



LUMS<sup>X</sup>

# DATA ANALYTICS AND VISUALIZATION WITH POWER BI

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Shazeb Ali and Dr. Suleman Shahid

LUMSx is the center for online learning and professional development at LUMS. We extend LUMS' excellence in teaching and research beyond its borders by leveraging technology and innovative pedagogy. Our courses aim to bridge critical knowledge & skill gaps for Pakistani learners and to meet their diverse learning needs, we offer **Massive Open Online Courses (MOOCs)**, **Hybrid Courses**, **Synchronous (Live) Courses**, and **Free Open Online Courses (OpenCourseWare)**. We intend to harness technology for enhancing access, improving educational quality, and amplifying education's impact.



**Course Format:** Online-Cohort

**Language:** English

**Duration:** 6 Weeks (2 to 4 hours of effort per week)

**Note:** For more details about the dates and pricing, please visit our website



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# ABOUT THIS COURSE



This course offers a comprehensive, hands-on introduction to data analytics, data visualization, and Business Intelligence, with a strong practical focus on Microsoft Power BI. Designed for beginners and early-career professionals, the course is structured in three progressive parts that move learners from foundational concepts to advanced, tool-based application.

In **Part I: Introduction to Data Analytics**, learners build a strong conceptual foundation by understanding what data analytics is, where it is used, and why it matters for decision-making. This part covers the analytics lifecycle, types of analytics, key analytics roles, and essential data concepts, including data types, databases, and the basics of SQL. By the end of Part I, learners are able to interpret how raw data is transformed into insights across real-world contexts.

In **Part II: Data Visualization**, learners focus on turning data into clear, meaningful insights through effective visual communication. This part explores when and why visualizations are more powerful than raw data, how human visual perception influences interpretation, and how to design charts and dashboards that are accurate, accessible, and decision-focused. Learners develop the ability to evaluate visualizations critically, avoid misleading designs, and apply best practices for dashboard design.

In **Part III: Data Analytics and Visualization Tools – Power BI**, learners apply everything they have learned using Microsoft Power BI. This is the most applied and hands-on part of the course, where participants work through the full Business Intelligence workflow. Learners clean and prepare data using Power Query, build robust data models, create calculated columns and measures using DAX, and design interactive, well-structured reports and dashboards. The course also covers publishing, sharing, and securing reports using Power BI Service, ensuring learners understand how insights are delivered in real organizational settings.

# ABOUT THIS COURSE



Through a combination of video lessons, practice exercises, graded assessments, live sessions, and real-world examples, learners gain the skills to analyze data, design impactful visualizations, and communicate insights confidently. By the end of the course, participants are well-prepared to work with data in professional contexts, showcase Power BI projects, and take next steps toward certifications and data-focused career opportunities.

## WHAT WILL YOU LEARN

By the end of this course, students should be able to:

- **Understand data analytics:** explain its types, applications, and role in informed decision-making, and describe the analytics lifecycle and key professional roles.
- **Work with data:** identify, access, and interpret structured, semi-structured, and unstructured data, and apply foundational SQL to retrieve and manipulate data.
- **Design clear visualizations:** create and evaluate charts, dashboards, and reports that communicate insights effectively, applying principles of visual encoding, perception, and accessibility.
- **Use Power BI effectively:** clean, transform, and model data with Power Query and DAX, build robust data models with relationships and hierarchies, and create interactive dashboards.
- **Share and showcase insights:** publish, manage, and secure reports in Power BI Service, and present your Power BI projects professionally for portfolios, resumes, interviews, and certifications.

# MEET YOUR INSTRUCTOR



Course Instructor

**Dr. Suleman Shahid**

*Associate Professor, LUMS*

*Director, LUMSx*

Suleman Shahid is an Associate Professor of Computer Science at the Lahore University of Management Sciences (LUMS) and the founding director of the LUMSx - Digital Learning Center at LUMS. At LUMS, he directs the 'Computer-Human Interaction for Inclusion, Wellbeing and Learning' (CHISEL) Lab, manages the university's Usability Lab and is the Faculty Lead for the Facebook Innovation Lab at LUMS, which is Facebook's first Innovation Lab in Pakistan. Suleman is also a part of the National Center on Big Data and Cloud Computing at LUMS. It leads its Open Data Pakistan initiative, a first-of-its-kind open data portal in Pakistan. Suleman is also a Senior Design and Strategy Consultant. He works with private and public sectors on design-driven innovation, people-centred change management, and digital transformation projects.

