

# INFORMATION SYSTEMS, BACHELOR OF SCIENCE (B.S.)

The mission of the Bachelor of Science in Information Systems is to prepare students for successful careers as information systems professionals through a curriculum that combines technical computing knowledge, skills and techniques with relevant business knowledge.

INFO 202 and MATH 211 are prerequisites for many upper-level information systems courses. Students may wish to choose their upper-level information systems electives to gain enhanced proficiency in the following areas:

Course	Title	Hours
<b>Application development</b>		
INFO 450	Advanced Programming	3
INFO 451	Advanced Technology for E-business	3
<b>Business analysis</b>		
INFO 463	Business Process Engineering	3
INFO 468	Information Engineering	3
<b>Information and communications technology</b>		
INFO 472	Infrastructure Services	3
INFO 474	Advanced Networking and Security	3

## Learning goals

The major in information systems provides a curriculum in which:

- Graduates will have the ability to apply the most current technologies to support the secure delivery and management of information systems.
- Graduates will have the academic foundation that enables them to advance their careers through continuing education and professional development.
- Graduates will have the knowledge and ability to work effectively to support the information systems needs of the business community.

## Student learning outcomes

Upon completing this program, students will have an ability to:

- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions
- Design, implement and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline
- Communicate effectively in a variety of professional contexts
- Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles
- Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline
- Support the delivery, use and management of information systems within an information systems environment

## Special requirements

The admission requirements for the School of Business (<http://bulletin.vcu.edu/undergraduate/business/undergraduate-information/academic-policies/>) detail the deadlines and other requirements

for students to be admitted to one of these major programs of study. The following courses must be completed before the student may declare a specific business major: ACCT 203, ACCT 204, BUSN 201, or BUSN 205, BUSN 212 or MATH 200, BUSN 225, ECON 210, ECON 211, UNIV 111, UNIV

The School of Business has special academic policies (<http://bulletin.vcu.edu/undergraduate/business/undergraduate-information/academic-policies/>), including policies on transfer credits, that apply to all undergraduate degrees.

All baccalaureate degree programs in the School of Business require successful completion of the business knowledge exam as administered in BUSN 499.

Students may need to take additional mathematics courses as prerequisites to BUSN 212 or MATH 200. These credits will count as open electives in the degree program.

A maximum of six credits in INFO 491 may be applied to the degree.

No more than six credits from the INFO 16X Digital Literacy courses may be applied to the degree.

No more than four credits in physical education courses may be applied to the degree.

No more than four credits in physical education courses may be applied to the degree.

INTL 493 may not be counted toward a business degree.

Credit for SPCH 121 or SPCH 321 will substitute for BUSN 225, and no more than three credits of these courses may be applied toward a business degree. Students who earned a minimum grade of B in either ECON 203 or ECON 205 at VCU may substitute that credit for ECON 210.

The pass/fail grading policy may not be used for many course requirements. Students should check with their academic adviser before taking the pass/fail grading option.

## Degree requirements for Information Systems, Bachelor of Science (B.S.)

Course	Title	Hours
General education ( <a href="http://bulletin.vcu.edu/undergraduate/undergraduate-study/general-education-curriculum/">http://bulletin.vcu.edu/undergraduate/undergraduate-study/general-education-curriculum/</a> )		
Select 12-13 credits from general education foundations and 17-18 credits from areas of inquiry.		30
<b>Major requirements</b>		
• Major core requirements		
INFO 300	Information Technology Infrastructure	3
INFO 320	Business Intelligence and Data Mining	3
INFO 350	Programming	3
INFO 361	Systems Analysis and Design	3
INFO 364	Database Systems	3
INFO 370	Fundamentals of Data Communications	3
INFO 461	Information Systems Planning and Project Management	3
INFO 465	Projects in Information Systems	3

