Information Technology Auditing and Cybersecurity, M.S.

FOX SCHOOL OF BUSINESS AND MANAGEMENT (http://www.fox.temple.edu)

About the Program

The M.S. in Information Technology Auditing and Cybersecurity (MS ITACS) program prepares students as entry-level IT auditors and security professionals who have the skills and knowledge needed to pass the key professional exams in each area. The IT Auditing concentration is based on the model curriculum of the Information Systems Audit and Control Association (ISACA), and students are expected to complete the Certified Information Systems Auditor (CISA) exam at the end of their study. In most situations, the MS ITACS can also be substituted for one year of experience on the CISA application. Students in the Cybersecurity concentration sit for either the Certified Information Systems Security Professional (CISSP®) or Systems Security Certified Practitioner (SSCP®) exam, depending on their years of experience.

Time Limit for Degree Completion: 6 years

Campus Location: Main or online

Full-Time/Part-Time Status: The MS ITACS program requires students to take 30 to 39 credits of graduate study in one of two concentrations: Cybersecurity or Information Technology Auditing. The concentrations share three core courses; students then take seven to ten specialty courses focused on the selected concentration. Full-time students can complete either concentration in 12 months. Part-time students normally complete the program in two years.

Affiliation(s): Research is supported by Fox School of Business and Management's Advanta Center for Research in Financial Institutions, Center for Healthcare Research and Management, Innovation and Entrepreneurship Institute, and Institute of Global Management Studies. Research interests of the Fox School faculty are also supported by numerous centers and institutes throughout Temple University.

Ranking: Graduate programs offered by the Department of Management Information Systems (MIS), including the MS ITACS, are ranked by U.S. News and World Report as the 14th best MIS graduate programs in the country. The Fox School of Business and Management is highly ranked. Current ranking information may be viewed at http://www.fox.temple.edu/about-fox/why-fox/rankings/.

Accreditation: All Fox School of Business and Management graduate programs are accredited by the Association to Advance Collegiate Schools of Business (AACSB International).

Areas of Specialization: Two areas of concentration are offered:

• Cybersecurity
• Information Technology Auditing

Job Prospects: Job prospects for graduate students in both concentrations are excellent. The Center for Student Professional Development at Fox School of Business and Management provides career services and helps students find rewarding employment upon graduation. Note that the degree can count as one year of experience toward fulfilling the CISA experience requirement.

Licensure: The curriculum prepares students to sit, as appropriate, for one of these credentialing exams:

• Certified Information Systems Auditor (CISA)
• Certified Information Systems Security Professional (CISSP®), with a minimum of five years' experience
• Systems Security Certified Practitioner (SSCP®)

Non-Matriculated Student Policy: All courses in the MS ITACS program require the student to be matriculated.

Financing Opportunities: The Fox School of Business and Management recognizes outstanding educational achievement by awarding tuition scholarships. These awards are based on merit, which includes overall GPA and GMAT/GRE scores, where applicable. Students being considered for merit-based scholarships do not need to complete additional forms or submit additional application essays or recommendations. Scholarship recipients are notified shortly after the admissions decision is made.

Admission Requirements and Deadlines

Application Deadline:

Fall:

• December 10 - Early Decision
& March 1 - Application Deadline
& June 30 - Late Application Deadline

Spring: October 31

Applications are processed as they are received throughout the year. Late applications may be considered for admission.

APPLY ONLINE (http://fox.force.com/SiteLogin) to this Fox graduate program at http://fox.force.com/SiteLogin.

Letters of Reference:
Number Required: 2

From Whom: Letters of recommendation should be obtained from college/university faculty members familiar with academic competence and/or professional references (employers) who know the applicant well and can attest to her/his leadership ability.

Coursework Required for Admission Consideration: Applicants must hold a bachelor's degree, earned with an overall minimum GPA of 3.0 on a 4.0 scale.

Bachelor’s Degree in Discipline/Related Discipline: For the IT Auditing concentration, a baccalaureate degree in Accounting, Computer Science, MIS, or Risk Management is preferred. Other undergraduate degrees are considered for individuals already working in the field. For the Cybersecurity concentration, applicants must hold a bachelor’s degree in Computer Science, MIS, or Software Engineering.

Statement of Goals: One essay is required. It should discuss how you became interested in this field, what your professional plans and goals are, and how you see the degree program helping you achieve your goals.