He is also the founder of the annual UX Pakistan design conference, the Lahore Design Festival, the UX Camps program and co-host of the Design Baithak podcast and meetups initiative. Suleman's primary area of interest is designing learning and healthcare technologies for/with the margins in the global south with an emphasis on using participatory and inclusive design to drive innovation. His research focuses on the intersection of design, technology, and inclusion with applications to (1) assistive technologies (mobile apps and VR/AR systems) to enhance the quality of life of persons with disabilities (e.g. autism, dyslexia, visual impairment, dementia), and persons with mental health conditions (e.g. anxiety, depression), and (2) learning and playful technologies for children.



# MEET YOUR INSTRUCTOR

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Course Instructor

**SHAZEB ALI**

*Lead Data & Analytics Consultant,  
Storm Technology Ltd*

Shazeb Ali is a data and AI strategist with over eight years of experience across consulting, telecom, and technology sectors. Their expertise spans data engineering, business intelligence, and applied AI. They have led data projects at Afiniti, EY, and Careem, and currently serve as Lead Data and BI Consultant at Storm Technology, focusing on cloud-native analytics and helping organizations turn data into actionable insights.

# COURSE OUTLINE

## MODULE

## LEARNING OUTCOMES

### Introduction to Data Analytics

- Explain what data analytics is and its importance in modern decision-making
- Differentiate between descriptive, diagnostic, predictive, and prescriptive analytics
- Identify common analytics roles and responsibilities across industries
- Describe the data analytics lifecycle from raw data to insights
- Recognize basic data types and foundational database concepts

### Understanding Data Types and Sources

- Identify structured, semi-structured, and unstructured data
- Distinguish between different data sources and collection methods
- Explain how databases organize and store data
- Describe relational database concepts such as tables, rows, and keys
- Interpret the purpose and logic of simple SQL queries

### Introduction to Data Visualization

- Explain the purpose and value of data visualization in analysis
- Identify when to use visualizations instead of tables
- Recognize common chart types and their appropriate use cases
- Analyze how visualizations reveal patterns, trends, and outliers
- Select suitable charts to support analytical and business questions

### Deep Dive into Visual Encoding

- Explain how human perception influences data interpretation
- Identify visual encoding channels such as position, color, size, and shape
- Evaluate the effectiveness of different visual encoding choices
- Apply design principles to improve clarity and accuracy
- Design accessible visualizations that reduce misinterpretation

### Dashboards and Misleading Visuals

- Explain the purpose and appropriate use of dashboards
- Apply dashboard design principles for effective storytelling
- Use the Focus Framework to structure dashboard layouts
- Identify common visualization pitfalls and misleading techniques
- Recommend improvements to enhance clarity, trust, and insight



# COURSE OUTLINE

## MODULE

## LEARNING OUTCOMES

### BI Tools Overview

- Explain Business Intelligence and its role in organizations
- Describe the end-to-end BI workflow and analytics ecosystem
- Explain ETL and data preparation concepts
- Differentiate between self-service and enterprise BI
- Compare leading BI tools, features, and industry trends

### Getting Started with Power BI

- Navigate the Power BI Desktop interface and views
- Connect Power BI to various data sources
- Load and preview datasets for analysis
- Understand the Power BI workflow from data to visuals
- Build confidence using Power BI for basic reporting

### Power Query for Data Preparation

- Use Power Query to clean and transform datasets
- Apply common data transformation techniques
- Handle missing, inconsistent, and incorrect data
- Structure datasets for efficient analysis
- Prepare clean data models for reporting in Power BI

### Introduction to DAX

- Explain the purpose of DAX in Power BI
- Create calculated columns and measures
- Differentiate between row context and filter context
- Apply basic time intelligence functions
- Use DAX expressions to generate deeper analytical insights

### Data Modeling in Power BI

- Explain the importance of data modeling in analytics
- Design star schemas for reporting efficiency
- Create and manage relationships between tables
- Build hierarchies to support drill-down analysis
- Develop scalable data models for performance and usability

# COURSE OUTLINE



MODULE

LEARNING OUTCOMES

<div>Sharing and Security</div>	<ul style="list-style-type: none"><li>• Publish reports to Power BI Service</li><li>• Manage dashboards, reports, and workspaces</li><li>• Control access using sharing and permissions</li><li>• Apply row-level security concepts</li><li>• Follow best practices for secure BI deployment</li></ul>
<div>Career Prep (Live Session)</div>	<ul style="list-style-type: none"><li>• Understand the structure and requirements of the PL-300 certification</li><li>• Identify key skills assessed in Power BI roles</li><li>• Showcase Power BI projects professionally</li><li>• Communicate analytical insights effectively to stakeholders</li><li>• Position data analytics and visualization skills for career growth</li></ul>

# DATA ANALYTICS AND VISUALIZATION

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