INFORMATION SYSTEMS AND QUANTITATIVE ANALYSIS

The study of Information Systems and Quantitative Analysis involves application of computers, mathematics, statistics, and other quantitative techniques in the solutions of a wide variety of business problems. While computer science often concentrates on building the computer tools which make computers useful, it is information systems and quantitative analysis that specifically focus on effectively applying these tools in the solutions of everyday business problems.

Bachelor of Science in Management Information Systems

The Bachelor of Science in Management Information Systems degree will provide students with the educational background for pursuing an exciting career in applying information technology in business and government to process data and solve a wide variety of business problems.

Accreditation Information

The Bachelor of Science in Management Information Systems has been accredited by the Computing Accreditation Commission of ABET, Inc., the recognized accreditor of college and university programs in applied science, computing, engineering, and technology. ABET accreditation demonstrates a program's commitment to providing its students with a quality education.

General information about the College of IS&T's accreditation as well as specific educational objectives for its ABET accredited program in Management Information Systems can be found h (https://www.unomaha.edu/college-of-information-science-and-technology/academics/abet-accreditation.php)ere (https://www.unomaha.edu/college-of-information-science-and-technology/academics/abet-accreditation.php).

Contact

For more information about the MIS undergraduate program, contact the academic advising office at 402.554.3819.

Website (https://www.unomaha.edu/college-of-information-science-and-technology/academics/management-information-systems.php)

Degrees Offered: Bachelor of Science in Management Information Systems

- Management Information Systems, Bachelor of Science (http://catalog.unomaha.edu/undergraduate/college-information-science-technology/information-systems-quantitative-analysis/management-information-systems-bs/)

Minor Offered

- Minor in Management Information Systems (http://catalog.unomaha.edu/undergraduate/college-information-science-technology/information-systems-quantitative-analysis/management-information-systems-minor/)

Certificates Offered

- Data Management Certificate (http://catalog.unomaha.edu/undergraduate/college-information-science-technology/information-systems-quantitative-analysis/data-management-certificate/)
- Systems Development Certificate (http://catalog.unomaha.edu/undergraduate/college-information-science-technology/information-systems-quantitative-analysis/systems-development-certificate/)
- Information Technology Administration Certificate (http://catalog.unomaha.edu/undergraduate/college-information-science-technology/information-systems-quantitative-analysis/information-technology-administration-certificate/)

Undergraduate certificates allow the College of IS&T to offer a path for individuals who do not hold a bachelor's degree to advance their education along a focused, profession-oriented course of study and to have those studies acknowledged, documented, and later, should the student so desire, applied to a related bachelor's degree program.

The goal of the certificate is to provide non-traditional and traditional students an opportunity to take a focused set of undergraduate courses and earn a certificate of completion. For prospective certificate students already in the workforce who have earned an associate's degree, such certifications may fit with organizational professional development requirements and could be used, at the discretion of the organization, as professional development units (PDUs).

The Bachelor of Science in Management Information Systems degree will provide students with the educational background to solve problems using technology for businesses, government, and nonprofit organizations.

Career Options:

- Business Process Analyst
- Chief Information Officer
- Data Scientist
- Database Administrator
- Information Systems Manager
- IT Consultant
- IT Security Manager
- IT Technical Support Officer
- Network Architect
- Quality Assurance Specialist
- Software Engineer
- Systems Analyst

ISQA 2010 SPECIAL TOPICS IN INFORMATION SYSTEMS AND QUANTITATIVE ANALYSIS (1 credit)
This course is designed to acquaint students with issues which are current to the field or harbingers or emerging trends in the information systems area. Topics will vary across terms. This course may be repeated, but no topic may be taken more than once.
Prerequisite(s): Permission of instructor. Additional prerequisites may be required for particular topic offerings.

ISQA 2020 SPECIAL TOPICS IN INFORMATION SYSTEMS AND QUANTITATIVE ANALYSIS (2 credits)
This course is designed to acquaint students with issues which are current to the field or harbingers or emerging trends in the information systems area. Topics will vary across terms. This course may be repeated, but no topic may be taken more than once.
Prerequisite(s): Permission of instructor. Additional prerequisites may be required for particular topic offerings.

ISQA 2030 SPECIAL TOPICS IN INFORMATION SYSTEMS AND QUANTITATIVE ANALYSIS (3 credits)
This course is designed to acquaint students with issues which are current to the field or harbingers or emerging trends in the information systems area. Topics will vary across terms. This course may be repeated, but no topic may be taken more than once.
Prerequisite(s): Permission of instructor. Additional prerequisites may be required for particular topic offerings.

ISQA 2610 R FOR DATA ANALYTICS (1 credit)
R is a core language and toolkit in data science due to its vast capabilities to facilitate various stages of data analytics activities, from loading and transforming data to building and evaluating different analytics models. The course will enable students to use R to work with and manipulate data, build and evaluate data analytics models, and create visualizations.

