INFORMATION SYSTEMS

Program Overview

Students with a major in information systems develop a solid understanding of the use, design, development, and management of information systems and information technology. Rider's information systems courses are designed to give students the opportunity to develop and manage a variety of projects that can be applied to real business settings immediately.

Increasingly, organizations that seek individuals with an information systems specialization expect excellent organizational, communication, interpersonal and analytical skills. All information systems students are encouraged to participate in a full semester co-op or summer internship experiences during their junior year.

Student Learning Outcomes

An Information Systems graduate will demonstrate the ability to:

- Design and develop user-friendly applications, employing best practices in programming, including effective syntax, logical structure, and adherence to industry standards.
- Utilize and administer computer networking and telecommunication technologies, demonstrating proficiency in configuring, managing, and troubleshooting network infrastructure.
- Employ relational databases to effectively organize, query, and manage business data, considering data integrity, normalization, and security requirements.
- Analyze and evaluate emerging trends and issues in Information Systems, assessing their impact on businesses and society, and identifying opportunities for innovation.
- Apply ethical reasoning and ethical frameworks to guide the design, implementation, and use of Information Systems, considering privacy, security, and social implications.

Curriculum Overview

The required freshman-level information systems core course trains students to apply practical knowledge in their use of computer-based productivity tools. Core courses also allow students to develop an understanding of enterprise integration applications such as SAP R/3. The courses also explain the value of electronically integrating the major functional areas of an organization in order to facilitate more effective management decision-making.

Students gain an understanding of the enabling information technologies (IT) that organizations use to develop and sustain a strategic and competitive position in the marketplace. Students also learn about the benefits and drawbacks of adopting and using these information technologies.

Students with a major or a minor in information systems will be able to demonstrate their understanding of information technology by applying their technical knowledge and skills to provide a practical solution to a business problem, business need or business opportunity.

Students who satisfactorily complete a minimum of three courses with at least one-third SAP hands-on content in each course have the opportunity to earn the **SAP Student Recognition Award Certificate**. Click here (http://catalog.rider.edu/undergraduate/colleges-schools/business-administration/majors-minors-certificates/sap-student-recognition-award-certificate/) to learn more about this certificate program.

Degree Offered

- B.S.B.A. in Information Systems

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Program Website: www.rider.edu/academics/colleges-schools/cba/undergraduate/information-syst… (http://www.rider.edu/academics/colleges-schools/cba/undergraduate/information-systems/)

Associated Department: Department of Information Systems, Analytics, and Supply Chain Management

Related Programs:

- Business Administration (http://catalog.rider.edu/undergraduate/colleges-schools/business-administration/majors-minors-certificates/business-administration/)
- Global Supply Chain Management (http://catalog.rider.edu/undergraduate/colleges-schools/business-administration/majors-minors-certificates/global-supply-chain-management/)
- Management and Leadership (http://catalog.rider.edu/undergraduate/colleges-schools/business-administration/majors-minors-certificates/management-leadership/)

Information Systems Major Requirements

(24 credits)

Code	Title	Credits
Required Courses:		
CIS 200	Application Development with JavaScript	3
CIS 240	Cloud Computing Infrastructure	3
CIS 325	User Experience Design	3
CIS 330	Database Systems	3
CIS 345	Enterprise Security	3
CIS 395	Ethical & Global Impacts of IT	3
Electives		**6**
Select two of the following:		
BDA 205	Introduction to Visual Data Analytics	
CIS 315	Integrated Business with SAP	
CIS 350	Practical Business Analytics with Excel and R	
CIS 360	Data Mining	
CIS 370	Systems Analysis and Design Project	
CIS 375	Business Process Design for a Global Economy	
CIS 377	Risk Management and Compliance for Information Security	
CIS 388	Design Thinking	
CIS 390	Project Management	
CIS 399	Information Systems Co-op Experience [1]	
CIS 401	Artificial Intelligence for Business	
CIS 410	Selected Topics in Information Systems	

CIS 430	Enterprise Integration	
CIS 491	Information Systems Internship	
Total Credits		**24**

[1] The total credits that count towards the major from the internship and co-op experience cannot exceed 3.

