

INFORMATION SCIENCE AND TECHNOLOGY

Information science and technology offers a bachelors degree focused on today's cutting-edge information technology. Students in information science and technology study the latest technology in areas including business analytics & data science, networking, database management systems, telecommunications, enterprise resource planning, human-computer interaction, e-commerce, and integrated business systems. Professionals in this field administer, maintain, and support computer systems and networks.

Today's business environments have a critical need for professionals who have an understanding of information technologies based on a broad knowledge of management practices, economics, psychology, and the humanities. These individuals are needed to implement technology to support business processes, managerial decision-making, and organizational communication.

As an information science and technology major, you will take courses that are rigorous and oriented toward building the foundation necessary for lifetime learning. Studying at Missouri S&T, you will benefit from the world-class computer environment and your association with excellent students from around the country and the world. Students in the program are strongly encouraged to do summer internships or co-ops with companies before they graduate. There are many rich opportunities and students benefit greatly in terms of their education and the edge they have seeking full-time employment once they graduate.

Bachelor of Science Information Science and Technology

In Information Science and Technology, the Bachelor of Science degree consists of 120 credit hours. All undergraduate students in Business and Management Systems are required to complete a General Education Requirements Core, including courses in Humanities, Social Sciences, Mathematics, Science, and Communication Skills.

A common departmental core of courses in Management and Information Technology helps provide students with skills to succeed in a fast-changing and globalized environment. Information Science and Technology (IST) Core courses and IST Electives provide students with comprehensive knowledge of information technology utilization in businesses. These courses include business analytics & data science, database management, systems analysis, introduction to data science and management, computing internals, networks and communications, and electronic and mobile commerce. The electives for this degree consist of advanced coursework in the areas introduced by the required courses.

A minimum grade of "C" is required in the IST Core, IST Electives, Management, and Information Technology courses. Students have 9 credit hours for free electives.

Freshman Year			
First Semester	Credits	Second Semester	Credits
BUS 1810 ¹	1	PSYCH 1101	3
ENGLISH 1120	3	MATH 1212	4
MATH 1140 ⁵	3	IS&T 1561	3
Science Elective ²	3	BUS 1110	3
IS&T 1750	3	BUS 1210	3

Laboratory w/Science Elective	1		
	14		16
Sophomore Year			
First Semester	Credits	Second Semester	Credits
ECON 1200	3	IS&T 3131	3
SP&M S 1185	3	Science Elective ²	3
IS&T 1562	3	IS&T Elective ⁴	3
ENGLISH 1600 or TCH COM 1600	3	STAT 3111	3
ERP 2110	3	ECON 1100	3
	15		15
Junior Year			
First Semester	Credits	Second Semester	Credits
IS&T 4654	3	IS&T 3343	3
FINANCE 2150	3	MKT 3110	3
IS&T 3423	3	IS&T 3420	3
IS&T 3333	3	IS&T 4641	3
IS&T Elective ⁴	3	ENGLISH 2560 or TCH COM 2560	3
	15		15
Senior Year			
First Semester	Credits	Second Semester	Credits
Free Elective	3	BUS 5980	3
Fine Art, Social Science, or Humanities Elective ³	3	POL SCI 1200	3
IS&T Electives ⁴	6	IS&T Elective ⁴	3
History Elective	3	Free Electives	6
	15		15

Total Credits: 120

A grade of "C" or better is required in the following courses for graduation; BUS 1110, BUS 1210, BUS 1810, BUS 5980, ECON 1100, ECON 1200, ERP 2110, FINANCE 2150, MKT 3110, IS&T 1561, IS&T 1562, IS&T 1750, IS&T 3131, IS&T 3333, IS&T 3343, IS&T 3420, IS&T 3423, IS&T 4641, IS&T 4654, and all IS&T Electives.

- Writing intensive course
- Any course in the following areas: biology, chemistry, geology, geological engineering, physics.
- Any course in the following areas not used for other degree requirements: art, economics, English, foreign language, history, literature, music, philosophy, political science, psychology, sociology, theater.
- A grade of "C" or better is required in IS&T elective courses for graduation. Electives may be any IS&T or ERP designated course at the 3000-level or above or COMP SCI 4700 or COMP SCI 5601.
- MATH 1120 may be substituted for MATH 1140.

