

IBM ICE

Data Analytics

S. No.	SUBJECT
1	Introduction to Business Analytics
2	Predictive & Advanced Analytics
3	Descriptive Analytics
4	Big Data Analytics



Data Analytics

Data Analytics is the process of converting data into insights. With the increase in the availability of data, Analytics has now become a major differentiator in both the top line and the bottom line of any organization. The specialization in Business Analytics teaches the use of data and models to support decision making in business. Students learn how to model such relationships as the impact of advertising on sales, how historical data predict stock returns, and how changes in task characteristics can influence time to completion. This programme helps prepare students for careers in "economy of tomorrow" industries. They play a vital role in their organizations' technological direction. In an IT end-user industry, Business Analytics and Optimization (BAO) responsibilities can reside in various corporate functions and departments, such as operations, product development, information systems and finance.

Program Objectives

- To expose students to Identify, analyze and solve Business Analytics problems by applying knowledge of mathematics, science and engineering with modern engineering tools in the specific areas of
 - Data Mining and Predictive Modeling
 - Business Intelligence
 - Big Data Analytics
- To provide conceptual knowledge in the Business Analytics domain;
- To provide interdisciplinary knowledge;
- To expose students with advanced tools used in industry;
- To develop team work experience of professionals skills for IT Industry

Program outcome

- Relevant theoretical and practical knowledge to understand Business Analytics solutions and highlight key capabilities of Big Data & Business Analytics
- Understand the core technical concepts related to Business Intelligence, Big Data Analytics along with Hadoop Architecture and many more
- Use cutting edge Analytical Tools to Find, Interpret, Analyze Business Data
- Aligning Technology to the need of Business and interpreting outcome

Career Prospects

- Business Analytics Strategy Consultants,
- Business Intelligence and Performance Management Consultants, Advanced Analytics Consultants, Enterprise Information and Management Consultants,
- Enterprise Content Management Consultants and more

IBM-ICE Diploma MODULES FOR MBA -

- Introduction Business Analytics
- Data Mining and Predictive Analytics



- Business Intelligence
- Big Data Analytics

Upon completion

At the successful completion and assessment of each IBM-ICE module, students will progress towards achieving the “IBM Diploma” badge.



Introduction to Business Analytics

L T P C – 3 0 0 3

UNIT 1: Business analytics and optimization

- 6 Hrs.

Introduction to business analytics and optimization,
Challenges of big data,
Approaches to gain maximize profitability and returns,
Business analytics,
Enterprise analytics capabilities,
Analytic technologies categories,
A strong data infrastructure,
Analytics workforce,
Where to put the analytics team,
IBM business analytics maturity model, Optimization,
Key BAO concepts,
The need for BAO now,
Essential capabilities of BAO,
BAO capabilities,
Value of BAO to business organization,
Impact of BAO on diverse industries,
Advantages of implementing BAO solutions,
BAO support for decision-making,
Importance of reference architecture,
BAO reference architecture to BAO architects.

UNIT 2: Data warehouse

- 5 Hrs.

Decision support,
Data warehouse,
Enterprise and dependent data warehouse,
Data warehouse usage, Multidimensional data,
The snowflake and fact constellation schema,
Data warehouse design process,
Information pyramid,
Data analysis and OLAP,
Data cube,
OLAP server architectures,
Typical OLAP operations,
Metadata model,
Mobile and disconnected BI,
Collaborative BI,
Software development kit (SDK),



Making BI easy to consume.

UNIT 3: Business intelligence

- 6 Hrs.

What is business intelligence?

What is analytics?