Note:

- For graduation, the student must achieve an overall GPA of 2.0 in the major, with no course grade less than "C-".

Information Systems Minor Requirements

(18 credit program is available to all Rider University students except for Information Systems majors)

Code	Title	Credits
Gateway Course		**3**
CIS 185	Information Systems Essentials	
Required Courses		**9**
Select three of the following six courses:		
CIS 200	Application Development with JavaScript	
CIS 240	Cloud Computing Infrastructure	
CIS 325	User Experience Design	
CIS 330	Database Systems	
CIS 345	Enterprise Security	
CIS 395	Ethical & Global Impacts of IT	
Electives		**6**
Select any two CIS courses from the list below or two additional courses from the list of IS minor required courses above to fulfill the remaining requirements:		
BDA 205	Introduction to Visual Data Analytics	
CIS 315	Integrated Business with SAP	
CIS 350	Practical Business Analytics with Excel and R	
CIS 360	Data Mining	
CIS 370	Systems Analysis and Design Project	
CIS 375	Business Process Design for a Global Economy	
CIS 377	Risk Management and Compliance for Information Security	
CIS 388	Design Thinking	
CIS 390	Project Management	
CIS 399	Information Systems Co-op Experience	
CIS 401	Artificial Intelligence for Business	
CIS 410	Selected Topics in Information Systems	
CIS 430	Enterprise Integration [1]	
CIS 491	Information Systems Internship	
Total Credits		**18**

[1] Permission of instructor required

Notes:

- The maximum number of credits students may use to count towards another minor (e.g., Business Analytics minor), is six (i.e., two courses including CIS 185).

4 Year Academic Plan of Study

The following educational plan is provided as a sample only. Rider students who do not declare a major during their freshman year; who are in a Continuing Education Program; who change their major; or who transfer to Rider may follow a different plan to ensure a timely graduation. Each student, with guidance from their academic advisor, will develop a personalized educational plan.

Course	Title	Credits
Year 1		
Fall Semester		
CBA 110	Business in Action [1]	3
CIS 185	Information Systems Essentials [1]	3
CMP 120	Seminar in Writing and Rhetoric	3
MSD 105	Quantitative Methods for Business [2]	3
Liberal Arts Elective 1 [3]		3
	Semester Credit Hours	**15**
Spring Semester		
CIS 200	Application Development with JavaScript	3
CMP 125	Seminar in Writing and Research	3
ECO 200	Principles of Macroeconomics	3
MKT 200	Marketing Principles	3
MSD 205	Business Statistics	3
	Semester Credit Hours	**15**
Year 2		
Fall Semester		
ACC 210	Introduction to Accounting	3
BDA 201	Introduction to Business Analytics	3
COM 290	Professional/Strategic Speech	3
ECO 201	Principles of Microeconomics	3
MGT 201	Fund Management & Org Behavior	3
	Semester Credit Hours	**15**
Spring Semester		
ACC 220	Managerial Uses of Accounting	3
CBA 212	Business Communications	3
CBA 236	Career Planning	3
CIS 240	Cloud Computing Infrastructure	3
FIN 220	Introduction to Finance	3
	Semester Credit Hours	**15**
Year 3		
Fall Semester		
BUS 300	The Legal and Ethical Environment of Business	3
CIS 325	User Experience Design	3
CIS 330	Database Systems	3
CIS 385 or GSC 385	Management Information Systems or Management Information Systems for Global Supply Chain Management	3

Leadership Elective		3
	Semester Credit Hours	**15**
Spring Semester		
MSD 301	Operations Management	3
CIS 345	Enterprise Security	3
CIS Major Elective		3
Free Elective (International Business) [4]		3
Liberal Arts Elective 2		3
	Semester Credit Hours	**15**
Year 4		
Fall Semester		
CIS Major Elective		3
Free Elective		3
Free Elective		3
Free Elective		3
Liberal Arts Elective 3		3
	Semester Credit Hours	**15**
Spring Semester		
BUS 400	Strategic Management and Policy	3
CIS 395	Ethical & Global Impacts of IT	3
Free Elective (International Business) [4]		3
Free Elective		3
Liberal Arts Elective 4 [3]		3
	Semester Credit Hours	**15**
	Total Credit Hours for Graduation	**120**