Minors

You must see the department advisor and complete a minor application before beginning your minor. Requirements change over time. You will be held to the requirements in force at the time you apply for the minor. Postponing your application for the minor may result in you having to

take additional courses to complete the minor. At least six (6) hours of the minor course work must be taken in residence at Missouri S&T.

Minor in Artificial Intelligence and Machine Learning in Business

The Minor requires 15 credit hours, as follows:

BUS 5730	Machine Learning and Artificial Intelligence for Business	3
IS&T 5535	Machine Learning Algorithms and Applications	3
IS&T 3420	Introduction to Data Science and Management	3
And two courses from the following list:		
STAT 3111	Statistical Tools For Decision Making	3
IS&T 3333	Data Networks and Information Security	3
IS&T 3343	Systems Analysis	3
IS&T 4450	Introduction to Information Visualization	3
IS&T 5420	Business Analytics and Data Science	3
IS&T 5520	Data Science and Machine Learning with Python	3
ERP 5410	Use of Business Intelligence	3

Minor in Business

The minor in business and management systems requires the following 15 hours of coursework:

FINANCE 2150	Corporate Finance I	3
ECON 1100	Principles Of Microeconomics	3
or ECON 1200	Principles Of Macroeconomics	
BUS 1110	Introduction to Management and Entrepreneurship	3
BUS 1210	Financial Accounting	3
MKT 3110	Marketing	3

Minor in Business Analytics and Data Science

The minor in business analytics and data science requires the following 15 hours of coursework:

IS&T 1750	Introduction to Management Information Systems	3
IS&T 3423	Database Management	3
IS&T 3420	Introduction to Data Science and Management	3
Two courses from the following list:		
IS&T 4450	Introduction to Information Visualization	6
IS&T 5420	Business Analytics and Data Science	
IS&T 5520	Data Methodologies in Python	

Minor in Business Applications and Software Development

The Minor requires 15 credit hours, as follows:

Required Courses:		6
IS&T 3553	Modular Software Systems in Java	
IS&T 5520	Data Science and Machine Learning with Python	

And three courses from the following list:

IS&T 1552	Implementing Information Systems: Data Perspective	9
IS&T 3131	Computing Internals And Operating Systems	
IS&T 3420	Introduction to Data Science and Management	
IS&T 3423	Database Management	
IS&T 3443	Database Applications in Business	
ERP 5240	Enterprise Application Development and Software Security	

Minor in Cybersecurity Management and Information Assurance

This minor requires the following 15 hours of coursework:

The following three courses are required:

BUS 5910	Privacy and Information Security Law	3
IS&T 4780	Human and Organizational Factors in Cybersecurity	3
IS&T 3333	Data Networks and Information Security	3

Two of the following three courses must also be taken:

ERP 5240	Enterprise Application Development and Software Security	3
IS&T 4335	Fundamentals of Mobile Technology for Business	3
IS&T 4641	Digital Commerce and the Internet of Things	3

Minor in Digital Supply Chain Management

The minor in digital supply chain management requires the following 15 hours of coursework:

BUS 5360	Business Operations	3
or MECH ENG 3653	Manufacturing	
ERP 5310	Supply Chain Management Systems in an ERP Environment	3
ERP 4610	Customer Relationship Management in ERP Environment	3
or MECH ENG 5760/ Probabilistic Engineering Design		
AERO ENG 5760		

Two courses from the following list: *

ERP 5410	Use of Business Intelligence	6
ERP 5110	Enterprise Resource Planning Systems Design and Implementation	
MECH ENG 5708	Rapid Product Design And Optimization	
MECH ENG 5656	Design For Manufacture	
MECH ENG 5757/ ENG MGT 5515	Integrated Product And Process Design	
MECH ENG 5763	Principles And Practice Of Computer Aided Design	

* Non business and information technology students must select ERP 5110 as one of the two electives.

