

BUSINESS DATA ANALYTICS (BDA)

BDA 305. Data Structures. 3 Hours.

This course provides an in-depth exploration of data structures and their applications, with a focus on problem-solving, algorithmic thinking, and efficient program design using C++. Students will study fundamental and advanced data structures including arrays, linked lists, stacks, queues, trees, heaps, graphs, and hashing, along with their associated algorithms for searching, sorting, traversal, and storage optimization. Practical applications will be emphasized through projects that simulate real-world use cases, including emerging fields such as distributed ledger technologies. By the end of the course, students will be able to design, implement, and analyze data structures for high-performance, secure, and scalable applications. Coursework will combine theoretical study with extensive programming assignments, online lab activities, and collaborative problem-solving.

BDA 324. Business Data Analytics I. 3 Hours.

This course introduces students to statistical methods used in addressing real world business problems. Topics covered include sampling distributions, confidence intervals, hypothesis testing, simple regression and multiple regression. Appropriate computer resources will be used. This course integrates the principles of experiential Learning and meets the criteria for undergraduate research. Prerequisite MATH 2342 and BCIS 1305.

BDA 325. Business Data Analytics II. 3 Hours.

This course is designed to allow students to explore problems and challenges in international business. Students are given the opportunity to learn from challenges of actual international companies laying the foundation for a successful international business operation.

BDA 352. Java Programming I. 3 Hours.

This course teaches the basics of Java programming, the foundations of object-oriented programming, and the process of building a project in a modular fashion. Java programming provides an overview of programming concepts, design, and an introduction to coding using the Java language. This course has a focus on creating working computer programs in Java. It will address fundamental concepts of analysis, design, and testing and code development. These include flowcharts, Boolean logic, control flow, data types and structures, variables, arrays, functions, and exception handling. This course will prepare students for focused studies in any programming language. The student will also learn how to enter, compile, link, and run a computer program using the Java language in a Windows or equivalent environment. Instructors will introduce structured programming through techniques for solving business, engineering and scientific problems. Laboratory exercises will provide practice in writing programs and will reinforce basic programming concepts, logic flow, and structured design.

BDA 353. Java Programming II. 3 Hours.

This course teaches advanced Java programming including advanced manipulation of Strings and regular expressions. You will learn file handling through input/output streams and XML serialization for data interchange. The course also covers the use of generic collections, lambdas, and streams for efficient data management and functional programming. You will enhance problem-solving skills with recursion, searching algorithms and design custom generic data structures. Moreover, the course addresses concurrency and database connection with jdbc.

BDA 355. Python Programming. 3 Hours.

This course provides the fundamentals of Python programming. Python programming language is a dominant language in the industry today. Course topics covered include basic principles of programming using Python, algorithmic and procedural problem solving, program design and development, basic data types, control structures, functions, modules, and introduction to classes for programmer-defined data types. These concepts are applicable to programming in any language. Prerequisite: COSC 1315 or instructor permission.

BDA 430. Mobile App Development. 3 Hours.

This course introduces students to mobile application development, with a primary focus on the Android platform. Students will explore software design, implementation, and user-interaction design tailored for mobile computing environments. Core concepts such as software and data distribution, device sensors, and location-aware services will be covered. Students will develop hands-on experience using Java and the Android Studio IDE. No prior programming experience is required—this course is designed for beginners and intermediate learners alike.

BDA 472. Digital Forensics, Law, and Ethics. 3 Hours.

This course will provide a broad introduction to a comprehensive and integrative introduction to cybercrime. It provides an authoritative synthesis of the disparate literature on the various types of cybercrime, the global investigation and detection of cybercrime and the role of digital information, and the wider role of technology as a facilitator for social relationships between deviants and criminals.

BDA 484. DevOps and Software Testing. 3 Hours.

This course introduces DevOps practices and Software Testing methodologies, which help students to build, test, deploy and monitor software in modern, automated environments. Students will explore the aspects of DevOps, learn how Continuous Integration, Continuous Delivery (CI/CD) and automated testing work together to accelerate software delivery and improve quality. Students will be able to design and implement a complete DevOps pipeline, integrate automated tests into all stages of the software development lifecycle, and apply best practices for quality assurance, deployment, and operational monitoring in both local and cloud-based environments.

BDA 495. BDA Capstone. 3 Hours.

The Capstone Project completes a Computer Science student's undergraduate experience. Students apply basic software engineering to help them get a feel for real-world software development, practicing software engineering skills and applying fundamental computer science principles acquired throughout their undergraduate study.

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.