1. CIS 185 and CBA 110 can be taken in the Fall or Spring of year 1.
2. Students may be required to take MSD 104 Intro to Quantitative Methods based on placement. MSD 104 counts as a 3-credit Free Elective.
3. Students must take four liberal arts electives; 3 credits must be in Natural Science, 3 credits must be in Social Science, 3 credits must be in Humanities, and 3 credits can be any course offered by the College of Arts and Sciences.
4. Students are required to complete 6 credits of International Business Electives which can be fulfilled as major courses or as free electives.

3 Year Academic Plan of Study

The following educational plan is provided as a sample only. Rider students who do not declare a major during their freshman year; who are in a Continuing Education Program; who change their major; or who transfer to Rider may follow a different plan to ensure a timely graduation. Each student, with guidance from their academic advisor, will develop a personalized educational plan.

Course	Title	Credits
Year 1		
Fall Semester		
CBA 110	Business in Action	3
CIS 185	Information Systems Essentials	3
CMP 120	Seminar in Writing and Rhetoric	3
ECO 200	Principles of Macroeconomics	3
MSD 105	Quantitative Methods for Business	3
	Semester Credit Hours	**15**
JTerm		
MKT 200	Marketing Principles	3
	Semester Credit Hours	**3**
Spring Semester		
CIS 200	Application Development with JavaScript	3
CIS 240	Cloud Computing Infrastructure	3
CMP 125	Seminar in Writing and Research	3
ECO 201	Principles of Microeconomics	3
MSD 205	Business Statistics	3
	Semester Credit Hours	**15**
Summer Semester		
ACC 210	Introduction to Accounting	3
Liberal Arts Elective 1		3
	Semester Credit Hours	**6**
Year 2		
Fall Semester		
BDA 201	Introduction to Business Analytics	3
CIS 325	User Experience Design (CIS Major Elective)	3
CIS Major Elective		3
COM 290	Professional/Strategic Speech	3
FIN 220	Introduction to Finance	3
MGT 201	Fund Management & Org Behavior	3
	Semester Credit Hours	**18**
JTerm		
Free Elective		3
	Semester Credit Hours	**3**
Spring Semester		
ACC 220	Managerial Uses of Accounting	3
CBA 212	Business Communications	3
CBA 236	Career Planning	3
CIS 330	Database Systems	3
CIS 345	Enterprise Security	3
Leadership Elective		3
	Semester Credit Hours	**18**
Summer Semester		
MSD 301	Operations Management	3
Free Elective		3
	Semester Credit Hours	**6**
Year 3		
Fall Semester		
BUS 300	The Legal and Ethical Environment of Business	3
CIS 385 or GSC 385	Management Information Systems or Management Information Systems for Global Supply Chain Management	3
CIS Major Elective		3
Free Elective (International Business)		3
Free Elective		3
Liberal Arts Elective 2		3
	Semester Credit Hours	**18**

JTerm		
Liberal Arts Elective 3		3
	Semester Credit Hours	**3**
Spring Semester		
BUS 400	Strategic Management and Policy	3
CIS 395	Ethical & Global Impacts of IT	3
Free Elective (International business)		3
Free Elective		3
Liberal Arts Elective 4		3
	Semester Credit Hours	**15**
	Total Credit Hours for Graduation	**120**

Notes:

- The above plan assumes no AP or other credits were transferred into Rider University.
- Students are required to take 6 credits of International Business Electives which can be fulfilled as major courses or as free elective courses.
- Business Honors students will have a different sequence.
- Students may be required to take MSD 104 Intro to Quantitative Methods based on placement. MSD 104 counts as a 3-credit Free Elective.
- Students must take four liberal arts electives; 3 credits must be in Natural Science, 3 credits must be in Social Science, 3 credits must be in Humanities, and 3 credits can be any course offered by the College of Arts and Sciences.
- For the Leadership Elective, choose from CBA 320 Case Analysis & Presentation, LDP 398 Co-op Experience Seminar, LDP 200 Foundations of Leadership, LDP 220 Service Learning Through MOB, MGT 355 Team Management, or MGT 363 Management Skills.
- Students are strongly encouraged to complete a credit-bearing experiential course (e.g., internship, co-op, study tour, study abroad, ENT 448 Seminar in Small Business Consulting, ECO 450 Seminar in Economic Research).

