Course Name: Business Analytics

CONTENTS

Course Name: Business Analytics

About the course: Step into the world of data-driven decision-making with ASAP Kerala's Business Analytics course — your gateway to the most in-demand skills of the digital economy. Designed in collaboration with industry experts, this program equips you with hands-on expertise in data analysis, visualization, business intelligence tools, and strategic insights.
Learn to harness the power of Excel, SQL, Tableau, and Python to solve real-world business problems. Whether you're a student, job seeker, or professional looking to upskill, this course opens doors to careers in Business Analysis, Data Analytics, BI Reporting, and Market Research.

Programme Outcomes:

Develop a Data-Driven Mindset: Gain the ability to approach business problems using data and analytical thinking.

Proficiency in Excel for Business Analysis: Create models, perform calculations, and analyze data effectively using spreadsheets.

Foundational Data Visualization Skills: Build dashboards and reports to communicate insights using Tableau tools.

Hands-on Experience with SQL: Write queries to retrieve, filter, and manipulate data from relational databases.

Basic Competence in R for Analytics: Use R for data cleaning, statistical analysis, and generating business insights.

Confidence to Work on Real-World Business Data: Apply learned skills to solve practical business problems and support decision-making.

Probability and Statistics for Business Decisions : Master statistical methods to analyze business data and guide decision-making.

Data Analysis with Python : Learn Python for data manipulation, visualization, and automation in analytics workflows.

Applied Machine Learning : Build and apply machine learning models using tools like Excel, R, and Python for business use cases.

Generative AI for Business Analytics : Explore AI-powered data generation and automation for innovative business solutions.

Big Data Analytics and Cloud Computing : Understand big data ecosystems and leverage cloud platforms for large-scale analytics.

Eligibility Criteria:

- BTech/ BE (all branches) – 5th-semester students
- BCA/ MCA – 3rd-semester students

- BSc/ MSc in Statistics/ Mathematics/ Physics/ Chemistry (3rd-semester students in the case of BSc and 1st-semester students in the case of MSc)
- BA/ MA Economics
- BCom/ MCom (3rd semester in the case of BA and BCom, and 1st semester in the case of MA and MCom)
- Professionals in the abovementioned streams (engineers and graduates) – Applicants must have studied mathematics as a subject in their graduation

Duration of the programme: 300 Hours

Mode of Training : Blended (Live online sessions and self paced learning modules)

Course Syllabus

Unit 1- Introduction to Data Science and Data thinking

Developing Data Thinking
Mindset Types of Data
Identifying Business Problems as Data Problems through live cases

Unit 2- Spreadsheet modelling using MS Excel

Foundations of Excel Formulas and Logical Functions Text Handling and Data Cleaning
Data Organization, Sorting, and Filtering Data Visualization with Charts PivotTables and Pivot Charts

Data Modeling and Preprocessing

Analytical Tools and Scenario Analysis Workbook Security and Automation

Unit 3- Data Visualization and Reporting

Foundations of Data Visualization and Tableau Creating and Analyzing Visuals

Dashboard Design and Interactivity

Sharing, Publishing, and Business Storytelling

Unit 4- Databases & SQL

Introduction to Databases
Normalization & Its Forms Normalization
Other Normal Forms
Transaction Processing & Database Recovery
Management Database Recovery Management:
Concurrency Control & Locking
Systems Locking Systems:
Object-Oriented DBMS Other
Concepts of Object-Oriented
Databases Distributed Database

Other concepts of Distributed Databases

Unit 5- R for Business Analytics

Importance of Data inBusiness

Introduction to BigData

What is Business Intelligence & Data Analysis
Process Introduction to R

Data Frames

Data type conversion
Working with DPLYR Package

Unit 6- Probability and Statistics for Effective Business Analysis

1. Types of data: qualitative vs quantitative, discrete vs continuous. Scales: nominal, ordinal, interval, ratio. Fundamentals of descriptive statistics – measures of central tendency: mean, median, mode; measures of dispersion: variance, standard deviation, range.
2. Data tabulation, univariate and bivariate analysis techniques – frequency distribution, concepts of quartiles and percentiles, statistical plots: histograms, box plots, scatter plots, QQ plots, skewness and kurtosis. Data standardization and normalization, outlier detection, correlation and covariance.
3. Probability theory: Random variables, experiment, event and types of events, sample space. Axioms of probability – additive and multiplicative rules. Conditional probability, Bayes' theorem and its applications.

