

# DEPARTMENT OF BUSINESS ANALYTICS AND INFORMATION SYSTEMS

The mission of the Department of Business Analytics and Information Systems is to: 1) build students' core competencies in the areas of business analytics and computer information systems through engaged learning and real-world applications; 2) prepare students for successful careers; and 3) empower students to find ways to use their knowledge, skills and abilities to positively contribute to their organizations and communities.

Students completing a STEM degree in Business Analytics or Computer Information Systems are able to extract, manage and present data; apply skills in data mining and predictive modeling; apply critical thinking skills to solve business problems; assist firms to be more competitive via the use of technology; bridge the gap between technology and business; and become effective data scientists, developers, scrum masters and technology managers.

The department prides itself on excellence in teaching and fosters a supportive learning environment that provides students with the opportunity to develop the expertise required to distinguish themselves both academically and professionally. Career tracks of program graduates include high-demand positions in business analysis, data management, network management, information systems security administration, systems analysis, web development and mobile applications support.

The demand for BAIS graduates over the next decade is outstanding with job growth projected to increase rapidly. Currently there are more career openings for Business Analytics and Computer Information Systems majors than there are graduates available to fill the positions; consequently, starting salaries are among the highest of all undergraduate business majors. All BAIS students who qualify complete internships, many resulting in offers of full-time employment upon graduation.

- Bachelor of Science in Computer Information Systems (<http://catalog.qu.edu/business/computer-information-systems/computer-information-systems-bs/>)
- Bachelor of Science in Computer Information Systems and Accounting (<http://catalog.qu.edu/business/computer-information-systems/computer-information-systems-accounting-bs/>)
- Bachelor of Science in Business Analytics (<http://catalog.qu.edu/business/computer-information-systems/business-analytics-bs/>)
- Digital Badge in Foundations of Web Development (<http://catalog.qu.edu/business/computer-information-systems/certificate-digital-badge-web-development/>)
- Master of Science in Applied AI and Business Analytics (<http://catalog.qu.edu/graduate-studies/business/business-applied-ai-business-analytics-ms/>)
- Minor in Business Analytics (<http://catalog.qu.edu/business/computer-information-systems/business-analytics-minor/>)
- Minor in Computer Information Systems (<http://catalog.qu.edu/business/computer-information-systems/computer-information-systems-minor/>)

- Accelerated Dual-Degree BS/MSBA (3+1) (<http://catalog.qu.edu/graduate-studies/business/business-applied-ai-business-analytics-ms/accelerated-dual-degree-bs-ms/>)
- Dual-Degree BS/MSBA or BA/MSBA (4+1) (<http://catalog.qu.edu/graduate-studies/business/business-applied-ai-business-analytics-ms/dual-degree-bs-ms/>)

## Computer Information Systems (CIS)

### CIS 101. Introduction to Applied Ai and Business Analytics. 3 Credits.

This course introduces students to the rapidly evolving fields of applied artificial intelligence (AI) and business analytics. Students explore fundamental AI concepts, learn how to leverage prompt engineering, and examine the latest generative AI tools shaping today's work environment. Through practical demonstrations and hands-on activities, students gain experience with applications of generative AI for various media types. Students also learn how to leverage AI-assisted business analytics using Excel. Additional topics include ethical considerations and emerging trends, ensuring that students can harness AI responsibly and effectively in any work environment.

**Prerequisites:** None

**Offered:** Every year, All

### CIS 225. Systems Analysis and Design. 3 Credits.

This course provides an introduction to the phased, problem-solving approach commonly used by organizations to examine and improve their information systems. Topics include analysis of a business problem or opportunity; determining what role, if any, computer-based technologies can play in addressing the business need; articulating the business requirements for the technology-based solution; specifying alternative approaches to acquiring the technology capabilities needed to address the business requirements; and specifying the detailed requirements for the information systems solution.

**Prerequisites:** Take CIS 101.

**Offered:** Every year, Fall and Spring

### CIS 245. Programming With Python. 3 Credits.

This course provides an introduction to object-oriented programming using a high-level programming language such as Python. The course covers the basics of how one constructs a program from a series of simple instructions. Basic features of functional and object-oriented programming are covered. Common programming techniques necessary to create simple but useful applications are explained.