Courses and Descriptions

CIS 185 Information Systems Essentials 3 Credits
This course provides students with a conceptual understanding and hands-on practice with spreadsheets. At the completion of this course students will be able to apply the appropriate information systems technology tools within spreadsheets to a variety of quantitative data-centric analytic activities. This course assumes you have a basic knowledge of Microsoft Windows, Word, Excel, and Web browsers.

CIS 200 Application Development with JavaScript 3 Credits
In the early 1990s, Tim Berners-Lee created a set of technologies to allow information sharing at the CERN particle accelerator in Europe. These technologies dramatically changed the face of computing and became what we know today as the Web. Understanding how to develop and manage applications for the Web is a requirement for the information system professional. Because of the ease of development, deployment, maintenance and general scalability of Web applications, this approach to building and managing applications has become the de facto standard for business application development. This class will examine Web application development in detail. Through a combination of lecture and labs, students will learn the architecture of Web applications, how to develop Web pages using HTML and CCS, how to control user interaction with those pages using the JavaScript programming language. The programming basics of variable declaration and usage, program flow of control, function declaration and calling, and object usage and declaration will also be shown. The use of the JQuery Javascript library to ease the development of Web pages will also be shown.

CIS 220 Application Development with JavaScript and Python 3 Credits
In the early 1990s, a set of network technologies was combined to create a platform for application development. These technologies are now referred to as the Web. Because of the ease of development, deployment, maintenance, and scalability of Web applications, this approach to building and managing applications has become the de facto standard for business application development. Understanding how to develop and manage applications for the Web is vital for information systems professionals. This class will examine Web application development in detail. Through a combination of lecture and labs, students will learn the architecture of Web applications, how to develop Web pages using the Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS), and managing user interaction in those pages using the JavaScript programming language. The process of creating dynamic web pages using the PHP programming language on the Web server will also be taught.
Prerequisite(s): CIS 200.

CIS 240 Cloud Computing Infrastructure 3 Credits
Cloud computing represents a form of utilizing hardware resources in a way which allows a business to be more responsive to a changing environment. Computer networks are a critical component of cloud computing. This class will cover the components of a computer network, the process of configuring networks, and the creation and provisioning a cloud computing environment. Students will also learn the process of computer operating system installation, configuration and maintenance. Virtualization, the process of creating multiple operating system environments on a single piece of hardware will also be covered using both the WIndows and Linux operating systems.
Prerequisite(s): CIS 185.

CIS 255 Intro to Game Design & Development 3 Credits
The basic concepts, logic, techniques, tools, and vocabulary associated with interactive, digital game and simulation development will be explored through a combination of lectures, discussions, and hands-on learning. Knowledge and skills derived can be applied to a wide variety of business and other organizational settings globally for interactive simulations, games, and education.

CIS 260 Business Graphics 3 Credits
Basic color theory, t ypography, and page/slide layout are presented. Students utilize presentation, word processing and photo editing applications to create and edit various documents through hands-on labs and projects.
Prerequisite(s): CIS 185 or permission of instructor.

CIS 270 Computer Networking 3 Credits
This course provides an introduction to business data communications and networking. The Internet and OSI models are discussed. Network technologies include local area networks, backbone, wide area networks, and the Internet. Introduction to network design, security, and network management are also provided.
Prerequisite(s): CIS 185.

CIS 300 Programming with Java 3 Credits
Students will learn the basic concepts of object-oriented programming as contrasted with traditionally structured programming and will develop applications using the Java programming language.
Prerequisite(s): CIS 200.