4. Probability distributions: Distribution function of a random variable, discrete and continuous probability distributions – Bernoulli, binomial, uniform, Poisson, exponential, normal, and standard normal distributions.
5. Theory of estimation and statistical tests: Concept of population and sample, theory of estimation, central limit theorem, significance levels, confidence intervals, hypothesis testing – t-test, z-test, chi-square test, one-way ANOVA, two-way ANOVA, Linear regression - Simple vs multiple linear regression, assumptions, ANOVA table, R-squared and model interpretation

Unit 7- Data Analysis with Python

1. Introduction to Python and Jupyter Notebook – Setting up the Python environment and navigating Jupyter Notebooks. Understanding variables, built-in data types, and core data structures (lists, tuples, dictionaries, sets). Writing conditional statements, loops, and user-defined functions.
2. Working with pandas Data Frames – Creating Series and Data Frames, accessing and modifying rows and columns, using index objects, re- indexing, and dropping entries. Applying indexing, selection, filtering, and basic arithmetic operations across Series and Data Frames. Mapping and function application.
3. Data wrangling with pandas – Merging and concatenating datasets, reshaping with melt and pivot, transforming data structures, cleaning text with string functions and regular expressions. Introduction to mathematical and scientific computing using NumPy.
4. Aggregation and group operations – Grouping data with groupby, performing aggregation and group-wise operations, generating pivot tables and cross- tabulations. Handling time series data and working with date-time formats in pandas.

Unit 8- Applied Machine Learning with Business Tools (Low-Code/No-Code)

1. Platform Access and Workflow Management

This module introduces learners to accessing and navigating the analytics platform in both offline and online environments. Participants will explore data connections, create new projects, and understand core workflows and controls used for data processing and machine learning tasks.

Key Topics:

- Offline and online platform setup
- Platform navigation and interface overview
- Data connections and data source management
- New project creation
- Workflows and key controls for data processing
- Workflows for machine learning tasks

2. Machine Learning Overview and Foundational Concepts

This section covers the fundamental concepts of machine learning, including different learning paradigms and the role of variables in model development. It also focuses on essential data pre-processing techniques and model evaluation strategies.

Key Topics:

- Supervised and unsupervised learning techniques
- Dependent and independent variables
- Data pre-processing for machine learning:
    - Standardization and normalization
    - Outlier detection and removal
    - Missing value imputation
- Model development and performance testing
- Training, validation, and testing datasets

3. Linear Regression

Learners will understand the theoretical foundation of linear regression and gain hands-on experience in building, evaluating, and deploying regression models using the platform.

Key Topics:

- Model form and underlying concepts:
    - Predictions
    - Ordinary Least Squares (OLS)
    - Loss functions
- Building a Linear Regression model using platform controls
- Model performance evaluation:
    - R-squared
    - Adjusted R-squared
    - Root Mean Square Error (RMSE)
- Model finalization and scoring within the platform

4. Logistic Regression

This module focuses on classification using logistic regression, covering both theory and practical implementation, along with detailed performance evaluation techniques.

Key Topics:

- Model form and underlying concepts:
    - Predictions
    - Maximum Likelihood Estimation (MLE)
    - Binary Cross-Entropy loss
- Building a Logistic Regression model using platform controls
- Model performance evaluation:
    - Accuracy
    - Confusion Matrix
    - Precision and Recall

    - Concordance
    - Rank-order test
    - ROC–AUC curves
- Model finalization and scoring within the platform

5. Decision Trees and Random Forests

This section introduces non-parametric models capable of capturing non-linear relationships, with emphasis on tree-based algorithms and ensemble techniques.

Key Topics:

- Non-parametric model concepts and modeling non-linearity
- Building a Decision Tree model in the platform
- Hyperparameter tuning and model control
- Model performance testing and scoring
- Building a Random Forest model and controlling its hyperparameters

6. K-Means Clustering

Learners will explore unsupervised learning through clustering, focusing on k-means algorithms, evaluation metrics, and business interpretation of clusters.

Key Topics:

- Core concepts in k-means clustering:
    - Clusters and centroids
    - Distance measures
    - Random initialization
    - Selection of optimal number of clusters
- Evaluation metrics:
    - Within-Cluster Sum of Squares (WCSS)
    - Silhouette Score
- Building a k-means clustering model in the platform
- Profiling clusters and explaining their business significance

Unit 9: Generative AI for Business Analytics

This unit introduces Generative AI (GenAI) concepts and explores how they can be effectively integrated into business analytics to generate insights, automate reporting, and enhance decision-making.

1. Introduction to Generative AI

Learners will understand the evolution of Generative AI and its relevance to business analytics, focusing on how GenAI complements traditional analytical approaches.

Key Topics:

- Core concepts and evolution of Generative AI
- Understanding business analytics: definitions, scope, and importance
- Bridging Generative AI and business analytics
- Synergies and opportunities between GenAI and analytics
- Data foundations for GenAI:
    - Data collection
    - Data cleaning and preparation
- Prompt engineering for business analytics:
    - Crafting effective prompts
- Large Language Models (LLMs) in business analytics:
    - Overview and applications
    - Text generation for business insights
    - Automated report generation and summarization

2. Successful Applications of Generative AI in Business Analytics

This section focuses on real-world implementation of GenAI solutions and best practices for achieving measurable business value.

Key Topics:

- Generative AI workflow for business analytics
- Practical implementation steps
- Tools and platforms for Generative AI in analytics
- Measuring ROI of Generative AI initiatives
- Team structures and skillsets for implementing GenAI in analytics
- Data storytelling using Generative AI
- Industry standards and best practices
- Capstone project, future directions, and continuous learning

Unit 10: Big Data Analytics and Cloud Computing

This unit provides an in-depth understanding of big data ecosystems, real-time analytics, distributed processing frameworks, and cloud computing fundamentals.