Standardized Test Scores:

GMAT or GRE: Required. Scores are expected to be in the 75th percentile.

TOEFL: 100 iBT or 600 PBT minimum

IELTS: 7.5 minimum

Resume: Current resume required.

Interview: A personal interview may be requested to make a decision on the application.

Program Requirements

General Program Requirements:
Number of Credits Required Beyond the Baccalaureate: 30

Required Courses:

Information Technology Auditing Concentration

Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MIS 5202</td>
<td>IT Governance</td>
<td>3</td>
</tr>
<tr>
<td>MIS 5206</td>
<td>Protection of Information Assets</td>
<td>3</td>
</tr>
<tr>
<td>MIS 5214</td>
<td>Security Architecture</td>
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IT Auditing Concentration Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MIS 5121</td>
<td>Enterprise Resource Planning Systems</td>
<td>3</td>
</tr>
<tr>
<td>MIS 5201</td>
<td>IT Audit Process</td>
<td>3</td>
</tr>
<tr>
<td>MIS 5203</td>
<td>Systems and Infrastructure Lifecycle Management 1</td>
<td>3</td>
</tr>
<tr>
<td>MIS 5205</td>
<td>IT Service Delivery and Support</td>
<td>3</td>
</tr>
<tr>
<td>MIS 5208</td>
<td>Data Analytics for IT Auditors</td>
<td>3</td>
</tr>
<tr>
<td>MIS 5287</td>
<td>Business Skills for the IT Auditor (2 terms)</td>
<td>3</td>
</tr>
</tbody>
</table>

Capstone Course

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MIS 5902</td>
<td>IT Auditing Capstone</td>
<td>3</td>
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</tbody>
</table>

Total Credit Hours: 30

1 MIS 5122 Enterprise Architecture for IT Auditors (3 s.h.) may be required of students who are admitted to the program, but lack sufficient technical background.
Students may take up to two Special Topics courses in the ITACS, Computer Science, or Engineering Security programs in lieu of up to two concentration courses. This is done in consultation with the ITACS Program Director.

**Cybersecurity Concentration**

**Core Courses**

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**Cybersecurity Concentration Courses**

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<tbody>
<tr>
<td>MIS 5209</td>
<td>Securing Digital Infrastructure</td>
<td>3</td>
</tr>
<tr>
<td>MIS 5211</td>
<td>Introduction to Ethical Hacking</td>
<td>3</td>
</tr>
<tr>
<td>MIS 5212</td>
<td>Advanced Penetration Testing</td>
<td>3</td>
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<td>MIS 5215</td>
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<tr>
<td>MIS 5216</td>
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<tr>
<td>MIS 5217</td>
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<td>MIS 5903</td>
<td>Cyber Security Capstone</td>
<td>3</td>
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</table>

Total Credit Hours: 30

Students may take up to two Special Topics courses in the ITACS, Computer Science, or Engineering Security programs in lieu of up to two concentration courses. This is done in consultation with the ITACS Program Director.

**Culminating Events:**

The MS ITACS program culminates in a capstone that prepares students to take the appropriate professional certification examination:

- Certified Information Systems Auditor (CISA)
- Certified Information Systems Security Professional (CISSP®), with a minimum of five years' experience
- Systems Security Certified Practitioner (SSCP®)

**Contacts**

**Program Web Address:**


**Department Information:**

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701 Alter Hall (006-22)
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foxinfo@temple.edu
215-204-5890
215-204-7678
Fax: 215-204-1632

**Submission Address for Application Materials:**

http://fox.force.com/SiteLogin

**Department Contacts:**

*ITACS Academic Director:*
David Lanter
209C Speakman Hall
david.lanter@temple.edu
215-204-3077

*Specialized Master's Program Coordinator:*
Rachel Carr
Associate Director for Specialized Master's Programs
rcarr@temple.edu
Courses

MIS 5001. Information Technology Management. 1 to 3 Credit Hour.
Organizations that strategically select, manage, and deploy digital business models prosper in the global economy. Students will use systems and business process thinking to create and analyze strategies for technology-enabled organizational and industry transformation. They will propose innovative solutions for new and existing business initiatives to leverage enterprise, consumer, and social technologies.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

MIS 5101. Business Intelligence. 3 Credit Hours.
Data is a core building block of modern organizations; transforming data into information and knowledge enables firms to compete effectively. In this course, students learn best practices for acquiring, assessing, and analyzing data to solve business problems. Students also learn the technologies that comprise an organization’s information infrastructure. Students gain hands-on experience with these concepts through case studies and exercises.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