CIS 309 Data Structures & Cmptr Archit 3 Credits
An introduction to linked lists, stacks, queues, trees, pointers, and sorting and searching algorithms. Students will learn the technical details of data storage and manipulation along with the concepts of program execution, and will use tools such as hex-editors and debuggers.
Prerequisite(s): CIS 185 or permission of instructor.

CIS 315 Integrated Business with SAP 3 Credits
This course provides an introduction to enterprise resource planning (ERP) systems and addresses how integrated information systems improve business operations. Students will learn about functional business areas and business processes, and understand the problems inherent in un-integrated enterprise information systems. Using SAP software and case studies, students will learn how ERP systems are being used to facilitate integrated, real-time management decision making.
Prerequisite(s): CIS 185 and ACC 210.

CIS 319 Computer Forensics 3 Credits
Students will use computers to obtain and analyze evidence found on storage devices such as those confiscated under warrant, and learn how to trace digital activities. Criminal and investigative procedures will be explored in depth.
Prerequisite(s): CIS 185.

CIS 320 Cloud Computing Administration 3 Credits
Students will learn the process of creating or provisioning a cloud computing environment. Content will include the provisioning of operating system resources in a cloud environment, operating system installation, configuration and maintenance. Virtualization, the process of creating multiple operating system environments on a single piece of hardware will be covered in some detail. Troubleshooting problems in the virtualization environment and in the operating system environment will also be covered. Hands-on labs will be used throughout. Both Windows and Linux operating systems will be used.
Prerequisites: CIS 185.

CIS 325 User Experience Design 3 Credits
This course focuses on the critical role user experience plays in today's technology-driven business world. While technology advances make the design of functionality more readily in interactive products, usability plays a critical role in determining their success in the real world. Increasingly, business leaders realize the need to consider the emotional and social experiences as well as functional requirements and the steps users take to complete a task. This course explores User Experience Design (UXD), and its strategic importance in creating competitive advantage. Students will be able to discover, define, develop, and deliver a complete user experience. They will understand the role of usability and design principles, build innovative and pleasurable user experience prototypes, and validate them to achieve human, social, and business goals.

CIS 330 Database Systems 3 Credits
This course involves the study of computer databases. Major topics include relational databases, use of the structured query language (SQL) to query relational databases, and design and maintenance of relational databases.
Prerequisite(s): CIS 185.

CIS 340 Electronic Commerce 3 Credits
Students will learn about the most current e-commerce technologies and business models through readings, case studies, and hands-on projects. Students will gain experience using business data analytics tools to understand and evaluate the value of data that is generated and collected from various e-commerce platforms on the Internet.

CIS 345 Enterprise Security 3 Credits
This course introduces students to cybersecurity, the process of securing computers and the information they store. Coverage includes security attacks and attack prevention and mediation, security firewalls, PC and server security, authentication methods and procedures, and network security. Through lecture and hands-on labs students will learn how computer systems can be attacked and how computer professionals can manage the risks and potential damage from these attacks.

CIS 350 Practical Business Analytics with Excel and R 3 Credits
This is a required course for the Business Analytics major/minor. This course will provide the student with an opportunity to gain proficiency in analyzing and visualizing data using both Excel and R. The learning experience includes not only classic data tools, such as PivotTables, VLOOKUP, and data visualization, but also more advanced data tools such as descriptive statistics, inferential statistics, predictive analytics using R, and optimization using Excel Solver.
Prerequisite(s): BDA 201.

CIS 360 Data Mining 3 Credits
This course deals with modern technologies for data analysis. Hands-on exercises for data retrieval, data visualization and predictive analytics will be carried out using up-to-date methodologies and software tools. The full data mining life cycle will be covered from recognizing business problems and opportunities amenable to data mining analysis through deploying and monitoring solutions.
Prerequisite(s): CIS 185 with a minimum grade of D .

CIS 370 Systems Analysis and Design Project 3 Credits
Topics include modeling techniques and methodologies to address the planning, analysis, design, and implementation of high quality systems, delivered on time and within budget. Using rapid application development tools, students will also construct an operational system within the span of a single semester. Issues and tools related to the management of project teams are also discussed.
Prerequisite(s): CIS 330.

