Emerging technologies continue to dramatically alter the way business and life is conducted. Those who wish to have a leading role in developing and implementing next generation information systems should consider a career in management information systems, including the sub-fields of data science and information assurance/cybersecurity. The need for knowledgeable workers with expertise in these information systems driven areas will continue to increase at substantial rates for the foreseeable future.

The Department of Management Science and Information Systems offers an undergraduate major in management information systems (MIS) with possible options of data science and information assurance (IA). It also offers graduate studies leading to master's degrees in information assurance (MSIA) and management information systems (MIS). Also, PhD degrees in business administration with an option in MIS, information assurance, management science and operations management can be earned.

Undergraduate degrees in MIS require a common foundation of work in disciplines such as mathematics, statistics, behavioral sciences and communications. A second tier of required work consists of the courses required for all Spears School of Business students such as economics, marketing, accounting and management. The third tier of classes are core MIS courses that develop information technology, data science and cybersecurity expertise in students.

Management Information Systems (MIS)
The MIS degree focuses on the business applications of information technology. This includes emphasizing necessary skills required in the analysis, development, evaluation and implementation of various information and communication technologies critical for today's global organizations. The integration of information technology throughout all aspects of business coupled with the critical need for responsive information systems has created a strong demand for graduates with expertise in information systems and business administration.

Once MIS students satisfy the first two tiers of requirements mentioned above, they will focus on specialized courses in areas such as systems analysis and design, web and mobile app development, database design and management, data science techniques and applications, data communications and cybersecurity, among other relevant areas.

Data Science
The data science option allows developing aptitudes in quantitative tools that are especially critical in today's data-driven organization. Additional course work in statistics, and descriptive, predictive and prescriptive analytics is possible with a Data Science option.

Information Assurance
The Information Assurance option uses the expertise in the department that led OSU to be named a National Center of Academic Excellence in Information Assurance Education and Research by the NSA and the Department of Homeland Security. This option provides students with in-depth study and hands-on analysis of critical organizational issues in information assurance and cybersecurity.

Courses
MSIS 2103 Business Data Science Technologies
Description: The class focuses on problem solving with data analytics tools and technologies that are key to organization decision making. Emphasis is placed on decision making with spreadsheets and databases. Key information systems and cybersecurity concepts are also studied.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 2203 Computer Programming for Business
Prerequisites: MSIS 2103 or equivalent.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 3023 Technology, Diversity and Entrepreneurship
Prerequisites: MSIS 2103 or consent of instructor.
Description: A study of technology, diversity and entrepreneurship. The use of technology as a research tool to study diversity and the opportunities available to diverse groups through entrepreneurship.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 3103 End User Database Systems Design and Management
Prerequisites: MSIS 2103 and Non-MIS (or CS) majors only.
Description: Use of computer technology and software to represent, manipulate and manage data. Principles and techniques of logical database design and related database concepts. Analysis, design and implementation of a database system using a relational DBMS. No credit for students in the MIS major.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
MSIS 3153 International Telecommunications Business Environment (I)
Prerequisites: MSIS 2103 or consent of instructor.
Description: This course concentrates on understanding the implications and challenges of utilizing telecommunications networks in today's global business environment. Emphasis will be placed on identifying the major players in the global information infrastructure, standards setting bodies and procedures, and the various regulatory processes encountered. Students will research the telecommunications industry in other countries and develop comprehensive written reports. Course previously offered as TCOM 3153.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
General Education and other Course Attributes: International Dimension

