as a tool for data analysis and reporting.

2.Data Preparation and Transformation: Teach participants how to connect to various data sources, clean and transform data using Power Query Editor, and create an optimized data model for analysis.

3.Data Modeling and DAX: Cover the essentials of data modeling, including establishing relationships between tables, building hierarchies, and implementing calculations using Data Analysis Expressions (DAX).

4.Creating Interactive Reports: Show participants how to design and develop interactive reports and dashboards using various visualization types and custom visuals to represent data effectively.

5.Exploring Advanced Features: Introduce advanced features of Power BI such as time intelligence functions, advanced calculations, and the use of custom visuals to enhance data analysis and reporting.

List of Practical's

1.Filters and Slicers: Understand how to apply filters and slicers to interactively control data displayed in visuals.

2.Custom Visuals: Explore custom visuals from the Power BI marketplace and learn how to import and use them in your reports.

3.Report Formatting: Practice formatting options to improve the appearance of your reports, such as color themes, fonts, and background images.

4.Power BI Service: Learn how to publish reports to the Power BI service, create dashboards, and share them with others.

5. Creating Dashboard of Product dataset
6. Creating Dashboard of Company Employee Details
7. Creating Dashboard of Covid- 19 patient record

Course Outcomes: Students will be able to…
1. Proficient in Power BI Usage: Participants will gain a solid understanding of Power BI's features, functionalities, and components, enabling them to navigate the tool confidently.
2. Data Connection and Transformation: Students will be able to connect to various data sources, transform and clean data using Power Query Editor, and create optimized data models for analysis.
3. Data Modeling and DAX Proficiency: Learners will grasp the concepts of data modeling and how to build relationships between tables. They will also be proficient in using Data Analysis Expressions (DAX) to create calculated columns and measures.
4. Advanced Analytical Techniques: Students will explore advanced features, including time intelligence functions, advanced calculations, and custom visuals, to perform complex data analysis.
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5.Alberto Ferrari Analyzing Data With Microsoft Power Bi And Power Pivot For Excel 2019 Edition by Alberto Ferrari , PHI Learning PHI Learning January 2019

CP III: ADDSP101 (Project): Related to the Syllabus

(Contact Hrs. 60, Credits: 2)

1. **Project Allotment**
2. **Project submission**
3. **Project Reporting**

BOS Sub-Committee   Expert Committee

1. Dr. B.T. Jadhav (Chairman)   1. Mr. Mehul Jadhav (Academic Expert)
2. Mr. R.P. Waghamare (Member)   2.Mr. Vijayendra Shinde (Industrial Expert)
3. Mr. S.B. Khandagale
4. Mr. S.D. Shinde