



The MSIS Major

Undergraduate Program, New Brunswick
Rutgers Business School Newark and New Brunswick

What is the MSIS major?

MSIS stands for “Management Science and Information Systems”. It has two related parts: “Management Information Systems” (MIS) and “Management Science” (MS). Broadly, MIS refers to applying information technology (IT) in business, while “management science” means quantitative planning and analysis in support of decision making.

Management Information Systems (MIS) means studying the aspects of computers and information systems that are critical for operating and managing modern organizations. In particular, we focus on database technology, decision support, and security.

Management Science is what business information systems do when they go beyond simply storing, retrieving, and compiling information: for example, helping with things like demand forecasts, deciding what levels of inventory to maintain, or scheduling how many staff to have on hand at various times of the week. Management science has applications in all functional areas of business, including finance, marketing, and operations.

The MSIS major prepares students for careers in

- Information technology
- Risk management
- Technical/quantitative supply chain logistics and management
- Operations planning and management.

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Electives (four required for major)

Certain courses from the Supply Chain Management and Marketing Science, Computer Science, and Mathematics departments are also accepted as electives. The exact set of electives offered will depend on enrollment and demand.

33:623:405 Operations Research Models in Finance. Elements of nonlinear programming duality with applications to asset pricing. Risk modeling: value at risk, mean-risk models, coherent measures of risk. Risk-averse optimization. Application to portfolio problems. Multistage financial decision problems under risk. Planned to also be open to finance majors. Prerequisites: 33:623:385, 33:623:386, 33:390:300.

33:623:471 Information System Security. Protecting information assets. Nature of information security threats and vulnerabilities. Responding to security incidents. Firewalls, intrusion detection, cryptography, and secure programming. Prerequisites: 33:623:370, 33:623:388.

33:623:472 Designing and Creating Websites. Visual design and proper organization of interactive websites, including electronic commerce sites. Software tools for creating web material. Web design projects and critical analysis of existing website design and organization. Prerequisites: 33:623:470

33:623:410 Telecommunication and Network Systems in Business. Introduction to the fundamentals of data communications technologies and to the business opportunities and challenges presented by these technologies. Discusses a balanced mix of data communications fundamentals, emerging communications technologies, and business and IT management concepts. Prerequisite: 33:623:370.

33:623:445 Simulation. Discrete event simulation of business systems in service operations, manufacturing, and transportation. Basics of dynamic probabilistic modeling, including queuing theory. Computer simulation tools. Prerequisites: 33:623:385, 33:623:386.

33:623:494 Data Mining. Detecting useful patterns in large databases, drawing on the perspectives of multiple analytical disciplines. Business applications of classification methods, clustering techniques, association rule mining, and outlier detection. Prerequisites: 33:623:370, 33:623:385, and 33:623:386.

33:623:498/499 Independent Study in MSIS. (Taken by permission of the instructor only.)



Management Science and Information Systems

RUTGERS

Rutgers Business School
Newark and New Brunswick

How does MSIS compare to other Information Technology Majors at Rutgers?

We are the *business* IT major. There are two other ways to study IT at Rutgers:

- Computer Science (CS)
- The Information Technology and Informatics (ITI) major at the School of Communication and Library Science (SCILS)

Neither of them are business majors. As an MSIS major, you will take core courses in many aspects of business: accounting, marketing, management, operations, and finance. This subject matter is similar to that found in an MBA program, and is good preparation for starting your own business someday. Only business school students may take these courses. In MSIS, you then concentrate on business IT, quantitative planning, and quantitative analysis supporting decision making.

How does MSIS compare with Computer Science?

MSIS is a business major that concentrates on the aspects of computing that arise in operating most kinds of businesses. The CS major is an in-depth study of all aspects of computing, not just those that are directly business-related.

- Both majors have extensive technical content, but computer science would generally be considered more technical, and involves far more computer programming.
- MSIS is a business major, and MSIS majors take a core of standard business courses in accounting, finance, management and marketing. Students outside the business school cannot take those courses.
- MSIS and CS focus on different kinds of analytical techniques. CS concentrates on the science of computing, and tends to teach techniques for analyzing how computer programs behave. MSIS teaches analytical techniques for solving business decision-making and planning problems.

The CS major is a good choice for students who are interested in computers and their applications, and don't want a business focus. If you want a blend of IT and business, want to focus on business applications of computing, or are interested in quantitative business decision making, you should consider the MSIS major.