Minor in Electronic and Social Commerce

The minor in electronic and social commerce requires the following 15 hours of coursework:

IS&T 4641	Digital Commerce and the Internet of Things	3
Four courses from the following list:		
IS&T 4335	Fundamentals of Mobile Technology for Business	12
IS&T 5251	Technological Innovation Management and Leadership	
IS&T 5652	Advanced Web Development	
IS&T 5168	Law and Ethics in E-Commerce	
IS&T 5885	Human-Computer Interaction	
IS&T 5886	Prototyping Human-Computer Interactions	
MKT 5310	Digital Marketing and Promotions	
MKT 4580	Marketing Strategy	

Minor in Enterprise Resource Planning (ERP)

The minor in ERP requires the following 15 hours of coursework:

BUS 1210	Financial Accounting	3
ERP 2110	Introduction to Enterprise Resource Planning	3
ERP 5110	Enterprise Resource Planning Systems Design and Implementation	3

Six credit hours of electives from any other ERP-designated courses at the 4000-level or above

Total Credits 15

Minor in Entrepreneurship

The minor in entrepreneurship requires the following 15 hours of coursework:

BUS 1110	Introduction to Management and Entrepreneurship	3
BUS 5980	Business Models for Entrepreneurship and Innovation	3
MKT 5310	Digital Marketing and Promotions	3
Two courses from the following list:		
BUS 4150	Customer Focus and Satisfaction	6
BUS 5580	Strategic Management	
IS&T 4641	Digital Commerce and the Internet of Things	
IS&T 4654	Web and Digital Media Development	
IS&T 4335	Fundamentals of Mobile Technology for Business	
IS&T 5251	Technological Innovation Management and Leadership	
IS&T 6654	Advanced Web and Digital Media Development	
IS&T 5886	Prototyping Human-Computer Interactions	
ENG MGT 5511	Technical Entrepreneurship	
ENG MGT 5411	Engineering Design Optimization	

Minor in Finance

The minor in finance requires the following 15 hours of coursework:

ECON 1100	Principles Of Microeconomics	3
or ECON 1200	Principles Of Macroeconomics	
FINANCE 2150	Corporate Finance I	3
Three additional FINANCE electives at the 3000 level or above (Undergraduate Research is acceptable)		
Total Credits		15

Minor in Financial Technology

The Minor requires 15 credit hours, as follows:

Required Courses:		9
FINANCE 2150	Corporate Finance I	
FINANCE 5310	Financial Modeling	
IS&T 3420	Introduction to Data Science and Management	
And one course from the following list:		
FINANCE 5160	Corporate Finance II	3
FINANCE 5260	Investments I	
BUS 5230	Financial Statement Analysis	
And one course from the following list:		
IS&T 5520	Data Science and Machine Learning with Python	3
IS&T 4641	Digital Commerce and the Internet of Things	
IS&T 4780	Human and Organizational Factors in Cybersecurity	
ERP 5410	Use of Business Intelligence	
ERP 5210	Performance Dashboard, Scorecard and Data Visualization	

Minor in Human-Computer Interaction and User Experience

The minor in human-computer interaction and user experience requires the following 15 hours of coursework:

PSYCH 1101	General Psychology	3
IS&T 4654	Web and Digital Media Development	3
IS&T 5885	Human-Computer Interaction	3
And two of the following		
IS&T 4680	Introduction to Web and New Media Studies	6
IS&T 5886	Prototyping Human-Computer Interactions	
IS&T 5887	Human-Computer Interaction Evaluation	

Minor in Information Science and Technology

The minor in information science and technology requires the following 15 hours of coursework:

IS&T 1750	Introduction to Management Information Systems	3
IS&T 1551	Implementing Information Systems: User Perspective	3
IS&T 1552	Implementing Information Systems: Data Perspective	3
ERP 2110	Introduction to Enterprise Resource Planning	3
One other IS&T or ERP course at the 2000-level or above.		3
Total Credits		15

Minor in Management

The minor in management requires the following 15 hours of coursework:

BUS 1110	Introduction to Management and Entrepreneurship	3
Four courses from the following list:		
BUS 2910	Business Law	12
BUS 3115	Introduction to Teambuilding and Leadership	
BUS 4111	Business Negotiations	
BUS 4150	Customer Focus and Satisfaction	
BUS 5360	Business Operations	
BUS 5470	Human Resource Management	
BUS 5580	Strategic Management	
IS&T 4261	Information Systems Project Management	
ENG MGT 3320	Introduction to Project Management	