**Prerequisites:** Take CIS 101

**Offered:** Every year, Fall and Spring

### CIS 255. Data Visualization. 3 Credits.

This course provides an introduction as well as hands-on experience in the field of data visualization. Students learn basic visualization design and evaluation principles to create meaningful displays of quantitative and qualitative data. They also learn techniques for visualizing multivariate, temporal, text-based, geospatial, hierarchical and network/graph-based data.

**Prerequisites:** None

**Offered:** Every year, Spring

**UC:** Breadth Elective

**CIS 265. Rapid Application Development.****3 Credits.**

This project-based course covers the processes, tools, and issues involved in rapid application development using low-code/no-code platforms in a business context. Low-code/no-code platforms enable non-programmers to develop software applications through visual modeling instead of traditional programming. Students gain hands-on experience using various low-code/no-code platforms to rapidly develop software applications.

**Prerequisites:** None**Offered:** As needed**CIS 267. Client-Side Web Development.****3 Credits.**

This course introduces students to HTML and CSS, which are the core client-side programming languages used to build websites. In this project-based course, students learn how to develop modern websites using professional tools and workflows. Topics include design principles, responsive layouts, video and audio, accessibility, performance optimization and version control systems.

**Prerequisites:** None**Offered:** Every year, Fall**CIS 300. Special Topics.****3 Credits.****Prerequisites:** None**Offered:** As needed**CIS 301. Enterprise Systems.****3 Credits.**

An Enterprise Resource Planning (ERP) system is software that runs all areas of an organization including accounting and finance, human resources (HR), sales and distribution, production, purchasing and inventory. ERP systems are cross-functional, process-centered, and based on industry best practices. This course covers both ERP theory and practice; the course content includes the evolution of ERP systems, business process reengineering, process mapping, the ERP life cycle, ERP functionality, ERP add-ons and security and risk management issues.

**Prerequisites:** Take CIS 101.**Offered:** As needed**CIS 350. Data Analysis with Excel (AC 350).****3 Credits.**

This course utilizes advanced topics in Excel to solve a range of complex business problems. Topics include: spreadsheet design, the use of complex formulas, functions, list and data management, macros and Visual Basic for Applications.

**Prerequisites:** None**Offered:** Every year, All**UC:** Breadth Elective**CIS 351. Database Programming and Design.****3 Credits.**

This course presents the use of database architecture and programming as a tool for developing integrated solutions for the information requirements of a modern business environment. Students work to identify business solutions by identifying the appropriate database design, and to understand how that design supports the business requirements. Students learn how to design, build and query databases using Microsoft SQL Server.

**Prerequisites:** None**Offered:** Every year, Fall**CIS 360. Programming in Excel.****3 Credits.**

This course teaches students how to create Excel macros in Visual Basic for Applications (VBA). In the course students will learn to create hotkeys, how to compile code, loops, and logic statements. No prior experience in coding is needed.

**Prerequisites:** Take CIS 245**Offered:** As needed**CIS 371. Intro to Blockchain Tech for Business.****3 Credits.**

This course introduces students to distributed ledger technologies, particularly blockchain technology, and its applications in business. Students gain a practical understanding of the inner workings of blockchain technology, including transactions, blocks, and mining. The course places an emphasis on the interplay of blockchain technology with other emerging technologies while providing students with the foundational knowledge to develop smart contracts and distributed application

**Prerequisites:** None**Offered:** Every year, Spring**CIS 381. Server-Side Web Development.****3 Credits.**

This course introduces students to server-side programming, which is used to develop websites that can tailor their content to individual visitors. In this project-based course, students learn how to develop websites with server-side programming that adheres to industry best practices. Topics include architectural patterns, database integration, authentication, authorization, and security

**Prerequisites:** Take CIS 267.**Offered:** Every year, Spring**CIS 411. Information Systems Security.****3 Credits.**

This course introduces students to the fundamental principles and topics of information technology security and risk management at the organizational level. Students learn critical security principles that enable them to plan, develop and perform security tasks. The course addresses hardware, software, processes, communications, applications and policies and procedures with respect to organizational IT security and risk management.