MSIS 3163 Web Design Essentials
Description: Web design principles including UX/UI, HTML/CSS, scripting, database management, and other relevant topics using the latest professional tools.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 3203 Advanced Computer Programming for Business
Prerequisites: MSIS 2203.
Description: Advanced programming features are examined with an emphasis on the development of computer programs for business applications. Previously offered as MSIS 4203.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 3223 Principles of Data Analytics
Prerequisites: MSIS 2103 and MATH 2103 or equivalent.
Description: Problem solving with descriptive, predictive and prescriptive analytics in a business context using spreadsheets and other analytic tools. Techniques include forecasting, optimization, location analysis, decision analysis, inventory management, among others. Previously offered as MGMT 3223.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 3233 Management Science - Prescriptive Analytics
Prerequisites: MSIS 3223.
Description: Prescriptive analytics applied to resource allocation and operational problems encountered in accounting, economics, finance, management and marketing. Linear programming, goal programming, integer programming, and network models.. Previously offered as MGMT 3233.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 3243 Descriptive Analytics
Prerequisites: MSIS 3223.
Description: Application of descriptive analytics, especially from a "big data" perspective. Previously offered as MGMT 3243.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 3333 Database Systems Design, Management and Administration
Prerequisites: MSIS 2103 and MIS or CS or ACCT majors only.
Description: Extensive data modeling implemented and queried using SQL, DDL, and DML. Data integrity and accessibility in a shared network environment. Related database concepts including data warehousing, database security, data and database administration. Required for MIS majors. Course previously offered as MSIS 4013.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 3363 Web Application Development
Prerequisites: MSIS 2203 and MSIS 3333.
Description: Develop web applications involving database development, user interface design, and asynchronous client-side programming.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 3393 Advanced Spreadsheet Modeling and Programming
Prerequisites: MSIS 2103 and permission of instructor.
Description: This class provides students with advanced spreadsheet skills, including the ability to formulate math programming models, simulations, risk analysis, and other business decision-making tools. The class will also provide students with an introduction to spreadsheet programming (VB, macros, etc.), building decision support systems in spreadsheets, etc.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 3931 Diversity Impacts in Information Systems (D)
Description: Critical analysis of the impact of technology on socially-defined classifications such as race, ethnicity, age, gender, sexuality, and disability; and how those groups affect technology industries. Through reading, observation, discussion, and writing; students will have their own perceptions challenged to better understand technology interaction through and with diverse populations, and how relationships between those groups may be improved or worsened as a result of mediated communications.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
General Education and other Course Attributes: Diversity
MSIS 4003 Systems Analysis and Design
Prerequisites: MSIS 3333 and MSIS 3363.
Description: This course covers the core concepts and skills for developing software in an organizational context, including agile software development techniques, as well as the socio-cultural aspects of the systems analysis and design process. Course previously offered as MSIS 3303 and MGMT 3033.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
MSIS 4010 Applied Management Science and Information System Studies
Prerequisites: Consent of department head and MSIS majors only.
Description: Structured internship, field study or independent project with supporting academic study. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Mgmt Sci & Info Sys
MSIS 4020 Applications Software Tools and Techniques
Prerequisites: Permission of instructor and/or department.
Description: Hands-on experience with selected software-based tool or programming languages such as SAP, SQL, PERT/CPM, etc. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.
Credit hours: 1-3
Contact hours: Lecture: 1-3 Contact: 1-3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
MSIS 4033 Information Systems Project Management and Communication
Prerequisites: MSIS 2103.
Description: This class discusses the multi-faceted dimensions critical to successfully leading information systems projects. Topics will include behavioral, strategic, technical, quantitative and communications issues faced by those directing projects. Course previously offered as MSIS 3033.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
MSIS 4111 Tech Succ Skills App
Prerequisites: Senior standing and MIS major or permission of instructor.
Description: Advanced professional development and networking for technology students.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
MSIS 4113 Enterprise Systems and Collaborative Commerce
Prerequisites: MSIS 2103.
Description: Current and emerging management and technical concepts, practices, and tools for information integration and re-engineering of organizational processes. The use of enterprise resource planning tools (ERP II), collaborative commerce, supply chain, business intelligence, and e-business. Previously offered as MGMT 4113.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
MSIS 4123 Information Assurance Management
Description: A broad investigation of the elements of information assurance and security with an emphasis on the management impact to corporations and businesses engaged in the information services and e-commerce. Students should come away from the course with the ability to advise management on the risks and mitigation for all types of threats to information and privacy. May not be used for degree credit with MSIS 5123. Previously offered as MSIS 3123.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
MSIS 4133 Information Technologies for Electronic Commerce
Prerequisites: MSIS 4003.
Description: The Internet and web-based technologies, systems and applications that allow organizations to overcome the barriers of time and distance for conducting commerce. Scripting and markup languages, web programming tools, and the connectivity technologies for designing and developing electronic commerce and systems.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
MSIS 4233 Applied Information Systems Security
Prerequisites: MSIS 4123, MSIS 4523.
Description: An investigation into the various technical aspects of attacking and guarding against attacks and failures in various types of information systems. Course content may vary but will generally include computer, network, and data protection technologies (e.g. firewalls, packet filters, proxy servers, user authentication and validation techniques, encryption, backup methodologies, system and component redundancies, etc.). Various threats and attack methods will be examined. May not be used for degree credit with MSIS 5233.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
MSIS 4243 Digital Forensics and Auditing
Prerequisites: MSIS 4123.
Description: Procedures for identification, preservation and extraction of electronic evidence. Auditing and investigation of network and host system intrusions, analysis and documentation of information gathered, and preparation of expert testimonial evidence. Forensic tools and resources for system administrators and information system security offices. Ethics, law, policy and standards concerning digital evidence. May not be used for degree credit with MSIS 5243.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 4253 System Certification and Accreditation
Prerequisites: MSIS 4123.
Description: Introduction to the certification and accreditation process. Risk analysis, system security analysis, and other topics. Previously offered as MGMT 4253. May not be used for degree credit with MSIS 5253.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 4263 Business Intelligence and Predictive Analytics
Prerequisites: Permission of instructor and/or department.
Description: Applied knowledge management tools and techniques for organizational decision support. Predictive analytics, machine learning, and other emerging techniques.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 4273 Legal and Ethical Issues in Information Systems
Prerequisites: MSIS 4123.
Description: Reviews the current status of information systems law in regard to rights of privacy, freedom of information, confidentiality, work product protection, copyright, security, legal liability, ethical issues, and a range of additional legal and information policy topics. Investigates the legal difficulties that technological innovations are causing in all of these areas. Legal options for dealing with the conflicts caused by technological change and likely adaptations of the law over time in response to societal changes will be explored. May not be used for degree credit with MSIS 5273.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 4283 Operating Systems for Information Assurance
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 4293 Advanced Application Development
Prerequisites: MSIS 4003 and MSIS 3363.
Description: Develop next-generation, data driven mobile applications involving database development, development of web services, server-side business logic, and XML-based user interface design in format of a capstone project.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate, Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 4363 Advanced Application Development
Prerequisites: Senior standing and consent of instructor.
Description: Current and emerging advanced topics in the field of management information systems. Advanced network management, advanced electronic commerce issues, international management information systems and legal and regulatory issues in telecommunications.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate, Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 4373 Advanced Topics in Management Information Systems
Prerequisites: MSIS 4003 and MSIS 3363.
Description: Emerging topics in analytics, including simulation, business dynamics, blockchain/cryptocurrency, artificial intelligence, supply chain, among others. Previously offered as MGMT 4443.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate, Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 4443 Advanced Topics in Analytics
Prerequisites: Permission of instructor.
Description: Emerging topics in analytics, including simulation, business dynamics, blockchain/cryptocurrency, artificial intelligence, supply chain, among others. Previously offered as MGMT 4443.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate, Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 4523 Data Communication Systems
Prerequisites: MSIS 2103.
Description: Broad coverage of network types and protocols used to drive the diverse voice, video and data needs of today's business. Network vocabulary and the understanding of how telecommunications components function are stressed. Previously offered as MGMT 4523.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate, Undergraduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
**MSIS 4623 Data Science Programming**
**Prerequisites:** MSIS 2103 and MSIS 3223.
**Description:** Programming concepts and applications for data science, analytics, and business intelligence.
**Credit hours:** 3
**Contact hours:** Lecture: 3 Contact: 3
**Levels:** Undergraduate
**Schedule types:** Lecture
**Department/School:** Mgmt Sci & Info Sys