CIS 375 Business Process Design for a Global Economy 3 Credits
The course is aimed at generating a comprehensive understanding of the emergent domain of global business process outsourcing. Variously referred to as knowledge process outsourcing, IT-enabled services outsourcing, and business services outsourcing, the industry has seen enormous growth over the last decade and continues to grow. India commands the single largest share of this market but South Africa, Eastern Europe, Philippines, Morocco and Egypt have all emerged as other contenders in this global sector. The course is divided into four modules: the political economy of global outsourcing, process modeling, outsourcing management, and industry analysis. Please note: Students will not receive credit for both CIS 375 and GSC 375.
Prerequisite(s): junior standing.

CIS 377 Risk Management and Compliance for Information Security 3 Credits
This course will use a holistic approach to examine the management of information security risk in relation to the strategic goals of the business organization. Students taking this course will learn to identify threats, threat agents, potential exploits and the information assets which will be impacted by those exploits. The risk management process will specifically examine threat agents, and the amplifiers, catalysts, and inhibitors to those threats. Using a process which assigns a weight to various threats, and a comprehensive risk analysis model will be developed.

CIS 385 Management Information Systems 3 Credits
This course will enhance students' digital dexterity and familiarity with existing and emerging information technologies, emphasizing skills of abstraction in relation to digital strategy and organizational change, innovation, analytics, and ethics. This course will also provide hands-on experience with at least one essential business technology. At the completion of the course, students will have an understanding of the business-related, policy, societal, and ethical implications associated with modern information systems.
Prerequisite(s): CIS 185 and junior or senior standing.

CIS 388 Design Thinking 3 Credits
This undergraduate course on Design Thinking provides students with a framework for dealing with unstructured problems to create innovative business solutions. Students in this course will learn about the complex and iterative process of design thinking and its several phases, including problem finding, observation, visualization and sense making, ideation, prototyping and testing, and explore the value of design thinking for creating business solutions with lasting impact. Students who have earned credits for CIS 388 or equivalent cannot take PMBA 8352 for credit.
Prerequisite(s): JR/SR, 54+ credits, or POI.

CIS 390 Project Management 3 Credits
This course introduces students to general project management, the process of organizing resources to achieve business goals. Topics include the identification, approval, analysis, and general management of complex business projects. Project management tools, reports, techniques, and approaches will be covered.
Prerequisite(s): CIS 185.

CIS 395 Ethical & Global Impacts of IT 3 Credits
This course aims to help students realize the implications stemming from their use of technology as consumers, private citizens, and future employees, as well as those arising from the increasing use of data collection, automation, and artificial intelligence technologies by for-profit and governmental entities. Ethical, economic, social, political, and ecological impacts of technology are discussed.
Prerequisite(s): Junior or Senior standing.

CIS 399 Information Systems Co-op Experience 6 Credits
The co-op program provides students with an opportunity to work full-time in a company and apply what they have learned in their information systems and other business classes. It also enhances students' employment opportunities since many employers use a co-op program as a first step before they hire full-time employees. Eligible students include junior computer information systems majors with a minimum overall GPA of 3.0. Three of the co-op credits can be applied toward the information systems major, and three credits can be applied toward business or free elective requirements.
Prerequisite(s): 60 credits; three of the following (CIS 200 or CIS 240 or CIS 325 or CIS 330 or CIS 345 or CIS 395), with a minimum GPA of 3.0.

CIS 401 Artificial Intelligence for Business 3 Credits
Artificial Intelligence (AI) is the broadest term used to classify machines that mimic human intelligence. It is used to predict, automate, and optimize tasks that humans have historically done, such as speech and facial recognition, decision-making, and translation (IBM.com). Undoubtedly, AI is one of the most transformative and disruptive technologies of our age, which has already had a direct impact on the value chain. Private investment in AI has significantly increased in recent years, more than doubling from $42.2 billion in 2020 to $93.5 billion in 2021 (AI Index report, 2022). A recent MIT paper predicts AI will cause significant innovations in the next ten years, creating many new jobs. However, there is currently a significant AI talent shortage in the U.S. and worldwide, and the AI skills gap is expected to widen in the future. Therefore, pursuing an AI/machine learning job is a solid choice specifically for recent university graduates to secure a high-paying position that will be in demand for decades. This course was designed for students within various disciplines, such as Information Systems, Business Analytics, Marketing, Finance, and Accounting, to learn the basics of Artificial Intelligence (AI) and how AI is applied to business. In addition, students learn how to work with SAS Viya, the SAS platform for AI and Machine Learning. This course could be the students' first yet most important step in preparing for the AI job market.