Sample BI architecture,

BI components and architecture,

Functional areas of BI tools,

A single or a few applications,

Benefits of BI,

Maximize value from BI systems,

Business transformation projects,

Where are we now? ASUG business intelligence,

Maturity model,

Measuring BI success and value (McDonald's 2004),

Five key areas of strategy,

BI design and development,

Business environment,

Project tasks –

Task 1 – Knowledge capture goals, Discuss business objectives and prior learning,

Task 2 – Consolidate findings,

Task 3 – Map the customer situation,

Task 4 – Methodology and approach,

Task 5 – Standards and governance,

Task 6 – sections, milestones, and tasks,

Task 7 – Proof of concept (POC),

Task 8 – Table creation,

Task 9 – OLAP creation,

Task 10 – Three final deliverables, Risk management and mitigation, Cost justification and measuring success

UNIT 4: Datamining

- 6 Hrs.

Data Mining,

Data Mining Process,

KDD Process Model,

CRISP - DM, CRISP-DM - Elaborate view,

Data Mining – On what kinds of Data?

Data mining operations,

Challenges of Data Mining,

Why Machine should “Learn”?



Machine Learning types.

UNIT 5: Dashboard & Report Designing

- 6 Hrs.

Definition of dashboard,
Layers of information,
Dashboard design,
Dashboard design principles,
Chart overview,
Metrics,
Kaplan-Norton balanced scorecard,
The Rayport-Jaworski performance dashboard and strategy framework,
Building reports,
Filters in report,
Run report – on demand or schedule,
Parts of a graph,
Chart types.

UNIT 6: Big Data Analytics

- 7 Hrs.

What is Big Data?
A Growing Interconnected and Instrumental World,
Need for Big Data,
Characteristics of Big Data,
Structure of Big Data and need for standards,
Big Data Analytics Adoption,
Benefits & Barrier of Big Data Analytics,
Commoditization of Hardware Enabling New Analytics,
The 5 Key Big Data Use Cases,
Big Data Platform and Application Frameworks,
Use Cases for a Big Data Platform.

Text Book - Introduction to Business Analytics (IBM ICE Publication)



Data Mining and Predictive Modeling (Predictive & Advanced Analytics)

LTPC – 3024

Unit 1: Introduction to Data Mining

- 6 Hrs.

Introduction, what is Data Mining?
Concepts of Data mining,
Technologies Used,
Data Mining Process,
KDD Process Model,
CRISP – DM,
Mining on various kinds of data,
Applications of Data Mining,
Challenges of Data Mining.

Unit 2: Data Understanding and Preparation Hrs.

- 10

Introduction,
Reading data from various sources,
Data visualization,
Distributions and summary statistics,
Relationships among variables,
Extent of Missing Data
Segmentation,
Outlier detection,
Automated Data Preparation,
Combining data files, Aggregate Data,
Duplicate Removal,
Sampling DATA,
Data Caching,
Partitioning data,
Missing Values

Unit 3: Model development & techniques

- 10 Hrs.

Data Partitioning,
Model selection,
Model Development Techniques,
Neural networks,
Decision trees,
Logistic regression,
Discriminant analysis,
Support vector machine,
Bayesian Networks,
Linear Regression,



Cox Regression,
Association rules

Unit 4: Model Evaluation and Deployment

- 10 Hrs.

Introduction,
Model Validation,
Rule Induction Using CHAID,
Automating Models for Categorical and Continuous targets,
Comparing and Combining Models,
Evaluation Charts for Model Comparison,
Meta-Level Modeling,
Deploying Model,
Assessing Model Performance,
Updating a Model.

Text Book - Predictive & Advanced Analytics (IBM ICE Publication)



Business Intelligence (Descriptive Analytics)

LTPC-3024

UNIT 1: Introduction to BI

- 6 Hrs.

- What is business intelligence?
- What is analytics?
- Sample BI architecture
- BI components and architecture
- Functional areas of BI tools
- A single or a few applications
- Conditions that lead to analytics-based organizations
- The nature of industry: online retailers
- Seizing an opportunity: Harrah's
- Responding to a problem: First American Corp
- A clear business need
- A fact-based decision-making culture
- A strong data infrastructure
- The right analytical tools
- Analytics workforce.

