Comprehensive Examination Course outline

Business Intelligence and Analytics

Core Area	Topics to Include in Comprehensive Exam
1. Business Analytics Foundations	Business analytics, business intelligence, data-driven decision-making, role of analytics in business strategy, digital transformation, descriptive, diagnostic, predictive, and prescriptive analytics
2. Business Problem Framing & KPIs	Identifying business problems, converting business problems into analytical questions, defining KPIs, selecting relevant data, and linking analytics with managerial decisions
3. Data Sources, Data Quality & Preparation	Types of data, structured/unstructured data, transactional data, behavioral data, digital data, data cleaning, missing values, outliers, data transformation, data quality, accuracy, reliability, consistency, and bias
4. Exploratory Data Analysis & Descriptive Analytics	EDA, patterns and trends, summary statistics, measures of central tendency, dispersion, correlation, business performance analysis, and interpretation of results
5. Data Visualization & Dashboard Interpretation	Dashboard design, KPI visualization, Power BI/Tableau-style interpretation, visual storytelling, communicating insights to management, and choosing appropriate charts
6. Forecasting & Predictive Analytics	Forecasting concepts, trend analysis, moving average, exponential smoothing, regression-based prediction, predictive modeling, use of predictive analytics in finance, marketing, HR, supply chain, and operations
7. Basic Machine Learning for Business Decisions	AI vs. ML vs. data science, supervised vs. unsupervised learning, regression, classification, clustering, decision trees, model selection, model interpretation, and business use cases such as churn prediction, fraud detection, segmentation, and forecasting

8. Model Evaluation & Interpretation	Accuracy, precision, confusion matrix, R^2, MSE, overfitting, validation, and managerial interpretation of model outputs
9. Segmentation & Consumer/Business Insights	Customer segmentation, K-means clustering, purchase patterns, digital footprints, behavioral data, customer journey, consumer insights, and translating data patterns into marketing or business recommendations
10. Data Governance, Ethics, Privacy & Security	Ethical use of data, privacy, transparency, accountability, data ownership, data stewardship, data security, data breaches, bias, compliance, responsible analytics, and ethical decision-making
11. Analytics-Based Decision-Making & Recommendations	Interpreting analytical results, comparing alternatives, recommending actions, supporting strategic decisions, and explaining limitations of analysis
12. Integrated Business Case Analysis	End-to-end case: identify business problem, select data, clean/prepare data, choose method, interpret results, visualize findings, address ethical/security concerns, and provide managerial recommendations