CIS 410 Selected Topics in Information Systems 3 Credits
Information and communication technologies are evolving rapidly and continually. The Special Topics course facilitates the exploration of a selected topic (or combination of topics) that represents a recent technological advance with important and direct implications in the field of computer information systems. Current research, readings, lectures, discussions and/or hands-on computer experience or other appropriate measures will be employed to stimulate student learning.
Prerequisite(s): to be determined by instructor.

CIS 430 Enterprise Integration 3 Credits
The major focus of this course includes the forces driving enterprise integration as well as the management decisions associated with the design and implementation of enterprise systems. Students will use SAP ERP extensively to configure, build, test, and implement an enterprise system for a real business environment from the ground up.
Prerequisite(s): CIS 315.

CIS 490 Independent Study: Research and Creative Expression 1-4 Credits
Topic to be approved by professor and chairperson. Available for juniors and seniors. No more than 12 credits allowed toward graduation.
Prerequisite(s): permission of instructor.

CIS 491 Information Systems Internship 3 Credits
This course provides the student with approximately two months of supervised employment with participating companies. Students are given a variety of information technology experiences. They are required to complete a term paper and/or make an oral presentation to the faculty.
Prerequisite(s): Permission of Instructor.

MSD 104 Intro to Quantitative Methods 3 Credits
The aim of this course is to give students the preparation in algebra needed for successful completion of other required courses in management sciences and the functional areas of business administration. Topics covered include linear and quadratic equations and functions, systems of linear equations, exponential functions, logarithms, linear inequalities, radicals, percent change, scientific notation and scientific digits.

MSD 105 Quantitative Methods for Business 3 Credits
The aim of this introductory course is to acquaint students with a number of basic mathematical techniques that will enhance their ability to become effective decision-makers in a realistic business environment. Topics covered include linear equations and inequalities, linear programming, summation notation, geometric series, counting techniques, event probability and discrete random variables. Where appropriate, these tools will be illustrated with examples chosen from business settings.
Prerequisite(s): MSD 104 or a passing grade on the Math Placement Exam.

MSD 106 Quantative Methods for Business II 3 Credits
An introduction to calculus. The limit, derivative, optima and integral of a function of one variable, as well as optimization of a function of two variables, are covered. Applications to problems in business and economics are discussed.
Prerequisite: MSD 105 or equivalent.

MSD 110 Math for Actuarial Science I 3 Credits
The first of two courses designed to give the actuarial science student the necessary background in calculus. Topics include a brief review of a function, and introduces limits and continuity, the derivative and its applications, implicit differentiation, differentiating an inverse function, differentials, related rates, curve sketching, optimization problems, L'Hopital's rule, and an introduction to the indefinite integral. Fall.

MSD 111 Math for Actuarial Science II 3 Credits
A continuation of MSD 110. Topics include the definite integral and the fundamental theorem of calculus, change-of-variable theorems, the area between two graphs, integration by parts, improper integrals, infinite series, partial differentiation of a function of two variables and its optimization applications, and the double integral of a function of two variables.

MSD 205 Business Statistics 3 Credits
This course is designed to provide students with fundamental concepts, knowledge and tools from statistics that may be useful in one's attempt to reach intelligent conclusions in real-world settings, particularly in business applications. The focus is on the normal random variable, sampling distributions, framework of estimation and hypothesis testing, as well as the one-way ANOVA and simple regression model.
Prerequisite(s): MSD 105.