Minor in Marketing

The minor in marketing requires the following 15 hours of coursework:

ECON 1100	Principles Of Microeconomics	3
or ECON 1200	Principles Of Macroeconomics	
MKT 3110	Marketing	3
Three courses from the following list:		
MKT 3210	Consumer Behavior	9
MKT 5310	Digital Marketing and Promotions	
MKT 4150	Customer Focus and Satisfaction	
MKT 4580	Marketing Strategy	
ERP 4610	Customer Relationship Management in ERP Environment	
Other marketing electives approved by the department (MKT 3000 and above)		

Minor in Mobile Business and Technology

The minor in mobile business and technology requires the following 15 hours of coursework:

IS&T 4641	Digital Commerce and the Internet of Things	3
IS&T 4335	Fundamentals of Mobile Technology for Business	3
ERP 5240	Enterprise Application Development and Software Security	3
Two courses from the following list:		
IS&T 3333	Data Networks and Information Security	6
IS&T 5652	Advanced Web Development	
IS&T 5886	Prototyping Human-Computer Interactions	
ERP 4610	Customer Relationship Management in ERP Environment	
ERP 5310	Supply Chain Management Systems in an ERP Environment	
ERP 5210	Performance Dashboard, Scorecard and Data Visualization	

Carla Pauline Bates, Assistant Teaching Professor
PHD University of Missouri-Columbia

Darryl Lee Brinkmann, Adjunct Instructor
MASTER Sangamon State University

Randy Lawrence Canis, Adjunct Professor
JD University of Missouri-Columbia

Langtao Chen, Assistant Professor
PHD Georgia State University

Yu Hsien Chiu, Associate Teaching Professor
MASTER University of Wisconsin-Milwaukee

Craig C Claybaugh, Associate Professor
PHD University of Wisconsin-Milwaukee

Arlan Dekock, Professor Emeritus
PHD University of South Dakota

Cassandra Carlene Elrod, Associate Professor
PHD University of Missouri-Rolla

Li-Li Eng, Associate Professor
PHD University of Michigan Ann Arbor

Hanqing Fang, Assistant Professor
PHD Mississippi State University

Barry B Flachsbar, Professor
PHD Stanford University

Nobuyuki Fukawa, Associate Professor
PHD Louisiana State University

Richard H Hall, Professor
PHD Texas Christian University

Michael Gene Hilgers, Professor
PHD Brown University

Bih-Ru Lea, Associate Professor
PHD Clemson University

Yu Liu, Assistant Professor
PHD University of Oregon

Chris J Merz, Adjunct Instructor
PHD University of California-Irvine

Fiona Fui-Hoon Nah, Professor
PHD University of British Columbia

Nicholas Oswald, Adjunct Instructor
MASTER Missouri University of Science & Technology

Keng Leng Siau, Professor
PHD University of British Columbia

James K Tharp, Adjunct Instructor
MBA Webster University

Nathan W Twyman, Assistant Professor
PHD University of Arizona

Wen-Bin Yu, Associate Professor
PHD University of Louisville

Hongxian Zhang, Assistant Professor
PHD University of Texas at San Antonio

IS&T 1001 Special Topics (IND 0.0-6.0)

This is designed to give the department an opportunity to test a new course. Variable title.

IS&T 1551 Implementing Information Systems: User Perspective (LEC 3.0)

Introduction to object-oriented programming in the context of developing and implementing the various components of an information system with particular attention given to system interface such as window and web forms. Class will include numerous projects covering foundational programming.

IS&T 1552 Implementing Information Systems: Data Perspective (LEC 3.0)

Continuation of object-oriented programming in the context of developing and implementing the various components of an information system with particular attention given to database incorporation. Class will include numerous projects covering intermediate topics. Prerequisite: A grade of "C" or better in IS&T 1551.

IS&T 1561 Algorithms and Programming with Java (LEC 3.0)

Introduction to programming using Java. Topics include basic programming concepts such as variable data, decision-making, and repetitive code. Also algorithm design and analysis, event-driven design with classes and methods. Numerous programs and group exercises.

