DEPARTMENT OF COMPUTER INFORMATION SYSTEMS

Graduates of the Computer Information Systems program are business problem solvers who assist firms to be more competitive via the use of technology. Those who choose the Computer Information Systems major enjoy technology and also enjoy working with people.

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 data management, network management, information systems security administration, systems analysis, web development and mobile applications support.

The demand for CIS graduates over the next decade is outstanding with job growth projected to increase rapidly. Currently there are more career openings for CIS majors than there are graduates available to fill the positions; consequently, starting salaries are among the highest of all undergraduate business majors. All CIS 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/)
- Master of Science in Business Analytics (http://catalog.qu.edu/graduate-studies/business/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-analytics-ms/accelerated-dual-degree-bs-ms/)
- Dual-Degree BS/MSBA or BA/MSBA (4+1) (http://catalog.qu.edu/graduate-studies/business/business-analytics-ms/dual-degree-bs-ms/)

**Computer Information Systems (CIS)**

**CIS 101. Introduction to Information Systems.** 3 Credits.
This course introduces students to the analysis, design and development of information systems using the example of a mobile application. In a semester-long, team-based project, students develop a prototype and business case for a mobile application that addresses a defined business need. Students learn how information systems are developed while simultaneously learning how to gather, analyze and present data for decision-making in a business environment.

*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*

**CIS 245. Object-Oriented Programming.** 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, 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.

*Offered: Every year, Spring*

UC: Breadth Elective

**CIS 265. Mobile Application Development.** 3 Credits.
This project-based course covers the use of mobile applications in business and the issues involved in mobile application development. It also explores the principles and tools involved in the design and construction of applications for mobile devices.

*Prerequisites: Take CIS 101.*

*Offered: As needed, Spring*

**CIS 267. HTML and CSS.** 3 Credits.
This course introduces students to the fundamentals of HTML and CSS, which are two of the core technologies used to build websites. In this project-based course, students learn how to build modern websites using professional tools and workflows. Topics include design principles, responsive layouts, interactivity, video and audio, accessibility, performance optimization and version control systems.

*Prerequisites: Take CIS 101.*

*Offered: Every other year, Fall*

**CIS 299. Independent Study.** 1-6 Credits.

**CIS 300. Special Topics.** 3 Credits.

*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: Every year, Fall

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.
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.
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 381. Web Development. 3 Credits.
This course introduces students to the development of modern web applications. In this project-based course, students learn how to develop web applications that adhere to industry best practices and leverage the latest tools and technologies. Equal emphasis is placed on front end and back end aspects of web development. Topics include architectural patterns, database integration, authentication and authorization, security and web services.
Prerequisites: Take CIS 101.
Offered: Every other year, Fall

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 125 or CIS 225.
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: Every year, All

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

CIS 600. Information Systems Strategy. 3 Credits.
Students develop the ability to analyze and identify opportunities to improve the effectiveness of organizations through the use of appropriate information technologies. Technologies that influence organizational strategies, structure, risks and processes are emphasized. Ethical, global and security issues also are covered.
Offered: As needed

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: Take CIS 245 or prior python programming course
Offered: Every year, Fall

BAN 300. Business Data Analysis 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.
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 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: Every year, All

BAN 610. Introduction to Business Analytics. 3 Credits.
This course develops ideas for helping to make decisions based upon the examination of data. Topics include variability, data display and summary statistics, regression, and correlation, probability, probability distributions, sampling, the central limit theorem, confidence intervals and hypothesis testing. Attention is also given to the design of experiments and analysis of variance, frequency distributions, statistical inference and sampling theory.
Offered: Every year, Fall and Spring

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

BAN 621. Data Management. 3 Credits.
The concepts, principles, issues and techniques for managing corporate data resources are covered, including techniques for managing the design and development of large database systems. Data warehousing, data mining and database administration are emphasized. Students engage in hands-on-learning and work individually or in teams to complete a real-world project using contemporary data management tools and techniques.
Offered: Every year, Fall and Spring

BAN 622. Data Warehousing. 3 Credits.
This course focuses on the design and implementation of data warehouses, identifying key architecture differences between data warehouses and transactional databases. It also focuses on the interface to data warehouses to better understand how large amounts of information are used to enable organizations to make better decisions.
Prerequisites: Take BAN 621.
Offered: Every year, 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.
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.
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.
Prerequisites: Can only take 1 from list: BAN 650 or PMBA 626.
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.
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.
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.
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.
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.
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.
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.
Offered: As needed

BAN 675. Special Topics. 3 Credits.
Offered: As needed

BAN 688. Business Analytics Independent Study. 3 Credits.
Offered: Every year, All