MIS 5102. Process Improvement and Innovation. 3 Credit Hours.
An information system is only valuable to an organization when it enables and supports a useful business process. Students learn to assess, design, and analyze processes that foster innovation. Core concepts include designing effective solutions, identifying metrics for assessment, and communicating plans to management. Students apply these skills through analysis of business problems for actual firms.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
MIS 5001|Minimum Grade of B-|May not be taken concurrently
OR MIS 5302|Minimum Grade of B-|May not be taken concurrently
OR MIS 5402|Minimum Grade of B-|May not be taken concurrently.

MIS 5103. Network Architectures for Business. 3 Credit Hours.
This course covers the information architecture of the internet-enabled organization, including the use and development of client server and distributed systems. It provides detailed analysis of networking and telecommunications, including data, voice, image, video, network hardware, and topology. Concepts, models, architectures, and standards for the design, implementation, integration, security, and management of distributed internet- and intranet-enabled systems and networks are discussed. The course provides an understanding of the role of the information architecture and distributed systems on organizational design and management strategy.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
MIS 5001|Minimum Grade of B-|May not be taken concurrently
OR MIS 5302|Minimum Grade of B-|May not be taken concurrently
OR MIS 5402|Minimum Grade of B-|May not be taken concurrently.

MIS 5104. Network Centric Application. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.
MIS 5105. Emerging Technologies. 3 Credit Hours.
This seminar reviews emerging technologies that will prepare students to effectively leverage new technologies to create business opportunities through innovation. The specific topic of this course varies by semester to accommodate new trends and technologies.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5106. Object Oriented Computing. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5107. Knowledge Mgmt/Bus Intel. 3 Credit Hours.
This course reviews knowledge management principles and technologies focusing on business applications.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5108. Digital Business Strategy. 3 Credit Hours.
Information Technology leadership is a critical function in organizations. This course teaches the skills of effective technology strategists. Students develop the business case for new technology initiatives, evaluate the success of existing initiatives and develop plans for technology-enabled organizational change. Through a series of case study analyses, students develop technological and organizational skills required of IT leaders.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
MIS 5001|Minimum Grade of B-|May not be taken concurrently
OR MIS 5302|Minimum Grade of B-|May not be taken concurrently
OR MIS 5402|Minimum Grade of B-|May not be taken concurrently.

MIS 5109. User Interface Design. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5112. Business Design and Innovation. 3 Credit Hours.
Digital business opportunities are no longer limited to the technology itself; they also include the experiences and ecosystems around them. To succeed in this new economy, today's leaders require a broad set of skills that incorporate creative thinking and innovation. Students will learn the tools and methods of Business Design to address real-world business problems. They will apply design inquiry techniques to craft original solutions to a series of practical scenarios.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

MIS 5121. Enterprise Resource Planning Systems. 3 Credit Hours.
This course introduces students to the essential concepts of an ERP. The course looks at how a business' key transactions are executed and accounted for in an ERP. IS and accounting controls to assure confidentiality, integrity and authenticity are examined. Finally, the course looks at how transaction processing data is transformed into data for management analysis and legal entity reporting.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5122. Enterprise Architecture for IT Auditors. 3 Credit Hours.
This course surveys the technology concepts and components that are critical for the IT auditor to understand. It uses an enterprise architecture framework to explore issues of business process, business data, applications and the infrastructure that are necessary to run those applications.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.
MIS 5123. Business Essentials for IT Audits. 1 to 3 Credit Hour.
This course gives incoming students from technical disciplines the basic business background that they will need throughout the ITACS curriculum. Students will learn how to read basic financial statements, the components that make up a business model, how applications support both revenue generation and operations, and the role of a control environment. Topics include the income statement, balance sheet, cash flow statement, business model, value proposition, market segmentation, the sales process, business processes and controls.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5161. Inf Sys Applications-Org. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5162. Database Mgt Sys & Model. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5163. Sys Anal/Rapid App Dev. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5164. Inf Tech Prin-Network-BS. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5170. Special Topics. 1 to 6 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

MIS 5178. Inf Architect & Network. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5179. Inf Systems Mgt & Proces. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5182. Independent Study. 1 to 6 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