**MSIS 4673 Data Visualization**
**Prerequisites:** MSIS 2103 or equivalent or permission of department.
**Description:** This course will provide an understanding of the role of descriptive analytics, visualization, and dashboarding in direct support of managerial decision making (business intelligence and analytics). May not be used for degree credit with MSIS 5673.
**Credit hours:** 3
**Contact hours:** Lecture: 3 Contact: 3
**Levels:** Undergraduate
**Schedule types:** Lecture
**Department/School:** Mgmt Sci & Info Sys

**MSIS 4713 Scripting Essentials**
**Description:** Application of scripting languages (e.g. BASH, PowerShell, Python) for general business, data and information assurance solutions. May not be used for degree credit with MSIS 5713.
**Credit hours:** 3
**Contact hours:** Lecture: 3 Contact: 3
**Levels:** Undergraduate
**Schedule types:** Lecture
**Department/School:** Mgmt Sci & Info Sys

**MSIS 4943 Decision-Making Tools for Sports Management**
**Prerequisites:** Instructor permission.
**Description:** This course is designed as an elective for MGMT students enrolled in the Sports Management option. Useful decision tools such as statistical inference, decision analysis, mathematical programming, forecasting and simulation are used to address decisions faced by sports administrators and decisions made during sporting contests. Current ‘hot’ issues in sports decision-making will also be examined.
**Credit hours:** 3
**Contact hours:** Lecture: 3 Contact: 3
**Levels:** Undergraduate
**Schedule types:** Lecture
**Department/School:** Mgmt Sci & Info Sys