• Major electives

Select courses from the list below.	6
<b>Ancillary requirements</b>	
• Ancillary core requirements	
ACCT 203 & ACCT 204	Introduction to Accounting I and Introduction to Accounting II 6
BUSN 225	Winning Presentations 3
BUSN 301	Career and Professional Development 1
BUSN 499	Business Knowledge Exam 0
ECON 210	Principles of Microeconomics (satisfies general education BOK for social/behavioral sciences and/or AOI for global perspectives) 3
ECON 211	Principles of Macroeconomics 3
FIRE 311	Financial Management 3
INFO 202	Introduction to E-business Technologies 3
INFO 360	Business Information Systems 3
MATH 211	Mathematical Structures 3
MKTG 301	Marketing Principles 3
MGMT 303	Creativity and Ideation 3
MGMT 310	Managing People in Organizations 3
MGMT 434	Strategic Management 3
SCMA 301	Business Statistics I 3
SCMA 320	Production/Operations Management 3
• Additional ancillary requirements	
BUSN 201 or BUSN 205	Foundations of Business <sup>1</sup> Introduction to the World of Business 3
BUSN 212	Differential Calculus and Optimization for Business (either satisfies general education quantitative foundations) 3-4
or MATH 200	Calculus with Analytic Geometry I
BUSN 323 or FIRE 325 or FIRE 459	Legal Environment of Business Real Estate Law Insurance Law 3
<b>Open electives</b>	
Select any course. <sup>2</sup>	11
Total Hours	120

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BUSN 205 satisfies general education AOI for global perspectives.

2

Students may choose electives to reach the minimum total of 120 credits.

The minimum number of credit hours required for this degree is 120.

**Major electives**

Course	Title	Hours
BUSN 400 & BUSN 401	Principles of Consulting and International Consulting Practicum (if this option is chosen, both must be taken)	6
INFO 450	Advanced Programming	3
INFO 451	Advanced Technology for E-business	3

INFO 463	Business Process Engineering	3
INFO 468	Information Engineering	3
INFO 472	Infrastructure Services	3
INFO 474	Advanced Networking and Security	3
INFO 481	Information Technology Auditing	3
INFO 482	Introduction to Enterprise Resource Planning Systems	3
INFO 491	Topics in Information Systems	1-3
INFO 492	Independent Study in Information Systems (requires departmental approval)	1-3
INFO 493	Internship in Information Systems (requires departmental approval)	3
SCMA 430	Data Management and Visualization	3
SCMA 440	Data Mining and Forecasting	3

What follows is a sample plan that meets the prescribed requirements within a four-year course of study at VCU. Please contact your adviser before beginning course work toward a degree.

**Freshman year**

Fall semester		Hours
BUSN 171	Mathematical Applications for Business (prerequisite for BUSN 212; counts as open elective)	3
UNIV 111	Focused Inquiry I (satisfies general education UNIV foundations)	3
Play course video for Focused Inquiry I		
General education course		3
General education course		3
General education course		3
Term Hours:		15

**Spring semester**

BUSN 212	Differential Calculus and Optimization for Business (satisfies general education quantitative foundations)	3
BUSN 225	Winning Presentations	3
UNIV 112	Focused Inquiry II (satisfies general education UNIV foundations)	3
Play course video for Focused Inquiry II		
General education course		3
Open elective		3
Term Hours:		15

**Sophomore year**

Fall semester		Hours
ACCT 203	Introduction to Accounting I	3
BUSN 201 or BUSN 205	Foundations of Business or Introduction to the World of Business	3
ECON 210	Principles of Microeconomics (satisfies general education BOK for social/behavioral sciences and/or AOI for global perspectives)	3

UNIV 200	Inquiry and the Craft of Argument (satisfies general education UNIV foundations)	3
General education course		3
Term Hours:		15
<b>Spring semester</b>		
ACCT 204	Introduction to Accounting II	3
BUSN 301	Career and Professional Development	1
ECON 211	Principles of Macroeconomics	3
INFO 202	Introduction to E-business Technologies	3
MATH 211	Mathematical Structures	3
MKTG 301	Marketing Principles	3
Term Hours:		16
<b>Junior year</b>		
<b>Fall semester</b>		
INFO 300	Information Technology Infrastructure	3
INFO 360	Business Information Systems	3
INFO 361	Systems Analysis and Design	3
MGMT 310	Managing People in Organizations	3
SCMA 301	Business Statistics I	3
Term Hours:		15
<b>Spring semester</b>		
INFO 350	Programming	3
INFO 364	Database Systems	3
INFO 370	Fundamentals of Data Communications	3
INFO 461	Information Systems Planning and Project Management	3
SCMA 320	Production/Operations Management	3
Term Hours:		15
<b>Senior year</b>		
<b>Fall semester</b>		
BUSN 323 or FIRE 325 or FIRE 459	Legal Environment of Business or Real Estate Law or Insurance Law	3
FIRE 311	Financial Management	3
INFO 320	Business Intelligence and Data Mining	3
MGMT 303	Creativity and Ideation	3
Open elective		3
Term Hours:		15
<b>Spring semester</b>		
BUSN 499	Business Knowledge Exam	0
INFO 465	Projects in Information Systems	3
MGMT 434	Strategic Management	3
Major electives		6
Open elective		2
Term Hours:		14
Total Hours:		120

