

MASTERS OF SCIENCE - BUSINESS AND DATA ANALYTICS

Business & Data Analytics Degree Requirements

Students should refer to their DegreeWorks degree audit located in their Digital Backpack for more information regarding their specific degree requirements.

Code	Title	Hours
BDA 517	Data Science for Business	3
BDA 512	Information Systems and Data Analytics	3
BDA 552	Java Programming & Software Engineering	3
BDA 555	Python for Data Analytics & Visualization	3
BDA 561		3
BDA 515	Foundations of AI/ML	3
BDA 595		3
Students will choose 1 of the following Tracks:		
Business Analytics Track		9
BDA 501	Web & Marketing Analytics	
BDA 502	Finance and Risk Analytics	
BDA 503	Predictive Data Analytics	
Data Analytics Track		9
BDA 563	Data Mining using AI	
BDA 582	Statistical Analysis using R	
BDA 556	Supervised and Unsupervised Learning	
Total Hours required for Degree		30

BDA 501. Web & Marketing Analytics. 3 Hours.

This course examines digital data from web traffic and social media to optimize marketing spending and improve the user experience. Students learn about SEO/SEM metrics, conversion funnels, A/B testing, and customer attribution modeling. The syllabus covers the technical implementation of tracking tags and the interpretation of heatmaps and click-stream data. By the end of the course, students can design comprehensive digital marketing strategies backed by hard data, enabling them to calculate the exact Customer Lifetime Value (CLV) and Return on Ad Spend (ROAS) for any online campaign.

BDA 502. Finance and Risk Analytics. 3 Hours.

BDA 503. Predictive Data Analytics. 3 Hours.

Focusing on forecasting future outcomes, this course covers time-series analysis, exponential smoothing, and ensemble methods to improve decision-making accuracy in uncertain business environments. Students learn to build models that account for seasonality, trends, and cyclical patterns in data. The curriculum emphasizes the practical application of these models in demand forecasting, financial planning, and inventory management. By comparing different predictive techniques, students learn to select the most appropriate model for a given business problem, balancing accuracy with interpretability requirements.

BDA 512. Information Systems and Data Analytics. 3 Hours.

Designed for business analysts, this course introduces logic and structured programming to automate repetitive data tasks and streamline workflows. It bridges the gap between raw business requirements and technical execution by teaching foundational concepts like variables, loops, and conditional branching. Students learn to script basic automation tools and manipulate spreadsheets or CSV files programmatically. The syllabus emphasizes readable code and logical problem-solving, enabling non-technical managers to communicate effectively with development teams and build their own "citizen developer" solutions.

BDA 515. Foundations of AI/ML. 3 Hours.

An introduction to the core mathematical and philosophical concepts of AI, including search algorithms, knowledge representation, and the mechanics of neural networks. It provides the "why" behind modern machine learning models by exploring probability theory, linear algebra, and optimization techniques like gradient descent. Students build a strong theoretical foundation in how machines "learn" from data and explore the history of AI from symbolic logic to modern deep learning. The course also addresses the ethical implications of AI, including transparency, accountability, and the impact of automation on the future of work.

BDA 517. Data Science for Business. 3 Hours.

This course focuses on the strategic application of data science to solve high-stakes organizational problems and gain a competitive edge. It covers the entire data science lifecycle, from framing business questions and data acquisition to evaluating the ROI of analytical models. Students study case studies in customer segmentation, churn prediction, and supply chain optimization to understand how data translates into profit. The curriculum emphasizes the "managerial" side of data science, teaching students how to lead technical teams, manage data privacy risks, and advocate for data-driven cultures within traditional firms.

BDA 552. Java Programming & Software Engineering. 3 Hours.

This course teaches object-oriented programming (OOP) principles using Java, with a heavy emphasis on building robust, maintainable enterprise software. Topics include classes, inheritance, polymorphism, and the software development life cycle (SDLC). Students learn to use integrated development environments (IDEs) and version control systems like Git to manage complex codebases. The curriculum also introduces design patterns and unit testing frameworks, ensuring that students can not only write code but also engineer scalable software systems that meet professional industry standards for reliability and modularity.

BDA 555. Python for Data Analytics & Visualization. 3 Hours.

A hands-on course focused on the Python ecosystem, specifically the use of Pandas, NumPy, and Matplotlib for data manipulation and exploratory analysis. Students learn to clean messy real-world datasets, handle missing values, and transform data for statistical modeling. The syllabus also covers advanced visualization libraries such as Seaborn and Plotly for creating interactive dashboards that communicate complex findings to stakeholders. By the end of the course, students are proficient in using Jupyter Notebooks to document their analytical process and present visually compelling, data-driven narratives.

BDA 556. Supervised and Unsupervised Learning. 3 Hours.

A technical exploration of predictive modeling (regression, classification) and descriptive modeling (clustering, PCA). Students learn to tune hyperparameters, manage the bias-variance trade-off, and validate model performance using cross-validation. The course covers a wide range of algorithms, including Random Forests, Support Vector Machines (SVM), and K-Means clustering. By working with both labeled and unlabeled data, students can uncover hidden structures and build accurate predictors for tasks ranging from credit scoring to image recognition.

BDA 563. Data Mining using AI. 3 Hours.

This course applies AI and pattern recognition techniques to extract valuable, non-trivial knowledge from massive datasets. Key topics include association rule mining (market basket analysis), anomaly detection (fraud prevention), and text mining for sentiment analysis. Students learn to handle "big data" challenges such as dimensionality reduction and data noise using commercial-grade data mining software. The syllabus focuses on transforming raw data into high-level business intelligence, enabling organizations to discover emerging market trends and hidden customer behaviors that are not visible through standard reporting.

BDA 577. Data Analytics. 3 Hours.

This course studies the use of accounting data to identify, analyze, and solve business problems. Examines the processes needed to develop, report, and analyze accounting data and the business risks related to data collection, storage, and use. Prerequisite: Admission to the MBA program.

BDA 582. Statistical Analysis using R. 3 Hours.

This course uses R to perform rigorous statistical testing and data exploration, covering ANOVA, multiple regression, and nonparametric tests. It emphasizes interpreting statistical results in a business context and teaches students to distinguish between correlation and causation. The curriculum dives into hypothesis testing, confidence intervals, and p-values, ensuring that analytical conclusions are backed by mathematical certainty. Students also learn R-specific tools, such as the Tidyverse, for data cleaning, making them proficient in the preferred language of professional statisticians and academic researchers.