**Prerequisites:** Take CIS 101.**Offered:** As needed**CIS 440. IT Project Management.****3 Credits.**

This course evaluates the principles of Agile Project Management, using the scrum framework. The roles, events, artifacts, gathering requirements, estimation, values, and theory from the scrum framework are evaluated. In addition, differences between agile and traditional project management methods of software development are described. Students work on a development project to get a hands-on experience of working on a scrum team.

**Prerequisites:** Take CIS 101.**Offered:** Every year, Fall**CIS 484. Information Systems Internship.****3 Credits.**

Students gain experience by employing their skills in a professional setting under practicing professionals. This internship involves in-depth work related to user-defined information needs and is usually completed in the summer between the student's junior and senior years. Students must obtain approval and register prior to starting the work experience. Permission of department chair required.

**Prerequisites:** Take CIS 245.**Offered:** As needed**CIS 490. Computer Information Systems Capstone.****3 Credits.**

Students employ skills learned in all other CIS coursework, and are required to deliver a project that may encompass project management, systems analysis and design, enterprise systems, database management systems and programming. Students are responsible for managing the entire project from conceptual design to final deliverable.

**Prerequisites:** Take CIS 245, CIS 351 CIS 440.**Offered:** Every year, Spring

## Business Analytics & Information Systems (BAN)

### **BAN 220. Data Mining for Business Insights. 3 Credits.**

This course focuses on analyzing data sets to find patterns and anomalies, with the goal of extracting valuable information. The course covers basic concepts, methods, and techniques used in data mining, including data exploration, dimension reduction and data preparation.

**Prerequisites:** None

**Offered:** Every year, Fall

### **BAN 300. Statistical Programming With R. 3 Credits.**

This course introduces students to R, a widely used statistical programming language. Students learn to read data, write functions, analyze data and create visualizations in R.

**Prerequisites:** Take EC 271 or EC 272 or MA 170 or MA 176 or MA 206 or MA 275 or MA 275H or MA 285.

**Offered:** Every year, Fall

### **BAN 310. Web Analytics. 3 Credits.**

This course introduces students to the concept and use of web analytics. Topics covered include measurement planning, data collection, audience characteristics, traffic acquisition and user behavior. Students use Google Analytics to apply their learning and take the Google Analytics Individual Qualification exam to demonstrate their proficiency at the completion of this course.

**Prerequisites:** None

**Offered:** Every year, Spring

### **BAN 320. Big Data. 3 Credits.**

The course focuses on the concept and techniques used for managing big data. The course explores how big data is used within organizations to support analytics. Emphasis is on the Hadoop platform and supplemental tools that are used within a Hadoop environment to design and maintain a big data infrastructure.

**Prerequisites:** Take CIS 351.

**Offered:** As needed

### **BAN 410. Social Media Analytics. 3 Credits.**

In this course, students will learn how to use various tools and software to process and analyze social media data. The course covers the concepts and methods of social network analysis, including centrality measures, community detection, and visualization techniques. Additionally, the course covers the implications for business and ethical issues surrounding the collection and analysis of social media data.

**Prerequisites:** Take BAN 300 or CIS 245.

**Offered:** Every year, Spring

### **BAN 420. Machine Learning and Artificial Intelligence for Business. 3 Credits.**

The course introduces machine learning techniques for predictive modeling of business problems and opportunities. It covers the process of formulating a business analytics research hypothesis, developing business objectives, data selection, preparation and partitioning to successfully design, build and evaluate predictive models. Predictive modeling techniques such as classification and decision trees, neural networks, regression, random forests and other techniques are covered.

**Prerequisites:** Take BAN 220.

**Offered:** Every year, Spring

### **BAN 484. Business Analytics Internship. 3 Credits.**

Students gain experience by employing their skills in a professional setting under practicing professionals. This internship involves in-depth work related to analytics and is usually completed in the summer between the student's junior and senior years or during their senior year. Students must obtain approval to register for this course prior to starting the work experience. Permission of the department chair or internship coordinator is required.