The minimum number of credit hours required for this degree is 120.

## Accelerated B.S. and M.S.

The accelerated B.S. and M.S. program allows qualified students to earn both the B.S. and M.S. in Information Systems in a minimum of five years

by completing approved graduate courses during the senior year of their undergraduate program. Students in the program may count up to 12 credit hours of graduate courses toward both the B.S. and M.S. degrees. Thus, the two degrees may be earned with a minimum of 139 credits rather than the 151 credits necessary if the two degrees are pursued separately.

Students holding these degrees are prepared for management-level positions in information systems and information technology. Students will focus on practical application of the knowledge gained in the classroom with an emphasis on creativity, innovation and leadership skills.

## Admission to the program

Minimum qualifications for admittance to the program include completion of 85 undergraduate credit hours including INFO 300, INFO 361 and INFO 364; an overall GPA of 3.25; and a GPA of 3.25 in information systems course work. Successful applicants would enter the program in the fall semester of their senior year (or equivalent). Students who do not meet the minimum GPA requirements may submit GRE scores to receive further consideration.

Undergraduate students must have departmental approval to participate in an accelerated program. Students may be admitted after completing all courses listed as recommended for the junior year in the course sequence below; applications must be received no later than Nov. 1 for spring semester admission and no later than July 1 for fall semester admission.

Three reference letters (at least one from an information systems faculty member) must accompany the application. Students who are interested in the accelerated program should consult with the faculty adviser to the master's program before they have completed 85 credits.

Once admitted into the accelerated program, students must meet the standards of performance applicable to graduate students as described in the "Satisfactory academic progress" section of the Graduate Bulletin, including maintaining a 3.0 GPA. Guidance to students admitted to the accelerated program is provided by both the undergraduate information systems adviser and the faculty adviser to the graduate program.

## Degree requirements

The Bachelor of Science in Information Systems degree will be awarded upon completion of a minimum of 121 credits and the satisfactory completion of all undergraduate degree requirements as stated in the Undergraduate Bulletin. This is one additional credit hour than required for the standalone Bachelor of Science in Information Systems due to the inclusion of INFO 493 which is required for accelerated B.S. to M.S. students.

A maximum of 12 graduate credits may be taken prior to completion of the baccalaureate degree. These graduate credits substitute for required major elective courses or open elective credits for the undergraduate degree. These courses are shared credits with the graduate program, meaning that they will be applied to both undergraduate and graduate degree requirements.

The graduate information systems courses that may be taken as an undergraduate, once a student is admitted to the program, are:

Course	Title	Hours
INFO 610	Analysis and Design of Database Systems	3
INFO 620	Data Communications	3
INFO 630	Systems Development	3
Graduate program elective		3

## Recommended course sequence/plan of study

What follows is the recommended plan of study for students interested in the accelerated program beginning in the fall of the junior year prior to admission to the accelerated program in the senior year.