**MSIS 5020 Advanced Applications Software Tools**
**Description:** Advanced hands-on experience with selected software-based tool or programming languages such SAP, SQL, PERT/CPM, etc. For graduate credit only. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.
**Credit hours:** 1-3
**Contact hours:** Lecture: 1-3 Contact: 1-3
**Levels:** Graduate
**Schedule types:** Lecture
**Department/School:** Mgmt Sci & Info Sys

**MSIS 5033 Information Systems Project Management**
**Prerequisites:** Graduate standing.
**Description:** This class covers the important multi-faceted dimensions of directing and leading information systems projects. Topics will include behavioral, strategic, technical and quantitative issues faced by information system project teams.
**Credit hours:** 3
**Contact hours:** Lecture: 3 Contact: 3
**Levels:** Graduate
**Schedule types:** Lecture
**Department/School:** Mgmt Sci & Info Sys

**MSIS 5123 Enterprise Resource Planning**
**Prerequisites:** Admission to a graduate program.
**Description:** Challenges of data integration and redesign of processes in organizations. Introduction to enterprise resource planning (ERP) concepts, software, and practices. ERP issues architecture, planning, design, implementation, and project management. Extensions of ERP Technologies for managing supply chains and customer relationships. Emerging trends. May not be used for degree credit with MSIS 4123.
**Credit hours:** 3
**Contact hours:** Lecture: 3 Contact: 3
**Levels:** Graduate
**Schedule types:** Lecture
**Department/School:** Mgmt Sci & Info Sys

**MSIS 5133 Advanced Web Based Application Development**
**Prerequisites:** Graduate standing and MSIS 5643 or equivalent.
**Description:** Development of n-tier web-based applications, including concepts and technologies relating to the presentation, business, and data tiers. Technologies include (but are not limited to) browser and other client programming, server-side programming, data tier programming and XML technologies.
**Credit hours:** 3
**Contact hours:** Lecture: 3 Contact: 3
**Levels:** Graduate
**Schedule types:** Lecture
**Department/School:** Mgmt Sci & Info Sys

**MSIS 5213 Information Assurance Management**
**Description:** A broad investigation of the elements of information assurance and security with an emphasis on the management impact to corporations and businesses engaged in information services and electronic commerce. Students should come away from the course with the ability to advise management on the risks and mitigation for all types of threats to information and privacy. Course previously offered as TCOM 5223.
**Credit hours:** 3
**Contact hours:** Lecture: 3 Contact: 3
**Levels:** Graduate
**Schedule types:** Lecture
**Department/School:** Mgmt Sci & Info Sys