ISQA 2620 EVALUATING AND CLEANING DATA (1 credit)
Evaluating and cleaning data sets for analysis is a core skill for professionals in data analytics and other technical fields. The course will enable students to assess the state of existing data sets, identify appropriate remediation strategies to prepare data for analysis, and perform common data cleaning procedures.
Prerequisite(s): ISQA 2610

ISQA 3150 PRINCIPLES OF QUANTITATIVE ANALYSIS (3 credits)
An introduction to structuring real-life situations into mathematical models. The class covers four groups of decision making models: decision trees, inventory, linear programming, network planning, and winning strategy. A number of the existing commercial computer software packages will be used in the course.
Prerequisite(s): CIST 2500

ISQA 3310 MANAGING THE DATABASE ENVIRONMENT (3 credits)
Introduction to business database design and management functions. The focus is on the use of current database management systems (DBMS) to support the data management function of an organization. Topics include data modeling, database design, SQL, data management and database administration. Hands-on experience in database design, creation, and use is provided.
Prerequisite(s): CIST 2100.

ISQA 3330 FUNDAMENTALS OF DATABASE MANAGEMENT (1 credit)
Databases are at the core of modern application development. Their use extends to many other environments including scholarly, scientific information systems. The overall goal of this course is to provide an introduction to the use of database management systems for efficient storing, updating, retrieval and analysis of data.

ISQA 3340 SQL FOR DATA ANALYTICS (1 credit)
Using the Structured Query Language (SQL) to access and manipulate data is a core competency in data management, data analytics, data science, and other data-intensive fields. Starting with an overview of the relational model of database systems, the course will enable students use SQL to create database tables, and store, retrieve, and manipulate data at both basic and advanced levels.

ISQA 3400 INFORMATION TECHNOLOGY INFRASTRUCTURE (3 credits)
This course provides an introduction to IT infrastructure issues. It covers topics related to both computer and systems architecture and communication networks, with an overall focus on the services and capabilities that IT infrastructure solutions enable in an organizational context.
Prerequisite(s): CIST 2100

ISQA 3420 MANAGING IN A DIGITAL WORLD (3 credits)
This course introduces the fundamentals of information systems/technology (IS/T) management. Students are introduced to the various roles, responsibilities, skills, and concepts essential to successful management of IS/T in the context of a dynamic environment of technology workforce diversity, a global economy, and concern for ethics and social responsibility in the development of systems.
Prerequisite(s): CIST 2100
Distribution: Global Diversity General Education course

ISQA 3520 GRAPHICAL USER INTERFACE DESIGN (3 credits)
This course is an introduction to interaction design with a primary emphasis on designing usable and useful computer interfaces. Students will learn the principles of interface design grounded in a fundamental understanding of human cognitive processes. They will learn how end-users develop and use mental models of interaction and will apply this knowledge to the design of interfaces for real-world applications. A design project will challenge students to plan their own designs, to develop interfaces and to integrate them into a working application prototype, to test their application with real users, and to effectively communicate the overall results. (Cross-listed with ISQA 8525)
Prerequisite(s): CIST 1300

ISQA 3900 WEB APPLICATION DEVELOPMENT (3 credits)
This course focuses on contemporary techniques and technologies in the design, development, and integration of web-enabled information systems. Topics include: Multi-tiered systems architecture; agile application development; object-oriented analysis and design; prototyping; testing, verification, and validation; lifecycle models; and component-based development. This is a rapidly moving, hands-on course that mirrors real-world development.
Prerequisite(s): CIST 1300 or CSCI 2850, CIST 1400, ISQA 3310 or CSCI 4850 (or concurrent enrollment)

ISQA 3910 INTRODUCTION TO PROJECT MANAGEMENT (3 credits)
This course will cover the basics of project planning, scheduling and control. Earned value management techniques and project quality will be covered. Risk management will also be covered. The student will be introduced to the IEEE Standards for Project Management. The purpose of the course is to provide students with an introduction to the tools and techniques used to manage projects to achieve successful completion. The project management methods taught are suitable for a wide variety of project types such as software development or engineering projects (e.g. construction).
Prerequisite(s): CIST 2100; or equivalent.

ISQA 4000 SPECIAL TOPICS: INFORMATION SYSTEMS & QUANTITATIVE ANALYSIS (1-5 credits)
This course is designed to acquaint students with issues which are current to the field or harbingers or emerging trends in the information systems area. Topics will vary across terms. This course may be repeated, but no topic may be taken more than once. (Cross-listed with ISQA 8086)
Prerequisite(s): Permission of instructor. Additional prerequisites may be required for particular topic offerings.