UNIT- 2: Elements of BI solutions

- 7 Hrs

- Decision support
- Exploring and analyzing data
- OLAP and advanced analytics
- What is a data warehouse?
- Multidimensional data
- Data warehouse development
- Multi-tiered architecture
- Cross tabulation of sales by item name and color
- Data cube
- Hierarchies on dimensions
- Multi-feature cubes
- Typical OLAP operations
- Business query
- Dashboards and scorecards development
- Metadata model
- Mobile and disconnected BI
- Collaborative BI
- Software development kit (SDK)
- Making BI easy to consume

Unit 3: BUILDING THE BI PROJECT

- 8 Hrs.



Benefits of BI

Maximize value from BI systems

Business transformation projects

In BI analytics Where are we now?

ASUG business intelligence maturity model

Measuring BI success and value (McDonald's 2004)

Five key areas of strategy

BI design and development

Business environment

Project tasks

Task 1 – Knowledge capture goals, Discuss business objectives and prior learning

Task 2 – Consolidate findings

Task 3 – Map the customer situation

Task 4 – Methodology and approach

Task 5 – Standards and governance

Task 6 – sections, milestones, and tasks

Task 7 – Proof of concept (POC)

Task 8 – Table creation

Task 9 – OLAP creation

Task 10 – Three final deliverables

Risk management and mitigation, Cost justification and measuring success

Unit 4: REPORT AUTHORING

- 7 Hrs.

Metrics

Kaplan-Norton balanced scorecard

The Rayport-Jaworski performance dashboard and strategy framework

Building reports

Filters in report

Run report – on demand or schedule

Parts of a graph

Chart types

Unit 5: BI Deployment, Administration & Security

- 8 Hrs.

Definition of dashboard

Layers of information

Dashboard design

Dashboard design principles

Chart overview

Example of a dashboard

Sales simulation (what-if scenarios)



BI architecture

Phased and incremental BI roadmap

System sizing, measurement, and dependencies

End user provisos

Expanding BI potential

Authentication, authorization and access permissions

Server administration

Data backup and restoring

Text Book - Business Intelligence (Descriptive Analytics) (IBM ICE Publication)



Big Data Analytics

LTPC-3024

Unit No 1: Big Data Concepts

- 6 Hrs.

What Is Big Data,
Volume, Velocity, and Variety;
Why It's Important,
Risks of Big Data,
Need of Big Data,
Structure of Big Data;
Exploring Big Data,
Filtering Big Data,
The Need for Standards;
Big Data and Analytics,
Adoption Architecture,
Benefits & Barriers,
Trends for Big Data Analytics.

Unit No 2: Hadoop Fundamentals

- 7 Hrs.

Hadoop Architecture,
Hadoop File System (HDFS);
HDFS Administration;
Map / Reduce concepts;
Setup of an Hadoop Cluster;
Managing Job Execution;
Move data into Hadoop using Flume,
Data Loading;
Overview of workflow engine

Unit No 3: Query languages for Hadoop

- 8 Hrs.

Jaql basics,
Jaql data types,
Input/output with Jaql,
Working with operators and expressions,
Use of Pig & Hive

Unit No 4: Hadoop Reporting and Analysis

- 8 Hrs.

Approaches to Big Data reporting and analysis,
Big Data Access Technologies for Reporting and Analysis,
Business Intelligence and Hadoop Architecture,
Direct Batch Reporting on Hadoop,



Live Exploration of Big Data,
Indirect Batch Analysis on Hadoop

Unit No. 5: Analytics for Big Data at Rest & in Motion

- 7 Hrs.

Data Stream overview;
Streams Processing Language Basics;
Streams Processing Language Development;
SPL Programming Introduction;
Adapter Operators;
Relational and Utility Operators - The Journey Begins;
Relational and Utility Operators (continued) ;
Windowing and Joins ;
Punctuation,
Aggregation and Sorting;
Timing and Coordination;
Lists, Sets, and Maps;
Nodes and Partitions;
Debugging;
Adapters and Toolkits

Text Book - Big Data Analytics (IBM ICE Publication)