1. Introduction to Big Data

Learners will explore the characteristics of big data and the limitations of conventional systems, along with modern analytical approaches.

Key Topics:

- Introduction to big data platforms
- Challenges of conventional data systems
- Intelligent data analysis
- Nature and types of data
- Analytical processes and tools
- Analysis vs. reporting

2. Mining Data Streams

This section introduces stream processing concepts and real-time analytics techniques for handling continuous data flows.

Key Topics:

- Stream concepts and data stream models
- Stream data architecture and stream computing
- Sampling and filtering data streams
- Counting distinct elements in a stream
- Estimating moments and oneness in a window
- Decaying window models
- Real-Time Analytics Platform (RTAP) applications
- Case studies:
    - Real-time sentiment analysis
    - Stock market prediction

3. Hadoop Ecosystem

Learners will gain practical knowledge of Hadoop and its distributed processing capabilities.

Key Topics:

- History and evolution of Hadoop
- Hadoop Distributed File System (HDFS)
- Core components of Hadoop
- Data analysis using Hadoop
- Scaling out and Hadoop streaming
- HDFS design and Java interfaces
- MapReduce framework:
    - Developing MapReduce applications
    - Job execution lifecycle
    - Failures and job scheduling
    - Shuffle and sort mechanisms
    - Task execution and MapReduce types
- Hadoop environment setup

4. Basics of Cloud Computing, Cloud Models, and Virtualization

This section introduces cloud computing concepts, deployment models, and virtualization technologies.

Key Topics:

- What is cloud computing and its global nature
- Evolution of cloud computing
- System models for distributed and cloud computing
- NIST cloud computing reference architecture
- Cloud deployment models
- Cloud service models

- Major cloud service providers

5. Cloud Infrastructure and Service-Oriented Architecture

Learners will explore cloud infrastructure design, inter-cloud resource management, and programming models.

Key Topics:

- Cloud infrastructure and service models
- Architectural design of compute and storage clouds
- Demonstration of cloud services (Azure, AWS)
- Layered cloud architecture development
- Virtualization support and disaster recovery
- Architectural design challenges
- Cloud programming models and security
- Parallel and distributed programming concepts

Unit 11: Project Management for Business Analytics

This unit focuses on project management principles tailored specifically for business analytics roles, emphasizing collaboration, documentation, and delivery.

1. Role of Business Analytics in Project Management

Learners will understand how a Business Analyst (BA) contributes to successful project execution.

Key Topics:

- Role of BA in project management
- Key project roles:
    - Project Manager

    - Client
    - Business stakeholders
    - Technical team
- Key project terminologies:
    - Kick-off meetings
    - Business Requirement Documents (BRD)
    - Project plans and trackers
- BA as a bridge between business and technical teams
- Managing scope, requirements, and business understanding

2. Creating and Managing Trackers and Planners

This section covers tools and techniques for planning, tracking, and controlling analytics projects.

Key Topics:

- Creating planners with milestones, owners, and timelines
- Daily and weekly stand-ups for progress tracking
- Naming conventions and version control practices

3. Requirements Gathering and Documentation

Learners will develop practical skills in stakeholder engagement and documentation management.

Key Topics:

- Preparing for stakeholder meetings:
    - Agendas and guiding questions
- Documenting raw notes in a structured format
- Using simple tools (Word, Excel) for documentation
- Maintaining and updating requirement documents throughout the project lifecycle

Unit 12- Power Point creation and storytelling

1. Power Point essentials
2. Creating relevant and impactful presentations
3. Delivering impactful presentations

Electives	Topics
Supply Chain Analytics	Foundations of Supply Chain Analytics (3hrs)
	Demand, Inventory & Distribution Analytics (3hrs)
	Disruption, Risk & Sustainability (3hrs)
	Intelligent & Digital Supply Chains (3hrs)
Banking and Finance Analytics	Understanding the BFSI Sector & Role of Analytics (2 hrs)
	Core Datasets Every Analyst Should Know in BFSI (3 hrs)
	Critical Business Metrics & KPIs in BFSI (3.5 hrs)
	Dashboards, Insights & Decisions in BFSI (3.5 hrs)
	Predictive Models & AI in BFSI (3 hrs)
Marketing	Statistics for Marketing Analytics (6)

	Predictive Modelling for Marketing Analytics (10)
	Marketing Data Visualization (8)
	Text Analytics for Marketing (6)
Pharma	Understanding the Pharma Commercial Ecosystem and Strategic Launch Planning (3 hours)
	Pharma Products, Market Dynamics, and Core Commercial Datasets (3 hours)
	Key Metrics & KPIs in Pharma Commercial Analytics (3 hours)
	Dashboards, Insights & Decision-Making in Pharma (3 hours)
	Predictive Models & AI in Pharma Commercial Analytics (3 hours)

Certification process: Students who submitted the project, attended the via, presentation and cleared the final assessment will be awarded the certificate

Certificate awarded by: NCVET (National Council for Vocational Education and Training) & ASAP KERALA