INFORMATION SYSTEMS AND QUANTITATIVE ANALYSIS

The study of information systems and quantitative analysis involves the 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 which specifically focuses on effectively applying these tools in the solutions of everyday business problems.

The discipline of management information systems (MIS) includes the acquisition, deployment and management of information systems resources. MIS encompasses the development, implementation and management of computers, communications and data for organization-wide systems as well as departmental and individual technology systems. It also includes the responsibility for acquiring new information technology and incorporating it in the organization’s strategy, planning and practices.

MIS also includes the development and evolution of organizational infrastructure and systems to support organizational processes by applying methods, techniques and technology. The creation of information systems requires innovative and quality human-machine systems and also involves recognition of socio-technical design issues and change management.

Accreditation Information

The Bachelor of Science in Management Information Systems (MIS) 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 here (https://www.unomaha.edu/college-of-information-science-and-technology/academic/abet-accreditation.php) and here (https://www.unomaha.edu/college-of-information-science-and-technology/academic/abet-accreditation.php).

Bachelor of Science in Management Information Systems

The Bachelor of Science in Management Information Systems (BIS) 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.

Managers can be more effective and efficient when assisted by computer-based information systems. The student will learn how information technology can be applied to produce information both for controlling the day-to-day operations of a business and for planning for the future of that business. Information systems and quantitative analysis provide the educational background appropriate for pursuing career opportunities in business data management, management information systems, information centers, systems analysis, systems design, decision support, information security, electronic commerce, and other related areas.

A minimum of 120 credit hours is required for the degree. Thirty of the last 36 hours must be University of Nebraska at Omaha courses. Registering for courses without having taken the stated prerequisites may result in administrative withdrawal. To obtain a BIS, a student must fulfill certain University, College and Departmental requirements.

Second Baccalaureate Degree

General Requirements

Students who have satisfied the requirements for a first baccalaureate degree other than Management Information Systems (MIS) at the University of Nebraska at Omaha must complete a minimum of 30 additional semester hours at the University for a second bachelor’s degree.

To obtain an MIS degree as a second bachelor’s degree, students must complete academic requirements for the degree which include 15 credit hours of IS&T core courses, 24 credit hours of MIS core courses, 12 credit hours of specialization courses, 6 credit hours of mathematics and applied statistics courses, and 15 hours of business co-requisite courses, provided that the first baccalaureate degree is not in management information systems. International students may be required to complete 9 hours of English composition courses and any relevant pre-requisites as determined by the English Placement and Proficiency Exam (EPPE). Students who are admitted to a second degree program in MIS must meet with an academic advisor in the College of IS&T before beginning the degree to make a plan of study. Some transfer coursework may apply; however, 30 of the last 36 hours must be University of Nebraska at Omaha courses.

Integrated Undergraduate/Graduate Track (IUG) in Management Information Systems

The Department of Information Systems and Quantitative Analysis (ISQA) offers an Integrated Undergraduate/Graduate (IUG) Track which allows outstanding students to complete the BS in MIS undergraduate degree and the MS in MIS graduate degree in five years (144 total credit hours). The IUG program is designed for dedicated students who are motivated and willing to take on the challenges related to graduate education early. As such, the program involves both intensive study and preparation in the MIS field. Interested students are encouraged to meet with their academic advisor for more information about this track.

Student Groups

The Management Information Systems Student Organization (MISSO), was founded in 1999 and has been an active part of UNO ever since. MISSO regularly hosts guest speakers from a variety of information systems-related companies and organizations. MISSO also sponsors field trips, workshops and a variety of social events.

MISSO’s goals are:

• To provide a sense of community and camaraderie among students enrolled in and/or interested in the MIS program.
• To provide MIS students with career development advice and contacts through professional and social events.
• To provide students with presentations by professionals and valuable contacts in business and industry.

MISSO has a general meeting once a month, featuring a guest speaker or other activities. MISSO membership and attendance at MISSO meetings is open to all UNO and UNL students in all majors who are interested in the field of information systems. Learn more about MISSO here (https://www.unomaha.edu/college-of-information-science-and-technology/information-systems-and-quantitative-analysis/student-involvement/).

Contact

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

**General Guidelines for the Integrated Undergraduate/Graduate (IUG) Track in Management Information Systems**

**Admissions**
The IUG track is a 144-hour undergraduate-graduate option that allows eligible students to work toward the MS in MIS degree requirements while completing their undergraduate degree. Students interested in this option will work closely with an advisor to develop an integrated plan of study. The plan will cover the entire time period of the program, and if the student is admitted, the plan will be periodically reviewed with an advisor.

**Time of Admission to the Program**
Students can apply for consideration in the last part of their junior year in the College of IS&T and will be eligible for admission to the integrated degree program when they have completed that year of study. Students will start taking courses in the graduate program in their senior year.

**Joint Admission**
Students must apply to and meet the admission requirements of the MS in MIS graduate program. Students will present their portfolio and a plan of study in person to the Integrated Program Committee prior to being admitted to the program.