Course	Title	Hours
<b>Junior year</b>		
Fall semester		
INFO 300	Information Technology Infrastructure	3
INFO 361	Systems Analysis and Design	3
MGMT 310	Managing People in Organizations	3
SCMA 301	Business Statistics I	3
SCMA 320	Production/Operations Management	3
Term Hours:		15
Spring semester		
FIRE 311	Financial Management	3
INFO 350	Programming	3
INFO 364	Database Systems	3
INFO 370	Fundamentals of Data Communications	3
INFO 461	Information Systems Planning and Project Management	3
Term Hours:		15
<b>Senior year</b>		
Fall semester		
BUSN 323	Legal Environment of Business	3
or FIRE 325	Real Estate Law	
or FIRE 429	Property and Liability Insurance	
INFO 320	Business Intelligence and Data Mining	3
INFO 610	Analysis and Design of Database Systems	3
INFO 620	Data Communications	3
MGMT 303	Creativity and Ideation	3
Term Hours:		15
Spring semester		
BUSN 499	Business Knowledge Exam	0
INFO 465	Projects in Information Systems	3
INFO 493	Internship in Information Systems <sup>1</sup>	3
INFO 630	Systems Development	3
Graduate program elective		3
Term Hours:		15
<b>Fifth year</b>		
Fall semester		
INFO 640	Information Systems Management	3
INFO 644	Principles of Computer and Information Systems Security	3
Graduate program elective		3
Term Hours:		9

Spring semester

Graduate program electives	9
Term Hours:	9

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INFO 493 is required for accelerated program students. Students will take this in the open elective slot (typically two credits) in the senior year of study. Because INFO 493 is a three-credit course, a student in the accelerated program will take one additional credit hour than is required for the standalone baccalaureate program.

### INFO 160. Digital Literacy: Computer Concepts, Internet, Digital Devices. 1 Hour.

Semester course; 1 lecture hour (offered online). 1 credit. Overview of basic computer concepts, the Internet, new technologies and digital security. Topics include but are not limited to computing devices -- hardware and software -- skills for using and evaluating Internet content and security with digital devices. This course provides the foundation in digital technologies to prepare students for other business courses and application software courses in the INFO16X series. Administered as a self-paced course with all online content. Graded as pass/fail at 80 percent pass level. Purchase of online training/assessment package required.

### INFO 161. Digital Literacy: Word Processing Skills. 1 Hour.

Semester course; 1 lecture hour (offered online). 1 credit. Presents academic- and professional-level word processing skills. Topics include but are not limited to document preparation and modification, tables and graphic enhancements, collaboration, formatting for research papers, newsletters, forms, and linking to other applications. The course will help students prepare documents to support professional tasks and other VCU course work. Administered as a self-paced course. Graded as pass/fail at 80 percent pass level. Purchase of online training/assessment package required.

### INFO 162. Digital Literacy: Spreadsheets Skills I. 1 Hour.

Semester course; 1 lecture hour. 1 credit. Introduces students to academic and professional spreadsheet skills. Topics include but are not limited to the entering of text, numbers and formulas; formatting; moving; copying; recalculation; retrieving; charting; saving; and printing with introductory coverage of data manipulation. The course will help students prepare analyses, tables and charts to assist with professional tasks and other VCU course work. Administered as a self-paced course. Graded as pass/fail at 80 percent pass level. Purchase of online training/assessment package required.

### INFO 163. Introduction to Web Page Design and Application Software. 1 Hour.

Semester course; 1 credit. Introduces students to Web page design and construction using application software. Topics include Web page creation and modification, hypertext links, tables, graphics, and website organization. Graded as pass/fail. Administered as a self-paced, computer-aided instructional course.

### INFO 165. Digital Literacy: Spreadsheet Skills II. 1 Hour.

Semester course; 1 lecture hour (offered online). 1 credit. Presents intermediate-level academic and professional spreadsheet skills. Topics include but are not limited to advanced formulas, statistical and financial functions, multiple worksheet/workbook management, macros and pivot tables. This course is designed for students wanting to advance their previous spreadsheet skills. Administered as a self-paced course with all online content. Graded as pass/fail at 80 percent pass level. Purchase of online training/assessment package required.

**INFO 166. Digital Literacy: Database Skills. 1 Hour.**

Semester course; 1 lecture hour (offered online). 1 credit. Introduces students to academic and professional database skills. Topics include but are not limited to creating and editing tables and forms, sorting and filtering data, and generating reports. Administered as a self-paced, online course. Graded as pass/fail at 80 percent pass level. Purchase of online training/assessment package required.