MIS 5190. Special Topics in MIS. 1 to 6 Credit Hour.
Special topics in current developments in the field of information systems are covered.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

MIS 5201. IT Audit Process. 3 Credit Hours.
This course introduces students to the essential concepts of IT auditing. Students will learn standards and guidelines for performing an IT audit. Topics will include concepts of internal controls. Students will learn to plan and manage an audit as well as how to report on evidence collected during the audit.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.
MIS 5202. IT Governance. 3 Credit Hours.
Understanding how IT organizations are structured and managed is essential to effective IT auditing. In this course students will learn how IT organizations are managed and the issues which make IT management so challenging. Students will learn how strategic planning is performed within IT organizations. A number of tools, techniques, and frameworks such as COBIT will be discussed which will help make the auditor effective in this environment.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

MIS 5203. Systems and Infrastructure Lifecycle Management 1. 3 Credit Hours.
Examines how an organization builds an enterprise architecture within an environment of internal control. Topics cover include information system planning, management and usage, the development, acquisition and maintenance of these technologies and their impact on the organization's business processes.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

MIS 5204. Systems and Infrastructure Lifecycle Management 2. 3 Credit Hours.
A closer examination of the controls needed during software development and the external acquisition of systems as well as the concept of application controls and how they are used.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
MIS 5203|Minimum Grade of B-|May not be taken concurrently.

MIS 5205. IT Service Delivery and Support. 3 Credit Hours.
Learn how the operational aspects of an IT organization deliver on the value proposition of the organization. Learn about the technical infrastructure and how this infrastructure provides a reliable and secure platform for applications. Learn about service center management and how these teams are utilized to deliver value to the organization.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

MIS 5206. Protection of Information Assets. 3 Credit Hours.
Information is an organization's most precious asset. Inadvertent disclosure of sensitive information can have significant operational and financial impact on the organization. Loss of information or access to it can also have serious adverse impacts on the organization. In this course students learn the importance of managing the information assets of the organization including logical IT security, physical, and environmental security. Disaster recovery and mitigating risk through insurance are also discussed.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

MIS 5208. Data Analytics for IT Auditors. 3 Credit Hours.
MIS 5208 examines the emerging approach of continuous-audit. This approach relies heavily on data analytics to examine datasets produced by audit and security controls (for instance, network log files). Basic data analysis concepts are presented and then applied to security or audit problems. Audit specific tools like ACL will be used in addition to general tools like Excel.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.
MIS 5209. Securing Digital Infrastructure. 3 Credit Hours.
This course examines issues related to securing the components of a company's infrastructure. It reviews network, firewall, and basic operating system security issues. It presents the material theoretically and practically through many in class and homework exercises.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Repeatability: This course may not be repeated for additional credits.

MIS 5211. Introduction to Ethical Hacking. 1.5 to 3 Credit Hour.
This course introduces students to the hacking strategies and tactics used by ethical or "White Hat" hackers. Methods of vulnerability exploitation to be used primarily in the process of Security Penetration will be explored in theory and in hands on exercises. The course will require simple programming using Open Source scripting languages and hacking tool kits. For that reason some knowledge of and experience with computer programming is required.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.
Repeatability: This course may not be repeated for additional credits.

MIS 5212. Advanced Penetration Testing. 1.5 to 3 Credit Hour.
This course introduces students to Penetration Testing. Methods of vulnerability assessment and exploitation are examined as a means of identifying areas requiring improved security and recommended changes. The ethical, business governance and legal implications of penetration testing are examined. Specific techniques are examined in detail with the intent of giving the students a practical understanding of how Penetration Tests are conducted and laboratory-based experience in their actual conduct.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.
Repeatability: This course may not be repeated for additional credits.

MIS 5213. Intrusion Detection & Response. 1.5 to 3 Credit Hour.
While all businesses work to be as secure as possible, it is agreed that no organization can be completely secure. Preventing attacks, quickly identifying successful attacks, detecting advanced persistent threats and monitoring systems activity in order to deter intrusions can result in significant business benefit. This course examines the variety of tools and techniques used to do this work.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.
Repeatability: This course may not be repeated for additional credits.

MIS 5214. Security Architecture. 3 Credit Hours.
Examines the methodology by which an organization aligns its business strategy with its security operations. Both the current and desired future states of the business' security efforts are described so that resources can be directed to the security efforts most needed to support the business.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.
Repeatability: This course may not be repeated for additional credits.