IS&T 1561H Algorithms and Prog Java-Honors (LEC 3.0)

IS&T 1562 Java and Data Structures (LEC 3.0)

Provides an intermediate knowledge of programming using Java. Important concepts of Object Oriented programming will be covered. A significant part of the course will be devoted to data structures and how to handle them. Numerous programs will be assigned. Prerequisites: IS&T 1561.

IS&T 1750 Introduction to Management Information Systems (LEC 2.0 and LAB 1.0)

This course familiarizes the students with the fundamental concepts and principles of management information systems. Topics covered include the strategic role of IT, decision support systems, database and datawarehouse, enterprise applications, mobile applications, and social and ethical issues related to information systems.

IS&T 2000 Special Problems (IND 0.0-6.0)

Problems or readings on specific subjects or projects in the department. Consent of instructor required.

IS&T 2001 Special Topics (IND 0.0-6.0)

This is designed to give the department an opportunity to test a new course. Variable title.

IS&T 2002 Cooperative Training in Information Science & Technology (IND 0.0-6.0)

On-the-job experience gained through cooperative education with industry with credit arranged through departmental co-op advisor. Grade received depends on quality of reports submitted and work supervisors's evaluation. Prerequisite: Completed 30 hours toward degree.

IS&T 3000 Special Problems (IND 0.0-6.0)

Problems or readings on specific subjects or projects in the department. Consent of instructor required.

IS&T 3001 Special Topics (LEC 0.0-6.0)

This course is designed to give the department an opportunity to test a new course. Variable title.

IS&T 3131 Computing Internals And Operating Systems (LEC 3.0)

Design-oriented introduction to computer components and operation. Standard codes; number systems; base conversions; computer arithmetic; boolean algebra; operating system components including memory management, device management, and I/O management; and related issues are covered. Prerequisite: A grade of "C" or better in either IS&T 1552 or Comp Sci 1575.

IS&T 3321 Network Performance Design And Management (LEC 3.0)

This course provides analytical capabilities needed to effectively design, deploy, and manage computer networks and protocols. Prerequisites: IS&T 3333.

IS&T 3333 Data Networks and Information Security (LEC 3.0)

The course provides an overview of current and evolving networking and information security principles. Concepts include network standards and protocols; operation and management; switching and routing; area networks; wireless network infrastructure; security frameworks, policies, and management. Prerequisites: IS&T 1750; IS&T 1552 or Comp Sci 1510.

IS&T 3343 Systems Analysis (LEC 3.0)

Introduction to the processes by which business information systems are analyzed, designed, and introduced into the business environment. Topics include investigation of existing systems, requirements analysis, logical and physical design, database design, forms design, and report analysis. Prerequisite: IS&T 3423.

IS&T 3420 Introduction to Data Science and Management (LEC 3.0)

Introduces students to increasing business success through analysis of large-scale data collections. Topics include: import/export of data, summary statistics, cross-tabulation, data transformations (sub setting, merging, sorting and aggregation), modeling methods, and visualization. Significant programming in R is expected. Prerequisites: IS&T 1552 or Comp Sci 1510.

IS&T 3423 Database Management (LEC 3.0)

The course introduces the concepts of database management systems. Issues in database architecture, design, administration, and implementation are covered. Prerequisites: IS&T 1750; A grade of "C" or better in either IS&T 1552 or Comp Sci 1575.

IS&T 3443 Database Applications in Business (LEC 3.0)

Design, development and implementation of application software typical to the modern business environment utilizing popular commercial database management systems such as Oracle and Access. Focus given to business case modeling, requirement analysis, database design, and implementation challenges. Project oriented. Prerequisite: IS&T 3343.

IS&T 3553 Modular Software Systems in Java (LEC 3.0)

Introduction to Software Life Cycle and characteristics of large modular software systems. Exploration of software support for such systems, using Java, including use of GUI interfaces, advanced I/O and String handling, Interfaces, Threads, and other modularity features. Program project included. Prerequisites: IS&T 1552 and IS&T 3131.

IS&T 4000 Special Problems (IND 0.0-6.0)

Problems or readings on specific subjects or projects in the department. Consent of instructor required.

IS&T 4001 Special Topics (LEC 0.0-6.0)

This is designed to give the department an opportunity to test a new course. Variable title.