**MSIS 5223 Programming for Data Science and Analytics II**
**Prerequisites:** MSIS 5193 and graduate standing.
**Description:** Programming concepts and applications for data science, analytics, and business intelligence.
**Credit hours:** 3
**Contact hours:** Lecture: 3 Contact: 3
**Levels:** Graduate
**Schedule types:** Lecture
**Department/School:** Mgmt Sci & Info Sys
MSIS 5233 Applied Information Systems Security
Prerequisites: MSIS 5213, MSIS 5773.
Description: An investigation into the various technical aspects of attacking, and of guarding against attacks and failures in various types of information systems. Course content may vary but includes computer, network, and data protection technologies (e.g., firewalls, packet filters, proxy servers, user authentication and validation techniques, encryption, backup methodologies, system and component redundancies, etc.). Various threats and attack methods examined. May not be used for degree credit with MSIS 4233.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5243 Information Technology Forensics
Prerequisites: MSIS 5213.
Description: Review of systems for vulnerabilities and analysis of systems that have been breached. This course will cover the many related issues and have a heavy hands-on component. May not be used for degree credit with MSIS 4243. Course previously offered as TCOM 5243.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5253 Advanced System Certification and Accreditation
Prerequisites: MSIS 5213.
Description: Preparing information systems for operational status requires significant planning and sound execution. Covers the key components of the certification and accreditation process, including risk assessment and mitigation, system security analysis, controls and system documentation. May not be used for degree credit with MSIS 4253. Course previously offered as TCOM 5253.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5263 Information Assurance Offense
Prerequisites: MSIS 5233 and graduate coordinator permission.
Description: Learning successful computer attacks so as to recognize and apply appropriate security controls for system vulnerabilities.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5273 Legal and Ethical Issues in Information Technology
Description: This course reviews the current status of information systems law in regard to rights of privacy, freedom of information, confidentiality, work product protection, copyright, security, legal liability, ethical issues and a range of additional legal and information policy topics. May not be used for degree credit with MSIS 4273. Course previously offered as TCOM 5273.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5283 Secure Information Systems Administration
Prerequisites: MSIS 5213 and MSIS 5773 and graduate coordinator permission.
Description: Introduction to basic concepts and technologies relevant to secure information systems administration. The topics covered in this course include, but are not limited to, operating system (OS) hardening, securing servers, network protection, and various access control mechanisms.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5293 Information Assurance Capstone
Prerequisites: Final semester in program; graduate coordinator permission.
Description: This capstone course takes a strategic view of corporate information assurance. The goal is to provide an overarching view of an information assurance program to include physical, personnel, operational, and cyber security, including the underlying legislation and federal and state regulations that drive corporate IA programs and policy.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5303 Prescriptive Analytics
Prerequisites: Admission to a SSB graduate program.
Description: Application of prescriptive analytic techniques to business problems. Some descriptive analytics may also be covered.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5313 Supply Chain Analytics
Prerequisites: Graduate standing.
Description: Introduction to supply chain analytics including forecasting, scheduling, inventory, distribution, site selection, and other analytical tools and techniques.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
MSIS 5393 Advanced Spreadsheet Modeling
Description: Advanced spreadsheet modeling skills critical to business problem solving. Presentation, analysis, solution and communication facets are emphasized.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5410 Advanced Topics in Information Assurance
Prerequisites: Graduate standing and consent of program director.
Description: Advanced topics in information assurance and security. Course previously offered as TCOM 5410.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5413 Advanced Data Science Applications
Prerequisites: Graduate standing and permission of instructor.
Description: Special topics with an emphasis on emerging tools and techniques in the broad field of data science.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5503 Statistics for Data Science
Prerequisites: Graduate standing.
Description: Data Science focuses on the analysis of large secondary data sets. This course focuses on understanding and applying statistical models and techniques to obtain useful information from large data sets. These techniques are part of supervised statistical machine learning.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5600 Special Projects in Business Information Systems
Prerequisites: Consent of MS in MIS director.
Description: Study of advanced topics not covered directly in other classes or directed study under the supervision of a faculty member. Offered for variable credit, 1-12 credit hours, maximum of 12 credit hours.
Credit hours: 1-12
Contact hours: Contact: 1-12 Other: 1-12
Levels: Graduate
Schedule types: Independent Study
Department/School: Mgmt Sci & Info Sys

MSIS 5613 Advanced Supply Chain Analytics
Prerequisites: MSIS 5313.
Description: Advanced tools and analytic techniques used in the supply chain field.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5623 Information and Network Technology Management
Prerequisites: Admission to a SSB graduate program or consent of MBA director.
Description: Major principles and impact of information technology from a manager’s perspective in relation to the operation and success of businesses in today’s global digital economy. Topics include the Internet, networks and wireless systems, database management systems, decision support systems, social media and e-business applications.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5633 Predictive Analytics Technologies
Prerequisites: Graduate standing.
Description: A comprehensive analysis of contemporary business intelligence tools and techniques used in managerial decision-making, including decision support systems, data and text mining, knowledge management, expert systems, neural networks, and other tools and techniques.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5643 Advanced Database Management
Prerequisites: Graduate standing.
Description: Advanced theoretical and practical foundations of database systems. Brief review of classical issues surrounding design, analysis, and implementation of databases. Overview and use of modern database systems. Current and emerging issues in the database field.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5653 Advanced Systems Analysis and Design
Prerequisites: Graduate standing.
Description: Systems thinking. Systems life cycle, modeling approaches, methods, tools, and techniques of systems analysis and design for the development of modern organizational information systems.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 5663 Data Warehousing
Prerequisites: MSIS 5643.
Description: Provides an introduction of the major activities involved in a data warehousing project. These activities include understanding fundamental principles and concepts, design principles, data warehouse prototype development, including table definitions, extract/ transformation/load (ETL) logic, and example report definitions. The class will be hands-on.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys
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<td>MSIS 6200</td>
<td>Advanced Topics in Management Information Systems</td>
<td>Mgmt Sci &amp; Info Sys</td>
</tr>
<tr>
<td>MSIS 6300</td>
<td>Contemporary Topics in MSIS Research</td>
<td>Mgmt Sci &amp; Info Sys</td>
</tr>
</tbody>
</table>

**MSIS 5673 Descriptive Analytics and Visualization**

**Description**: This course will provide an understanding of the role of descriptive analytics, visualization, and dashboarding in direct support of managerial decision making (business intelligence and analytics). Specifically, knowledge about managerial decision making, business intelligence, analytics, decision support systems and how they relate to other types of information systems; knowledge about human visual processing in relation to data presentation; knowledge of dashboard design and management; and knowledge about software packages and hands-on capabilities. May not be used for degree credit with MSIS 4673.