**INFO 167. Introduction to Internet Researching. 1 Hour.**

Semester course; 1 lecture hour. 1 credit. Course emphasizes Internet search tools and research skills development while expanding students understanding of the World Wide Web and its resources. Students will learn to explore and evaluate the various types of search sites, including the VCU Library Internet resources and learn skills for developing researching strategies. Using a microcomputer-based Web browser such as Internet Explorer or Netscape, students will learn about advanced browser features that will aid them in their search efforts. This course provides the necessary foundation to help students better find and use Web resources for documents and papers that other VCU course work may require.

**INFO 168. Digital Literacy: Presentation Skills. 1 Hour.**

Semester course; 1 lecture hour (offered online). 1 credit. Introduces students to academic and professional presentation skills. Topics include but are not limited to creating and editing presentations, creating and modifying images/graphics, and use of video/audio media tools. The course will help students prepare presentations for professional tasks and other VCU course work. Administered as a self-paced course. Graded as pass/fail at 80 percent pass level. Purchase of online training/assessment package required.

**INFO 169. Multimedia Presentations. 1 Hour.**

Short course; 1 lecture hour. 5 weeks. 1 credit. Familiarizes students with the fundamental use of multimedia to enhance presentations. Topics include adding animation, creating templates, linking to other resources as well as audio and video. The course will help students to prepare more effective and professional presentations.

**INFO 202. Introduction to E-business Technologies. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Introduces students to the technologies used in e-business. Students will be introduced to current or emerging Web languages, e-business software development environments, Web application servers and other packages used in creating and running Web applications.

**INFO 250. Introduction to Programming. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: BUSN 171\*. Introduces students to writing, testing and debugging Java programs using simple logic and algorithms. Basic Java applets and the graphic user interface are covered. Cannot be used as an elective in the information systems major. \*Formerly MGMT 171, SCMA 171.

**INFO 291. Topics in Information Systems. 1-3 Hours.**

Variable hours. Variable credit. Maximum of 3 credits per topic. Prerequisite: permission of instructor. An in-depth study of selected business topics. Graded as pass/fail at the option of the department.

**INFO 300. Information Technology Infrastructure. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Pre- or co-requisite: INFO 202, CMSC 245 or CMSC 255. Principles of computer hardware and software architecture, network communications technologies and security. Introduction to data structures.

**INFO 320. Business Intelligence and Data Mining. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: SCMA 301\*, STAT 210 or STAT 212. Enrollment is restricted to students who have completed at least 54 credit hours (junior standing). Modeling business-related problems using information systems tools and quantitative techniques. Focus is on extraction, translation and loading of relevant business and external data, quantitative analysis and presentation of findings. Typical problem situations involve suggested productivity improvements, revenue enhancement opportunities and marketing. \*Formerly MGMT 301.

**INFO 350. Programming. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisites: INFO 202, INFO 250, CMSC 245 or CMSC 255; and MATH 211, both with a minimum grade of C. Object-oriented programming and algorithmic design are introduced using C# and the .NET Framework. Emphasizes building business applications using the .NET Framework Class Library and the components, events and message handling therein. Intermediate Web application development is also covered. Students cannot receive credit for both CMSC 256 and INFO 350.

**INFO 360. Business Information Systems. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Enrollment is restricted to students who have completed at least 54 credit hours (junior standing). Provides an understanding of the importance of computer-based information in the success of the firm. Emphasis is on the role of information systems within each of the functional areas of business. Major concepts include data management, decision support and management information systems.

**INFO 361. Systems Analysis and Design. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. This course is restricted to students who have completed at least 54 credit hours (junior standing). Examines the concepts, tools and techniques used to develop and support computer-based information systems. Systems planning, analysis, design and implementation are covered. Behavioral and model building aspects of systems development are emphasized throughout.

**INFO 364. Database Systems. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisites: INFO 202, INFO 250, CMSC 245 or CMSC 255; and MATH 211, both with a minimum grade of C. Enrollment is restricted to students who have completed at least 54 credit hours (junior standing). Designed to prepare students for development of systems involving databases and database management.

**INFO 370. Fundamentals of Data Communications. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisites: INFO 202, INFO 250, CMSC 245 or CMSC 255; and MATH 211, both with a minimum grade of C. Enrollment is restricted to students who have completed at least 54 credit hours (junior standing). Computer networks and data communications. Provides an understanding of the underlying concepts of computer networking. Emphasis is placed on terminology, techniques and issues in networking systems.