ISQA 4010 BUSINESS INTELLIGENCE (3 credits)
The course focuses on the various topics on knowledge management by utilizing both behavioral approaches and information technology tools. It includes data collection and analysis, intelligent agents, business concerns on data warehousing and data mining, customer relationship management. The course will also cover information overload, human expert systems vs. artificial intelligent systems and intelligent decision making.
Prerequisite(s): CIST 1400; CIST 2500

ISQA 4100 INFORMATION SYSTEMS ARCHITECTURE AND ORGANIZATION (3 credits)
This course examines the frameworks and tools used to develop an organization's information system architecture. It provides the analytical skills and conceptual frameworks with which to make recommendations and decisions regarding the integration of information technology components into an information system architecture. (Cross-listed with ISQA 8106)
Prerequisite(s): CIST 2100 and ISQA 3310

ISQA 4110 INFORMATION SYSTEMS ANALYSIS (3 credits)
This course examines and applies the principles of information systems analysis, following a structured systems development methodology. It surveys project management, feasibility and analysis and systems requirement definition using modern systems analysis techniques and automated tools. Course utilizes a case approach where students initiate the analysis and logical design of a limited-scope information system.
Prerequisite(s): CIST 2100, ISQA 3910, and ISQA 3310; only ISQA 3310 can be taken concurrently.

ISQA 4120 SYSTEM DESIGN AND IMPLEMENTATION (3 credits)
This is the second course in a sequence in computer information systems analysis, design, and implementation. This course extends the basic foundations of systems development started in ISQA 4110 and examines the activities comprising the design, construction and implementation of information systems.
Prerequisite(s): ISQA 3310 and ISQA 4110

ISQA 4130 INFORMATION TECHNOLOGY FOR DEVELOPMENT (3 credits)
Information Technology for Development (ITD) is the implementation and evaluation of information technology infrastructures to stimulate economic, social and human development. In this service-learning course, students will learn and apply ITD concepts for developing and adding value through IT by working with small business entrepreneurs in Omaha or rural Nebraska. Students will evaluate micro-business technology needs, prepare business technology plans, provide training, and implement appropriate solutions, to the extent possible within a semester class. (Cross-listed with ISQA 8136)
Prerequisite(s): Though not required, the following courses or their equivalent would provide the necessary background : CIST 1100, CIST 1300, ISQA 3210, ISQA 3310, ISQA 3400. Not open to non-degree graduate students.

ISQA 4150 ADVANCED STATISTICAL METHODS FOR IS&T (3 credits)
This course emphasizes the application and interpretation of statistical methods including design of experiments, analysis of variance, multiple regression, and nonparametric procedures and the use of statistical computer packages. The intent is to develop quantitative abilities needed for quantitatively intensive jobs and for advanced study in management information systems, computer science and information technology. (Cross-listed with ISQA 8156)
Prerequisite(s): CIST 2500 or equivalent (at least one course in statistics)

ISQA 4160 INTRODUCTION TO ENTERPRISE RESOURCE PLANNING (3 credits)
Introduction to Enterprise Resource Planning (ERP) is designed to expose students to the primary enterprise application that forms the information systems (IS) infrastructure for most large organizations today. The primary purpose of this course is for students to gain an understanding of the enterprise wide, cross functional nature of ERP software. In the process of learning about ERPs, the students develop "hands on" experience with the largest and most well-known ERP application, SAP. (Cross-listed with ISQA 8166, SCMT 4160)
Prerequisite(s): CIST 2100 or equivalent. Not open to non-degree graduate students.

ISQA 4170 DIGITAL SUPPLY CHAIN & LOGISTICS (3 credits)
Global Supply Chains are being disrupted by digital transformation driven by emerging technologies such as IoT (internet of things) and AI/ML (Artificial Intelligence/Machine Learning). This course will take a closer look at global supply chains and logistics with an emphasis on the impact of digitalization. We will explore the typical global supply chain processes and how state-of-the-art and emerging technologies impact them. Thus, the class views global digital supply chains by integrating business and technological perspectives. The course will start with an overview of technologies relevant to digital supply chains. We will then discuss digitalization strategy and digital supply chains, fundamental GSCM (Global Supply Chain Management) processes and their potential for digitalization, and discussion of IT/software systems, ioT, AI/ML, Data Analytics/Visualization, and related facets that impact digital supply chains. The course will culminate with an integrated case study and/or research paper (graduate). (Cross-listed with ISQA 8176).
Prerequisite(s): Permission of instructor. It is preferred that students have taken the introductory supply chain class from the College of Business, or have some experience in the transportation, logistics and supply chain management sector and are at least a Junior.

ISQA 4180 ELECTRONIC COMMERCE (3 credits)
Critical examination of the issues, technologies, standards and business and social implications of electronic commerce in Cyberspace.
Prerequisite(s): ISQA 3400 or equivalent.