**Credit hours**: 3
**Contact hours**: Lecture: 3 Contact: 3
**Levels**: Graduate
**Schedule types**: Lecture

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>MSIS 5683</td>
<td>Big Data Advanced Analytics Technologies</td>
<td>Mgmt Sci &amp; Info Sys</td>
</tr>
</tbody>
</table>

**Prerequisites**: MSIS 5223, MSIS 5643.

**Description**: The astounding growth of data in all aspects of life in the form of emails, weblogs, tweets, sensors, video and text has necessitated the use of Big Data and advanced analytics techniques to support large scale data analytics. This course brings together key Big Data tools on a Hadoop platform to show how to efficiently manage data with three main characteristics: volume, velocity and variety. Topics include the Hadoop platform, social media analytics, link analysis, and stream analytics.

**Credit hours**: 3
**Contact hours**: Lecture: 3 Contact: 3
**Levels**: Graduate
**Schedule types**: Lecture

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<th>Course Code</th>
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<tbody>
<tr>
<td>MSIS 5713</td>
<td>Scripting Essentials</td>
<td>Mgmt Sci &amp; Info Sys</td>
</tr>
</tbody>
</table>

**Description**: Application of scripting languages (e.g. BASH, PowerShell, Python) for general business, data and information assurance solutions. May not be used for degree credit with MSIS 4713.

**Credit hours**: 3
**Contact hours**: Lecture: 3 Contact: 3
**Levels**: Graduate
**Schedule types**: Lecture

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<tbody>
<tr>
<td>MSIS 5773</td>
<td>The Upper Layers of Telecommunications Systems</td>
<td>Mgmt Sci &amp; Info Sys</td>
</tr>
</tbody>
</table>

**Description**: This course is designed to develop a solid and deep understanding of data/telecommunications networks. The course covers various technical components and their functions in today’s communication networks, with a special focus on the upper layers of the TCP/IP protocol suite (i.e., Network, Transport, and Application). The topics covered in the course will include, but not be limited to IP packet delivery, forwarding, and routing, UDP and TCP, dynamic host configuration (DHCP), domain name (DNS) lookup, and other widely used Internet applications (e.g., Web and email). Course previously offered as TCOM 5123.

**Credit hours**: 3
**Contact hours**: Lecture: 3 Contact: 3
**Levels**: Graduate
**Schedule types**: Lecture

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<tbody>
<tr>
<td>MSIS 5900</td>
<td>Practicum in Management Information Systems</td>
<td>Mgmt Sci &amp; Info Sys</td>
</tr>
</tbody>
</table>

**Prerequisites**: Consent of director of and admission to the MS in MIS program.

**Description**: Application of MIS-related methods and skills in a business environment. Integration of knowledge through real-world problem solving situations in organizational contexts. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.

**Credit hours**: 1-6
**Contact hours**: Contact: 1-6 Other: 1-6
**Levels**: Graduate
**Schedule types**: Independent Study

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<tbody>
<tr>
<td>MSIS 5950</td>
<td>Advanced Practicum</td>
<td>Mgmt Sci &amp; Info Sys</td>
</tr>
</tbody>
</table>

**Prerequisites**: Consent of director of and admission to the MS in MIS program.

**Description**: Application of MIS-related methods and skills in a business environment beyond the normal practicum/internship timeframe. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.

**Credit hours**: 1-6
**Contact hours**: Contact: 1-6 Other: 1-6
**Levels**: Graduate
**Schedule types**: Independent Study

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<tr>
<td>MSIS 5990</td>
<td>Directed Studies in Information Assurance</td>
<td>Mgmt Sci &amp; Info Sys</td>
</tr>
</tbody>
</table>

**Prerequisites**: Graduate standing and consent of program director.

**Description**: Special advanced topics, projects and independent study in information assurance and security. Course previously offered as TCOM 5990. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.

**Credit hours**: 1-6
**Contact hours**: Lecture: 1-6 Contact: 1-6
**Levels**: Graduate
**Schedule types**: Lecture

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<tr>
<td>MSIS 6200</td>
<td>Advanced Topics in Management Information Systems</td>
<td>Mgmt Sci &amp; Info Sys</td>
</tr>
</tbody>
</table>

**Prerequisites**: Doctoral student status and consent of instructor.

**Description**: Special advanced topics in management information systems for doctoral students. Offered for variable credit, 3-6 credit hours, maximum of 12 credit hours.