How does MSIS compare to the ITI major at SCILS?

MSIS is a computing and quantitative business major. The ITI major combines information technology skills with a study of human factors in the workplace.

- As students in the business school, MSIS majors take a core of standard business courses, and accumulate a core of general business skills and knowledge.
- MSIS approaches computer technology not only with regard to communicating, storing, and organizing information, but also from the standpoint of quantitative business planning, decision support, and problem solving.

If you are interested in an integrated IT and business education, you should consider the MSIS major. That is especially true if you are interested in IT's role in business decision making.

How does MSIS compare with other majors at the Business School?

MSIS is the only business major that focuses on information technology skills; most other majors have only a single required course in information systems. If your main interest is in IT, then MSIS is the right business school major for you. MSIS also stresses quantitative analytical skills that can be applied to many different functional areas of business and government, and in many different industries. The new Supply Chain major deals with some aspects of quantitative decision making and information systems, but has a less technical/quantitative focus.

How hard is the MSIS major?

MSIS has technical and quantitative content, somewhat like the Finance major. The most recently available data show that the distribution of grades in MSIS courses is quite similar to those in Finance, and higher than in Accounting.

What kind of job can I get with an MSIS degree?

Many of our graduates find work in the IT consulting arms of major consulting and accounting firms, including Accenture, Deloitte and Touche, Ernst and Young, Hewitt Associates, and Price Waterhouse Cooper. Other graduates have found work in corporate IT departments and IT vendors like Electronic Data Systems (EDS). Technical aspects of supply chain management and supply chain logistics are other possibilities. Employers of

all kinds also prize our graduates' broad technical and analytical training – some graduates end up working in the financial industry, for example.

Among the large companies that have been hiring MSIS graduates are IBM, Johnson and Johnson, Bristol Myers Squibb, Random House Publishing, John Wiley Publishing, and large financial institutions like JP Morgan Chase, Merrill Lynch, Deutsche Bank, Credit Suisse First Boston, Dow Jones, and Prudential. Some hires are for particular jobs, and some are into rotational training programs. In addition, a few MSIS major graduates go to work for state government or for smaller companies.

Starting salaries are sensitive to job market conditions. In surveying graduating seniors, we find that in the past few years the bulk of those willing to reveal their starting salaries are starting at between \$40,000 and \$60,000 per year.

Aren't all the IT jobs going overseas now?

There has been a trend toward "offshoring" some IT jobs, especially certain kinds of computer programming. But that doesn't mean the number of US IT jobs is shrinking. A recent study by the ACM (a leading computer industry group) concluded that the number of US computer jobs is still growing, just not as fast as it would have without offshoring. About 4% *more* US workers consider themselves "IT professionals" now than in 1999, at the height of the "dot com bubble". When that bubble burst, there was an employment contraction, but that is over now. However, all over the country, fear of offshoring has reduced student interest in IT degrees, raising the prospect of a US IT labor shortage in coming years. According to a September 2006 article in *CIO Magazine*, the IT labor shortage has already arrived, especially for positions that require a combination of technology and general business skills.

Information technology will be an integral part of virtually all new business developments in the 21st century – IT is not going to disappear or even leave the country. It is more closely involved in business innovation than ever. IT professionals are still in demand, especially if they have both technical skills and a general business background.

Required Courses for all MSIS Majors (in order of course number)

The courses 33:623:370, 33:623:385, and 33:623:386 appear as prerequisites for many courses. They are core courses required of all business majors (except that accounting majors do not take 33:623:370).

Business Applications Programming

33:623:388 Business Applications Programming. Business-oriented introduction to structured programming, data structures, and object-oriented computer programming.

Decision and Inventory Analysis

33:623:400 Decision and Inventory Analysis. Decision tree methods for decisions with uncertain information. Analyzing business inventory management. Forecasting product and service demands. Prerequisites 33:623:386 and 33:623:385.

Web and Data Management

33:623:470 Web and Data Management. Relational database design and the SQL data manipulation language. Creating dynamic websites by combining hypertext, graphic, database/SQL, and procedural programming elements. Prerequisite: 33:623:370.

Case Studies in Management Science and Information Systems

33:623:490 Case Studies in Management Science and Information Systems. This is a capstone case studies course. Students research and present case studies of applying information technology and quantitative analysis to business problems. Many of the cases involve corporate decision support systems. Prerequisites: 33:623:370, 33:623:400.

(ELECTIVE COURSES ON BACK PANEL)