**INFO 450. Advanced Programming. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: INFO 350 with a minimum grade of C. Enrollment is restricted to students who have completed at least 54 credit hours (junior standing). The course covers advanced programming concepts. Topics include pointers, advanced GUI components and the building of multithreaded applications containing reusable components based upon design patterns and advanced data structures. Students cannot receive credit for both CMSC 245/246 and INFO 450.



**INFO 451. Advanced Technology for E-business. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisites: grades of C or better in INFO 350 and 364, and junior standing. Focuses on the technical aspects of developing e-business systems using Web services and Web server controls to build visually interactive and highly responsive Web applications. Students will learn how various XML APIs (processing, messaging and distributed registries) are used under the umbrella of Web services to support the sharing of data and processes for e-business applications. The course will integrate the students' prior knowledge of client-side GUI development with server-side controls, components and behaviors in a multitiered environment that includes database connectivity.

**INFO 461. Information Systems Planning and Project Management. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: INFO 361. Concentrated study of planning methods and techniques required for defining, planning, integrating and implementing information technology projects consistent with the organizational strategic plan and mission.

**INFO 463. Business Process Engineering. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisite: INFO 361. This course is restricted to students who have completed at least 54 credit hours (junior standing). A survey of legacy system re-engineering technologies in which the student becomes familiar with a variety of tools used in practice and has the opportunity to develop applications using these tools under supervision. Selection of technologies is determined each semester.

**INFO 465. Projects in Information Systems. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisites: INFO 350, 364, 370 and 461. The student's behavioral and technical skills developed in listed prerequisite courses are challenged by participating in a team systems development project. Appropriate computer-assisted software engineering tools are used throughout the project, from requirement specification to implementation and testing.

**INFO 468. Information Engineering. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisites: INFO 361 and INFO 364. This course is restricted to students who have completed at least 54 credit hours (junior standing). A study of information engineering as a model-based, data-centric approach to integrating organizational strategic planning with enterprise information systems development. Involves readings, group discussion and case studies.

**INFO 472. Infrastructure Services. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisites: INFO 370 and junior standing. Concepts and principles related to administering and securing information and communication technologies. Topics include management of infrastructure, hosts, applications and network security.

**INFO 474. Advanced Networking and Security. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Prerequisites: INFO 370 and junior standing. Detailed coverage of the TCP/IP protocol suite and its application to internetworking. Emphasis is placed on security, vulnerabilities and controls.

**INFO 481. Information Technology Auditing. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Enrollment is restricted to information systems majors who have completed 54 credit hours (junior standing), or students may enroll with permission of the department. The course teaches the role and objectives of information technology audits and the processes that are necessary to properly conduct an IT audit. Case studies introduce students to the process of interpreting audit evidence.

**INFO 482. Introduction to Enterprise Resource Planning Systems. 3 Hours.**

Semester course; 3 lecture hours. 3 credits. Enrollment is restricted to majors in the School of Business who have completed 54 credit hours (junior standing). This course allows students to develop an appreciation of the impact of enterprise resource planning systems on businesses and to understand the issues involved in the design, implementation and maintenance of these systems. Students also develop practical skills in the use of a commercial enterprise resource planning system.

**INFO 491. Topics in Information Systems. 1-3 Hours.**

Semester course; 1-3 lecture hours. 1-3 credits. Maximum of 3 credits per course; maximum total of 6 credits for all topics courses. Enrollment restricted to students with junior standing. An in-depth study of a selected business topic, to be announced in advance.

**INFO 492. Independent Study in Information Systems. 1-3 Hours.**

Semester course; 1-3 credits. Maximum total of 3 credits. Prerequisites: junior or senior standing as a major in a business curriculum and approval of adviser and department chair prior to course registration. Intensive study under supervision of a faculty member in an area not covered in-depth or contained in the regular curriculum.

**INFO 493. Internship in Information Systems. 3 Hours.**

Semester course; 3 field experience hours. 3 credits. Enrollment restricted to students with senior standing and permission of department chair prior to or during advance registration of the semester of credit. Students taking this course must have earned 12 hours of course credit in IS courses at the 300-level or above. Involves students in a meaningful work experience, typically 20 hours per week, in a setting appropriate to the information systems major.