**Prerequisites:** Take BAN 220.

**Offered:** As needed

### **BAN 610. Statistical Foundations for Applied AI And Business Analytics. 3 Credits.**

This course covers fundamental concepts in data analysis, statistical reasoning, and their connection to applied artificial intelligence in business settings. Students learn to organize, visualize, and summarize data, measure variability, and work with key concepts such as probability distributions, sampling, confidence intervals, hypothesis testing, regression, and correlation. Experimental design, analysis of variance, and statistical inference are also covered. Throughout the course, students gain hands-on experience with analytics platforms and utilize statistical methods supported by AI-driven tools for decision-making. Students will interpret results, communicate insights, and apply a range of techniques and AI-supported approaches to guide business decisions.

**Prerequisites:** None

**Offered:** Every year, All

### **BAN 615. Predictive Business Analytics. 3 Credits.**

The course introduces the techniques of predictive modeling and analytics in a data-rich business environment. It covers the process of formulating business objectives, data selection, preparation and partition to successfully design, build, evaluate and implement predictive models for a variety of practical business applications (such as marketing, customer retention, delinquency and collection analytics, fraud detection and insurance). Predictive models such as classification and decision trees, neural networks, regressions, pattern discovery analysis and other techniques are studied.

**Prerequisites:** Take BAN 610.

**Offered:** Every year, Fall and Spring

### **BAN 621. Data Management. 3 Credits.**

This course covers both operational and analytical databases, bridging the gap between day-to-day data management and strategic data analysis. Students will design, implement, and manage databases that support business operations, as well as how to extract and analyze data for decision-making purposes. Students will engage in hands-on learning to complete a real-world project using contemporary data management tools and techniques.

**Prerequisites:** None

**Offered:** Every year, Fall and Spring

### **BAN 628. Data Mining for Competitive Advantage. 3 Credits.**

This course focuses on the application of common data mining techniques. Students focus on developing business solutions by applying techniques such as market basket analysis, association rules, cluster analysis and time series.

**Prerequisites:** None

**Offered:** Every year, Fall

**BAN 629. Text Analytics.****3 Credits.**

This course builds upon previously introduced data mining methods, focusing specifically on techniques for text extraction and mining. Topics include efficient text indexing; document clustering and classification; information retrieval models; enhancement of structured data; scenario detection techniques; and using textual data in predictive models.

**Prerequisites:** None**Offered:** As needed**BAN 650. Data Visualization for Managers.****3 Credits.**

This course provides an introduction as well as hands-on experience to the field of data visualization. Students learn basic visualization design and evaluation principles to create meaningful displays of quantitative and qualitative data. They learn techniques for visualizing multivariate, temporal, text-based, geospatial, hierarchical and network/graph-based data. Students cannot receive credit for both BAN 650 and PMBA 626.

**Prerequisites:** None**Offered:** Every year, Fall and Spring**BAN 660. Optimization.****3 Credits.**

This course focuses on developing computational methods to solve various business optimization problems. Students will formulate and solve a variety of optimization problems including linear, integer, mixed-integer, and non-linear. The course also covers understanding decision making under uncertainty

**Prerequisites:** None**Offered:** As needed**BAN 661. Web Analytics and Web Intelligence.****3 Credits.**

This course focuses on the analysis of a variety of web metrics including tracking, traffic and visitor behavior, tactics and strategies to successfully market on the Web to make data-driven decisions. Business analytics tools and techniques are utilized to extract and analyze web-scale data to guide strategic decision making. Topics address solutions for measurably higher leads, sales, brand recognition, customer satisfaction or lower service costs.

**Prerequisites:** Take BAN 610.**Offered:** As needed**BAN 663. Business Data Analytics with R.****3 Credits.**

Students learn to program and use R for effective data analysis. Reading data, accessing R packages, writing functions, debugging, profiling code and organizing and commenting code also are covered. Working examples of topics in statistical data analysis are provided. The course also addresses installation and configuration of software as necessary for a statistical programming environment.