ISQA 4190 PROCESS REENGINEERING WITH INFORMATION TECHNOLOGY (3 credits)
Business process reengineering issues are examined. Reengineering concepts and methods are introduced. Additional special project(s) are required. SAP will be introduced. (Cross-listed with ISQA 8196.)
Prerequisite(s): CIST 2500; prerequisite/co-requisite ISQA 4110.

ISQA 4200 INFORMATION AND DATA QUALITY MANAGEMENT (3 credits)
The course primarily focuses on developing an in-depth understanding of Data and Information Quality (DQ and IQ) concepts and issues. On completing this course students will be able to understand and use DQ and IQ Concepts in Information Systems projects, be able to recognize various patterns of Data and Design Deficiencies in Systems and be able to suggest appropriate DQ and IQ improvement plans in light of known deficiencies in systems. (Cross-listed with ISQA 8206)
Prerequisite(s): CIST 2500 and CIST 2100.

ISQA 4300 DATABASE ADMINISTRATION (3 credits)
This course is designed to give students an applied, practical introduction to database administration. Students will gain an understanding of the functioning of a database management system and its relationship to the computing environment in which it runs. They will learn the concepts, principles, and techniques necessary to carry out such functions as database object creation, storage management, capacity planning, performance tuning, backup and recovery, and security management. Each semester the course will focus on one commercial database management system (DBMS), such as Oracle. (Cross-listed with ISQA 8306)
Prerequisite(s): ISQA 3310 or CSCI 4850. Not open to non-degree graduate students.

ISQA 4380 DISTRIBUTED TECHNOLOGIES AND SYSTEMS (3 credits)
The course introduces students to concepts, issues and tools needed to develop distributed computing systems. Topics include distributed systems architecture, middleware, Internet-based systems development, security and performance. Hands-on systems development using current technologies is provided.
Prerequisite(s): ISQA 3310 or equivalent and knowledge of database design and SQL.

ISQA 4500 SPECIAL PROBLEMS IN INFOMATION SYSTEMS AND QUANTITATIVE ANALYSIS (2-3 credits)
Individual investigation of specific problems in information systems and quantitative analysis and related areas.
Prerequisite(s): Senior standing and permission of program chair.

ISQA 4510 INFORMATION SYSTEMS INTERNSHIP (1-3 credits)
The purpose of this course is to provide the students with an opportunity for practical application of their academic studies in the business world to help prepare them for their professional career and to provide a view of the challenges they will face.
Prerequisite(s): Junior/senior standing and permission of department.

ISQA 4730 DECISION SUPPORT SYSTEMS (3 credits)
This course examines a set of information systems which specifically support managerial decision makers: Decision Support Systems, Group Decision Support Systems, Executive Information Systems, Data Warehouses, Expert Systems, and Neural Networks. This course explores the development, implementation, and application of these systems, how these systems can be applied to current business problems, as well as how organizational issues impact the implementation and usage of these systems. (Cross-listed with ISQA 8736)
Prerequisite(s): CIST 2100 or equivalent.

ISQA 4880 SYSTEMS SIMULATION AND MODELING (3 credits)
The course provides an introduction to the modeling and simulation with special emphasis on decision-theoretic models and rational decision-making. The ability to make good decisions is key to individuals and organizations and studying, understanding and improving decisions is vital to success. Students are given a background into systematic decision-making processes, and then are introduced to formal methods for decision modeling and analysis. Building on these foundational models, students learn how to perform process modeling and optimization. Finally, the course concludes with a look at psychological biases and traps that may affect decision-makers. (Cross-listed with ITIN 4880)
Prerequisite(s): CIST 1400 and CIST 2500 or equivalent

ISQA 4890 DATA WAREHOUSING AND DATA MINING (3 credits)
This course provides students with a theoretical foundation and practical methods for designing and constructing data warehouse and implementing data mining. After covering the essential concepts, issues, techniques to build an effective data warehouse, this course emphasizes the various techniques of data mining, such as association, classification, clustering and prediction for on-line analyses within the framework of data warehouse architectures. This course gives students an opportunity to undertake a real-life data analysis project. (Cross-listed with CSCI 4890).
Prerequisite(s): ISQA 3310 or CSCI 4850

ISQA 4900 FULL STACK DEVELOPMENT (3 credits)
Full stack development is the development of both client side and server side portions of web applications. Most organizations go beyond simply using HTML web pages with a small amount of JavaScript in applications and have moved to developing modern web applications with backend APIs and frontend JavaScript frameworks such as Vue.js. Students will learn how to build a backend application and REST APIs. Students will take that backend framework knowledge and learn to securely integrate these backend APIs with frontend JavaScript frameworks to build single page apps and hybrid mobile applications.
Prerequisite(s): CIST 1300 - Web Development or CSCI 2850 Programming on the Internet ISQA 3310 Managing the Database Environment or CSCI 4850 Database Management ISQA 3900 Web Application Development or equivalent