**Tuition charges**
Students will be required to pay graduate tuition rates when taking graduate courses.

**Admission Requirements and Procedures**
1. Students with junior standing and at least 85 credit hours of completed course work in their undergraduate degree program may apply for admission consideration into the IUG track.
2. Interested students will be required to present a “portfolio” of the following credentials:
   a. Three letters of recommendation, at least two from faculty.
   b. Statement of Intent - a personal statement about why the student wishes to apply for the IUG track.
   c. Undergraduate transcripts.
   d. Other supporting documents (e.g., projects and papers, software, work and internship experience, etc.) should be included where possible.
3. Students are highly encouraged to identify and work with a faculty mentor who knows their background and can champion their application to the IUG track.
4. All applicants will need to meet any other admission requirements established for the MS in MIS program.
5. Additional information:
   a. The application to the IUG track will be considered as a complete package and therefore, obtaining a high undergraduate GPA and/or GMAT/GRE score is not a guarantee of admission.
   b. Students are allowed to apply up to 12 hours of ISQA 8xx6 courses toward the specialization of the undergraduate degree, provided the courses are not the graduate equivalent of the MIS core undergraduate requirements.

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

**Writing in the Discipline**
All UNO students are required to take a writing-in-the-discipline course within their major. Management Information Systems degree students must take CIST 3000.

**Minors Offered**

**Minor in Management Information Systems**
A minor in Management Information Systems may be obtained by completing ISQA 3310, ISQA 3910 and ISQA 4110, plus three hours of upper-division Information Systems and Quantitative Analysis (ISQA) courses. A grade of “C-” or better is required in each course applied toward this minor in Management Information Systems. (Note: Some ISQA elective courses may have prerequisites that require a grade of ‘C’ or better.)

**Minor in Enterprise Resource Planning (ERP) Systems**
Enterprise Resource Planning (ERP) systems such as SAP, PeopleSoft or Oracle are used to integrate internal and external management of information across an entire organization, including finances, accounting, manufacturing, sales and service, customer relationship management, etc. The purpose of ERP is to facilitate the flow of information between all business functions inside the boundaries of the organization and to manage the connections to outside stakeholders. The College of IS&T offers courses that utilize ERP systems as a technology platform to apply course concepts.

**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-orientated 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. Prospective certificate students already in the workforce who have earned an associate degree benefit from advanced certifications in targeted areas. Such certifications may fit with organizational professional development requirements and could be used, at the discretion of the organization, as professional development units (PDUs).

**Data Management**
Data Management (DM) is the practice of managing data-related issues for an organization. Data management practitioners seek to optimize the design, storage, and use of organizational data.
**Systems Development**

Systems development practitioners seek to optimize the design, implementation, and use of information systems for organizational purposes.

**Information Technology Administration**

The undergraduate certificate in Information Technology (IT) Administration is designed for students who are interested in managing the complex technical infrastructure of today's organizations. The certificate is offered in partnership with the University of Agder in Norway (UiA), a sister university to UNO. The certificate consists of 12 credit hours of hands-on courses, covering such areas as systems administration, network administration, database administration, security administration, and distributed systems. All courses are offered online. Students will take courses taught by both UNO and UiA instructors and will have the opportunity to work with students residing in a country other than their own.

The Bachelor of Science in Management Information Systems (BIS) degree will provide students with the educational background to solve problems for business, government, and nonprofits using technology.

Computers are incredible tools for reaching customers, automating tasks, processing data, and helping people make good decisions. A major in Management Information Systems prepares you to be a leader in employing technology to support decisions and drive business operations. You will learn how computing can best be used in an organization and how to manage the technological decisions and projects in an organization.

**Careers 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 2000 SPECIAL TOPICS IN INFORMATION SYSTEMS AND QUANTITATIVE ANALYSIS (1-5 credits)**

The course content and topic will vary. Please contact the ISQA department office for specific course offerings.

**Prerequisite(s)/Corequisite(s):** Permission of instructor. Additional prerequisites may be required for particular topic offerings.

**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)/Corequisite(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)/Corequisite(s):** CIST 2100.

**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)/Corequisite(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)/Corequisite(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)/Corequisite(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)/Corequisite(s):** CIST 1300 or CSCI 2850, CSCI 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)/Corequisite(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)/Corequisite(s):** Permission of instructor. Additional prerequisites may be required for particular topic offerings.

**ISQA 4010 BUSINESS INTELLIGENCE (3 credits)**

This 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)/Corequisite(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)/Corequisite(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)/Corequisite(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)/Corequisite(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)/Corequisite(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)/Corequisite(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)/Corequisite(s): CIST 2100 or equivalent. Not open to non-degree graduate students.

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)/Corequisite(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)/Corequisite(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)/Corequisite(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)/Corequisite(s): ISQA 3300, 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)/Corequisite(s): ISQA 3310 or equivalent and knowledge of database design and SQL.

ISQA 4500 SPECIAL PROBLEMS IN INFORMATION SYSTEMS AND QUANTITATIVE ANALYSIS (2-3 credits)
Individual investigation of specific problems in information systems and quantitative analysis and related areas.
Prerequisite(s)/Corequisite(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)/Corequisite(s): Junior/senior standing and permission of department.

ISQA 4590 IT AUDIT AND CONTROL (3 credits)
This course explores organizational and managerial issues relevant to planning and conducting IT audit and control activities. The course covers the following conceptual areas: business risks and the management of business risk, IT risk as a component of business risk, the need to manage IT risks, and the basic type of controls required in a business system in order to control IT risks. Issues associated with new risks created by the use of the internet for business applications and electronic business are also covered. (Cross-listed with ISQA 8596)
Prerequisite(s)/Corequisite(s): A solid understanding of business foundations such as accounting and introductory auditing and exposure to the IS discipline is essential for success in this course. Permission of instructor is required to enroll.
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)/Corequisite(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)/Corequisite(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)/Corequisite(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)/Corequisite(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