MSD 260 Principles of Risk Management 3 Credits
The objective of this course is to provide students with a broad framework for evaluating all types of risk, along with conceptual tools for making risk management decisions rationally. The course focuses on studying the risk assessment and management techniques, methods, and predictive models used in industry to minimize, control, and communicate risks, including conducting various risk management protocols. This course covers the fundamental knowledge for the Associate in Risk Management (ARM) Designation of Institutes.
Prerequisite(s): CIS 185.

MSD 301 Operations Management 3 Credits
This course introduces students to the concepts and techniques necessary to manage firm operations. The course emphasizes enhancing students' ability in problem-solving and decision-making by (1) identifying operations problems, (2) structuring decision-making process, (3) evaluating options that provide resolution of the problems using appropriate and proven techniques. It is well recognized that today's global business competition is among supply chains. Operations management concentrates on the supply side of the corporate strategy of a supply chain, where the bulk of the organization resources are committed. Good management of operations, which may also be called management of supply chain operations, is crucial in achieving an effective supply chain. The emphasis on systematic thinking and analytic decision model discussed the course will also provide students with necessary skills and useful tools in the emerging field of Business Analytics.
Prerequisite(s): MSD 200 or MSD 205 or MTH 341.

MSD 320 Statistics for Risk Modeling I 3 Credits
This is the first course in a two course sequence to prepare actuarial science students for the Society of Actuaries' (SOA) new exam "Statistics for Risk Modeling." This course (SRM I), together with the second course of the sequence SRM II, cover all the topics in the SOA's proposed syllabus for the exam. The course covers two major topics: (i) Generalized Linear Models, and (ii) Regression-based time series models and forecasting.
Prerequisite(s): MSD 205 or MTH 341.

MSD 325 Statistics for Risk Modeling II 3 Credits
This is the second course in the two course sequence to prepare actuarial science students for the Society of Actuaries (SOA) new exam "Statistics for Risk Modeling." This course, together with MSD 320, will cover all the topics in the SOA's proposed syllabus for the exam. This course examines the use of statistical learning methods to adequately model and understand complex datasets in business and economics. The use of the statistics software R to analyze realistic data sets is an important component of the course. Topics include: (i) Basics of Statistical Learning; (ii) Principal Components Analysis; (iii) Decision Trees; and (iv) Cluster Analysis.
Prerequisite(s): MSD 205 or MTH 341 or equivalent course.

MSD 330 Predictive Modeling and Applications 3 Credits
This course covers a broad range of predictive models in the areas of parametric and non-parametric statistical methods. Examples include time series models and data mining. It focuses on building theoretical foundations underlying these methods and their applications to empirical data such as forecasting time series and classifications. Students are expected to acquire advanced predictive modeling skills and be comfortable with using statistics software R after taking this course. This is a required course for Actuarial Science students in preparation for the Society of Actuaries' "Statistics for Risk Modeling" exam, and an elective course for Business Data Analytics major and minor students who are interested in deepening their skills in predictive analytics.
Prerequisite(s): MSD 205 or MTH 341.

MSD 350 Financial Mathematics 3 Credits
A thorough treatment of the theory and applications of compound interest. Topics include the measurement of interest, elementary and general annuities, amortization schedules and sinking funds, and bonds and other securities.
Prerequisite(s): MSD 205 or equivalent. Fall.

MSD 361 Risk Assessment and Analysis 3 Credits
This course teaches students how to evaluate, and successfully treat risk in different organizations with advanced techniques. Students will learn about risk assessment methodologies, and different tools for risk analysis to avoid, retain, transfer, and benefit from risk. By the end of the course, students will have the skills needed to apply risk assessment and analysis methods in real-world situations. This course provides additional knowledge and hands-on experience for the Associate in Risk Management (ARM) Designation of Institutes.
Prerequisite(s): MSD 260.

MSD 490 Independent Research and Study 3 Credits
Topic to be approved by professor and chairperson. Available for juniors and seniors. No more than 12 credits allowed toward graduation.

MSD 491 Management Sciences Internship 3 Credits
This Internship course will provide students with supervised employment (approximately two months) with participating companies. Students are given a variety of work experiences. They are required to complete a term paper for the faculty and receive feedback from the supervised employment.
Prerequisite(s): Permission of instructor.