IS&T 4099 Undergraduate Research (IND 0.0-6.0)

Designed for the undergraduate student who wishes to engage in research. Not for graduate credit. Not more than six credit hours allowed for graduation credit. Subject and credit to be arranged with the instructor.

IS&T 4257 Network Economy (LEC 3.0)

Emerging Network/Internet economy, using traditional economic tools. Topics: production and reproduction cost of information, information as an "experience good," versions of products, switching cost, lock-in effects, market adoption dynamics, first-mover advantage, intellectual property rights. Prerequisite: Econ 1100 or Econ 1200. (Co-listed with Econ 4130).

IS&T 4261 Information Systems Project Management (LEC 3.0)

The course overviews general project management principles and then focuses on information system application development. Topics include requirements analysis, project scheduling, risk management, quality assurance, testing, and team coordination. Prerequisites: IST 1552 or Comp Sci 1510; Senior Standing.

IS&T 4335 Fundamentals of Mobile Technology for Business (LEC 3.0)

A broad overview of mobile technology use in business environments. Topics include the mobile industry; mobile network and wireless standards; mobile devices; mobile web design and app development; social and user experience issues; mobile marketing and commerce. Prerequisites: Junior standing or above.

IS&T 4444 Introduction to Data Warehouses (LEC 3.0)

This course presents the topic of data warehouses and the value to the organization. It takes the student from the database platform to structuring a data warehouse environment. Focus is placed on simplicity and addressing the user community needs. Prerequisites: IS&T 3423.

IS&T 4450 Introduction to Information Visualization (LEC 3.0)

Topics include: the visualization development framework, traditional presentations of data, human perception and aesthetics, colorspace theory, visualization algorithms and software, modern visualizations of large data sets. Application of R packages will be emphasized throughout. Prerequisites: Statistics, Calculus, and Programming Knowledge.

IS&T 4641 Digital Commerce and the Internet of Things (LEC 3.0)

Introduction to fundamental concepts of management and application to IT and support of commerce. Examines the use of IT in business processes and everyday interactions such as IoT. Explores management issues of integrating IT into processes to run businesses better. Prerequisites: IS&T 1750 and at least Sophomore standing.

IS&T 4642 E-Commerce Architecture (LEC 3.0)

Course will cover the issues associated with computer architecture, as it relates specifically to e-commerce applications. Topics will include e-commerce systems and processes, specialized software, and databases. Prerequisite: IS&T 3333.

IS&T 4654 Web and Digital Media Development (LEC 3.0)

This course covers techniques and tools for design and development of web-based media, including text, graphics, animation, audio, and video.

IS&T 4680 Introduction to Web and New Media Studies (LEC 3.0)

The course covers web culture, including topics such as social media, citizen journalism, crowd intelligence, privacy, and copyright. Prerequisite: Junior or Senior standing.

IS&T 4780 Human and Organizational Factors in Cybersecurity (LEC 3.0)

In-depth examination of human and organizational factors in cybersecurity and information assurance. Study of how to protect information integrity, availability, and confidentiality, as well as tools, methods, principles, and analytics for fraud prevention, insider threat detection, and forensic investigations. Assumes prior exposure to cybersecurity or IA.

IS&T 5000 Special Problems (IND 0.0-6.0)

Problems or readings on specific subjects or projects in the department. Consent of instructor required.

IS&T 5001 Special Topics (LEC 0.0-6.0)

This is designed to give the department an opportunity to test a new course. Variable title.

IS&T 5040 Oral Examination (IND 0.0)

After completion of all other program requirements, oral examinations for on-campus M.S./Ph.D. students may be processed during intersession. Off-campus M.S. students must be enrolled in oral examination and must have paid an oral examination fee at the time of the defense/comprehensive examination (oral/ written). All other students must enroll for credit commensurate with uses made of facilities and/or faculties. In no case shall this be for less than three (3) semester hours for resident students.

IS&T 5099 Research (IND 0.0-15)

Investigations of an advanced nature leading to the preparation of a thesis or dissertation. Consent of instructor required.