**Credit hours**: 3-6
**Contact hours**: Contact: 3-6 Other: 3-6
**Levels**: Graduate
**Schedule types**: Independent Study

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<tr>
<td>MSIS 6300</td>
<td>Contemporary Topics in MSIS Research</td>
<td>Mgmt Sci &amp; Info Sys</td>
</tr>
</tbody>
</table>

**Prerequisites**: Doctoral standing.

**Description**: In depth study in one or more topics in MSIS field. An ongoing conversation about major issues in the field. Topics related to any one of the areas within the broad, interdisciplinary field of management science and information systems, such as management information systems, management science, telecommunications, and operations management. Offered for variable credit, 1-12 credit hours, maximum of 12 credit hours.

**Credit hours**: 1-12
**Contact hours**: Lecture: 1-12 Contact: 1-12
**Levels**: Graduate
**Schedule types**: Lecture

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<td>Mgmt Sci &amp; Info Sys</td>
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</table>

**Prerequisites**: Consent of director of and admission to the MS in MIS program.

**Description**: Application of MIS-related methods and skills in a business environment. Integration of knowledge through real-world problem solving situations in organizational contexts. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.

**Credit hours**: 1-6
**Contact hours**: Contact: 1-6 Other: 1-6
**Levels**: Graduate
**Schedule types**: Independent Study

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<td>MSIS 5900</td>
<td>Practicum in Management Information Systems</td>
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**Prerequisites**: Consent of director of and admission to the MS in MIS program.

**Description**: Application of MIS-related methods and skills in a business environment beyond the normal practicum/internship timeframe. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.

**Credit hours**: 1-6
**Contact hours**: Contact: 1-6 Other: 1-6
**Levels**: Graduate
**Schedule types**: Independent Study

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**Prerequisites**: Consent of director of and admission to the MS in MIS program.

**Description**: Application of MIS-related methods and skills in a business environment beyond the normal practicum/internship timeframe. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.

**Credit hours**: 1-6
**Contact hours**: Contact: 1-6 Other: 1-6
**Levels**: Graduate
**Schedule types**: Independent Study

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<td>Directed Studies in Information Assurance</td>
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</table>

**Prerequisites**: Graduate standing and consent of program director.

**Description**: Special advanced topics, projects and independent study in information assurance and security. Course previously offered as TCOM 5990. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.

**Credit hours**: 1-6
**Contact hours**: Lecture: 1-6 Contact: 1-6
**Levels**: Graduate
**Schedule types**: Lecture

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</table>

**Prerequisites**: Doctoral student status and consent of instructor.

**Description**: Special advanced topics in management information systems for doctoral students. Offered for variable credit, 3-6 credit hours, maximum of 12 credit hours.

**Credit hours**: 3-6
**Contact hours**: Contact: 3-6 Other: 3-6
**Levels**: Graduate
**Schedule types**: Independent Study

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</table>

**Prerequisites**: Doctoral standing.

**Description**: In depth study in one or more topics in MSIS field. An ongoing conversation about major issues in the field. Topics related to any one of the areas within the broad, interdisciplinary field of management science and information systems, such as management information systems, management science, telecommunications, and operations management. Offered for variable credit, 1-12 credit hours, maximum of 12 credit hours.

**Credit hours**: 1-12
**Contact hours**: Lecture: 1-12 Contact: 1-12
**Levels**: Graduate
**Schedule types**: Lecture
MSIS 6333 Overview of MSIS Research
Prerequisites: Doctoral standing.
Description: Recent research studies that fall within the broad, interdisciplinary field of management science and information systems. An introduction to the academic "way of life", focusing on research productivity.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

MSIS 6343 Advanced Methods in MSIS Research
Prerequisites: Doctoral standing
Description: Development of advanced methodological skills necessary to carry out research in the chosen area of study within the field of MSIS. Skills related to any one of the areas within the broad, interdisciplinary field of management science and information systems, such as management information systems, management science, telecommunications, and operations management. Same course as BADM 6343.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Mgmt Sci & Info Sys

Undergraduate Programs
- Data Science (DS), Minor (http://catalog.okstate.edu/spears-business/management-science-information-systems/data-science-minor)
- Information Assurance (IA), Minor (http://catalog.okstate.edu/spears-business/management-science-information-systems/information-assurance-minor)

Graduate Programs
The Department of Management Science and Information Systems offers courses that lead to the completion of the Master of Business Administration (MBA), the Master of Science in information assurance (MSIA), the Master of Science in management information systems (MIS) and the Doctor of Philosophy in business administration (PhD).