**Prerequisites:** None**Offered:** As needed**BAN 664. Health Care Analytics.****3 Credits.**

This course provides a foundation on data analytics in health care and an understanding of the main concepts and issues. Contemporary tools and technologies are applied to develop an analytics solution to selected health care problems.

**Prerequisites:** None**Offered:** As needed**BAN 665. Big Data and Hadoop.****3 Credits.**

The concept, principles, issues and techniques for managing Big Data information management resources are covered. The course explores how Big Data fits into an organization's information management strategy. Focus is on the Hadoop platform, emphasizing how it is used to design and maintain Big Data to support analytics.

**Prerequisites:** None**Offered:** As needed**BAN 667. Design and Analysis of Business Information Systems.****3 Credits.**

This course considers systems-development methods, analysis and design techniques with a focus on object-oriented analysis and design. The application of systems analysis and design concepts using current tools, techniques and approaches is covered. Students engage in hands-on learning and work in teams to complete a real-world project using contemporary analysis and design methodologies and tools.

**Prerequisites:** None**Offered:** As needed**BAN 668. Python Programming for Data Analysis.****3 Credits.**

After briefly covering the basics of Python programming, the course will show how students can use Python for simple text analysis. The course will then delve deeper and cover topics such as acquiring and cleaning data, and analyze the data using various statistical analysis modules that are available for Python. Students will work on independent short Python programming projects, as well as data analysis projects using Python.

**Prerequisites:** None**Offered:** Every year, Fall**BAN 669. Project Management.****3 Credits.**

This course develops a foundation of concepts and solutions required for successful completion of a project. Topics include planning, scheduling, controlling, resource allocation and performance measurement.

**Prerequisites:** None**Offered:** As needed**BAN 671. Fundamentals of Blockchain Technology.****3 Credits.**

This course equips students with tools to integrate and utilize blockchain solutions in business ecosystems while assessing their business value. Private and public blockchain frameworks as well as interconnected devices are analyzed. Blockchain technologies and their ongoing technical challenges are covered. Students work to analyze what problem(s) blockchain technology address, how it solves them, and how to assess new blockchain protocols.

**Prerequisites:** None**Offered:** Every year, Fall**BAN 672. Applied Business Analytics W Advance Exc.****3 Credits.**

Advanced features in Excel are utilized to create business solutions. This includes working with financial, logical, and statistical functions, as well as Developer, macros, data management, and charts and graphs. Business Intelligence tools, such as Data Queries and Models, What If analysis and Power Pivot are featured. These techniques are applied to business problems and opportunities.

**Prerequisites:** None**Offered:** As needed, Summer**BAN 673. AI and Analytics in Healthcare.****3 Credits.**

This course provides an understanding of the concepts and issues for artificial intelligence (AI) and analytics within the health care industry. Contemporary tools and technologies are applied to develop AI and analytics solutions for health care problems.

**Prerequisites:** None

**BAN 674. Generative AI Applications in Business. 3 Credits.**

This course explores the practical use of generative AI tools in business environments. Students will engage with technologies such as ChatGPT, Claude, DALL-E, and others to understand their capabilities, applications, and limitations. The course emphasizes hands-on experience with generative AI to create content and improve existing workflows. By the end of the course, students will have hands-on experience with leading generative AI tools, understand their business applications, and critically analyze their limitations and ethical challenges.

**Prerequisites:** None

**Offered:** Every year, Fall

**BAN 675. Special Topics. 3 Credits.**

**Prerequisites:** None

**Offered:** As needed

**BAN 688. Business Analytics Independent Study. 3 Credits.**

**Prerequisites:** None

**Offered:** Every year, All

**BAN 690. Business Analytics Capstone. 3 Credits.**

The capstone course in the MSBA program is designed to enable students to directly utilize what has been learned in the tools and applications courses to analyze and offer solutions for a major business challenge. A definition of the problem, analysis of options and a comprehensive presentation of findings and solutions are required components of the course.

**Prerequisites:** Take BAN 610, BAN 615, BAN 621, BAN 650, BAN 668.

**Offered:** Every year, All