IS&T 5131 Foundations of Computer Architecture (LEC 3.0)

Design-oriented foundations of computer components and operation. Standard codes; number systems; base conversions; computer arithmetic; boolean algebra; operating system components including memory management, device management; plus related computer architecture topics. Research paper required. Prerequisites: Graduate Standing, strong programming knowledge.

IS&T 5168 Law and Ethics in E-Commerce (LEC 3.0)

Provides the ethical framework to analyze the ethical, legal, and social issues that arise for citizens and computer professionals regarding the computerization of society. Topics include: free speech, privacy, intellectual property, product liability, and professional responsibility. (Co-listed with Philos 4368).

IS&T 5251 Technological Innovation Management and Leadership (LEC 3.0)

The course focuses on the knowledge and skills necessary for the development and implementation of effective strategies for the management of technology-based organizations. This involves: developing a general management perspective on technology and innovation, examining the problems of new product development, identifying distinctive technological competencies, licensing and marketing technologies, assessing the organizational and industrial context of technology. Prerequisite: Senior or Graduate Standing.

IS&T 5420 Business Analytics and Data Science (LEC 3.0)

Analysis of large business data sets via statistical summaries, cross-tabulation, correlation, and variance matrices. Techniques in model selection, prediction, and validation utilizing general linear and logistic regression, Bayesian methods, clustering, and visualization. Extensive programming in R is expected. Prerequisites: Calculus, Statistics, and Programming knowledge.

IS&T 5423 Foundations of Data Management (LEC 3.0)

Foundational concepts of database management systems. Issues in database architecture, design, administration, and implementation. Extensive use of SQL with Oracle to create and manage databases. Significant project dealing with triggers or stored procedures. Prerequisites: Graduate Standing, knowledge of MIS, programming ability.

IS&T 5520 Data Science and Machine Learning with Python (LEC 3.0)

Examines data science methodologies for scraping, manipulating, transforming, cleaning, visualizing, summarizing, and modeling large-scale data as well as supervised and unsupervised machine learning algorithms applied in various business analytics and data science scenarios. Python libraries such as Pandas, NumPy, Matplotlib, and Scikit-learn are utilized. Prerequisites: One of Stat 3111, Stat 3113, Stat 3115, Stat 3117 and either IS&T 1552 or Comp Sci 1575; for Graduate Students: Graduate Standing and Knowledge of Calculus, Statistics, and Programming.

IS&T 5535 Machine Learning Algorithms and Applications (LEC 3.0)

Introduces techniques of modern machine learning methods with applications in marketing, finance, and other business disciplines. Topics include regression, classification, resampling methods, model selection, regularization, decision trees, support vector machines, principal component analysis, and clustering. R programming is required. Prerequisites: One of Stat 3111, Stat 3113, Stat 3115, Stat 3117 and either IS&T 1552 or Comp Sci 1575; or Graduate Standing with knowledge of calculus, statistics, and programming.

IS&T 5652 Advanced Web Development (LEC 3.0)

Advanced Web development techniques to provide dynamic interaction; methods for extracting and delivering dynamic information to/from Web servers - a hands-on approach. Emphasis on interaction with servers; mobile software development; processing of graphics and web video. Project work is required. Prerequisites: IS&T 1551 and IS&T 4654.

IS&T 5885 Human-Computer Interaction (LEC 3.0)

Introduction to the field of Human-Computer Interaction (HCI). Students examine issues and challenges related to the interaction between people and technology. The class explores the social and cognitive characteristics of people who use information systems. Students learn techniques for understanding user needs, interface prototyping & interface evaluation.

IS&T 5886 Prototyping Human-Computer Interactions (LEC 3.0)

This course explores novel HCI and UX technologies as well as methods and tools for creating system prototypes, including best practices and guidelines for optimal user experiences. Example concepts include mobile applications, behavioral monitoring, gamification, natural user interfaces, haptics, and computers as social actors. Prerequisite: Preceded or accompanied by IS&T 5885.

IS&T 5887 Human-Computer Interaction Evaluation (LEC 1.5 and LAB 1.5)

This course covers research and analysis methods and tools for evaluation of the impact of information technology systems on humans and organizations. The focus will be on practical evaluation with the goal of providing recommendations for improving system functionality and usability. Prerequisite: Preceded or accompanied by IS&T 5885.