The Master of Business Administration (MBA) Degree
(See "Business Administration (http://catalog.okstate.edu/spears-business/business-administration/#graduateprogramstext)."

The Master of Science in Information Assurance (MSIA) Degree
In response to industry's need for skilled and knowledgeable cyber security graduates, Oklahoma State University offers a Master of Science degree in information assurance. This program is offered not only through traditional means to on-campus students but also via distance learning technologies to students at remote locations.

This program prepares graduates for managing the security aspects of today's global firms, developing policies, procedures and technical expertise to protect their data assets. The graduates of this program are likely to be employed by providers or users of information assurance.

Information Assurance Curriculum
The program curriculum consists of 32-33 credit hours, including eight core courses and three electives. Students may choose either a part-time or full-time sequence. Full-time students can complete the program in one and one-half years while part-time students may complete it in two years.

MSIA degree candidates have the opportunity to develop broad knowledge in specific elective areas chosen to best fit their career aspirations.

Admission Requirements
Qualified graduates of colleges and universities of recognized standards are eligible to seek admission to the OSU Graduate College. Applicants must submit the completed application form to the Graduate College with official transcripts of all academic work and degrees received.

In addition to the OSU Graduate College's standard requirements, the information assurance program admissions committee will consider students' letters of recommendation, GMAT or GRE scores, previous academic performance and telecommunications experience.

Information about the program is available on the Internet at https://watson.okstate.edu/msia/.

The Master of Science in Management Information Systems (MIS) Degree
This degree program combines strong theoretical concepts with intense hands-on instruction, helping graduates not only to understand business processes and the concepts behind the information systems they work with, but also develop, modify, use and protect these rapidly-changing computing systems through their technical expertise.

The MS in MIS is a 33-34 hour program featuring a core of 25 hours (24 for part-time), including a business practicum, plus two options to highlight different interest areas: data science and application development. These options afford the student opportunities to focus on descriptive, predictive and prescriptive analytics as well as software design and implementation.

Admission requirements for the MS in MIS are similar to the admission requirements for the other master's programs in the Spears School of Business. Information about the program is available on the Internet at http://mis-analytics.okstate.edu.
Certificate in Health Analytics

There is a dire need for professionals with practical knowledge and skills in health analytics—ones who can convert large data repositories into actionable insight for better decisions to enhance effectiveness and efficiency in the ever more complex and highly competitive health care domain. OSU’s internationally ranked MS in MIS program has collaborated with the Center of Health Sciences’ MS in Health Care Administration (HCA) program and the Center of Health Systems Integration (CHSI) research center focused on the intersection of health, healthcare, informatics and analytics/data sciences to create a new, unique interdisciplinary program – a Certificate in Health Analytics.

The program requires taking four courses (each three credit hours, totaling 12 credit hours) of coursework. This certificate program allows for the courses to double-count toward a master’s degree and this certificate degree.

The Doctor of Philosophy (PhD) Degree

The PhD in business administration program administered through the Department of Management Science and Information Systems provides intensive study in management information systems, management science, operations management and telecommunications management. It prepares the student for significant professional contributions in university teaching and research.

The program is flexible and individually structured to meet the needs and objectives of the candidate. Emphasis is placed on understanding the analytical and theoretical foundations of business administration, applications in the depth area of specialization and development of research capabilities in the discipline.

As prerequisites to the program, all candidates are to have completed appropriate basic courses in calculus and statistics. Likewise, candidates are expected to have a basic competence in the major functional areas of business—accounting, finance, management, management information systems, management science and marketing. Competence in the functional areas is usually attained by documenting that the student has recently completed the appropriate graduate courses in each area through a program accredited by the Association to Advance Collegiate Schools of Business (AACSB International).

Competence in planning and executing research must be demonstrated in a dissertation. In addition, each candidate must pass a series of comprehensive qualifying examinations, written and oral, and a separate, final oral examination of the dissertation. To enhance teaching skills, all PhD students in residence are required to teach on a quarter-time or half-time basis for at least one semester while earning the degree.

Outstanding students with master’s degrees in any field of study may apply. The application for admission to the program is evaluated on the basis of the following:

1. undergraduate and graduate grade-point averages,
2. the score on the Graduate Management Admissions Test,
3. a two- or three-page statement describing goals and academic interests,
4. three letters of recommendation,
5. evidence of research potential, and
6. a personal interview when feasible.