MIS 5282. Independent Study. 1 to 3 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Repeatability: This course may be repeated for additional credit.

Pre-requisites:
MIS 5001|Minimum Grade of B-|May not be taken concurrently.
MIS 5287. Business Skills for the IT Auditor. 1.5 Credit Hour.
In this course students practice a variety of business skills that are necessary to be effective as an IT auditor. These skills include managerial communications and public speaking skills, interviewing skills, negotiation and personal selling skills, business writing, industrial psychology/behavioral science skills, project/time management and team building skills. The course is delivered through a series of workshops and simulations and include observations of business practices at host IT companies. The practicum will be scheduled for fall (1.5 credits) and spring (1.5 credits) semester to allow for optimal development of business skills.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may be repeated for additional credit.

MIS 5301. Data Analytics for Management. 1.5 Credit Hour.
Organizations rely on data to make effective decisions, and managers must create a data-driven mindset that uses analytics to drive strategy. In this course, students learn how data is used to support organizational decision-making and solve business problems. Students learn the tools and techniques organizations use to assess, prepare, and analyze data. Students gain hands-on experience through case studies and exercises that require the use of a wide range of data and analytic skills, including statistics. The course includes a data analytics contest involving the analysis, interpretation and reasoning from data provided by corporate and nonprofit partners.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

Pre-requisites:
STAT 5301|Minimum Grade of B-|May be taken concurrently.

MIS 5302. Managing Technology & Systems. 1.5 Credit Hour.
Organizations that strategically select, manage, and deploy digital business models prosper in the global economy. Students will use systems and business process thinking to create and analyze strategies for technology-enabled organizational and industry transformation. They will map systems and processes and propose innovative solutions for new and existing business initiatives to leverage enterprise, consumer, and social technologies.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

MIS 5303. Design Inquiry and Research. .5 to 1.5 Credit Hours.
This course forms a foundation of approaches, skills and working methods to be applied throughout the MBA experience. This material is less about a distinct subject and more about a new perspective to effectively meet the business challenges of a rapidly changing, technologically driven global world. The course introduces the concept of Business Design, a holistic approach to management that combines the analytical strengths of traditional business education with the qualitative research, idea generation and the ability to synthesize information from design education. It is a balance of quantitative and qualitative thinking. Design Inquiry is a question-based framework to structure this problem solving process to create innovative solutions that are user-centered, socially, culturally and functionally meaningful and economically sustainable. The challenge associated with this course will be an enterprise risk assessment featuring a specific company and including interviews, tours and other primary (as well as secondary) data gathering principles and processes.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may be repeated for additional credit.
MIS 5401. Data Analytics for Management. 1.5 Credit Hour.
Organizations rely on data to make effective decisions, and managers must create a data-driven mindset that uses analytics to drive strategy. In this course, students learn how data is used to support organizational decision-making and solve business problems. Students learn the tools and techniques organizations use to assess, prepare, and analyze data. Students gain hands-on experience through case studies and exercises that require the use of a wide range of data and analytic skills, including statistics. The course includes a data analytics contest involving the analysis, interpretation and reasoning from data provided by corporate and nonprofit partners.

**Level Registration Restrictions:** Must be enrolled in one of the following Levels: Graduate.

**College Restrictions:** Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

**Pre-requisites:**
STAT 5001|Minimum Grade of B-|May not be taken concurrently
OR STAT 5401|Minimum Grade of B-|May be taken concurrently.

MIS 5402. Managing Technology & Systems. 1.5 Credit Hour.
Organizations that strategically select, manage, and deploy digital business models prosper in the global economy. Students will use systems and business process thinking to create and analyze strategies for technology-enabled organizational and industry transformation. They will map systems and processes and propose innovative solutions for new and existing business initiatives to leverage enterprise, consumer, and social technologies.

**Level Registration Restrictions:** Must be enrolled in one of the following Levels: Graduate.

**College Restrictions:** Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

**Repeatability:** This course may not be repeated for additional credits.

MIS 5403. Design Inquiry and Research. .5 to 1.5 Credit Hours.
This course forms a foundation of approaches, skills and working methods to be applied throughout the MBA experience. This material is less about a distinct subject and more about a new perspective to effectively meet the business challenges of a rapidly changing, technologically driven global world. The course introduces the concept of Business Design, a holistic approach to management that combines the analytical strengths of traditional business education with the qualitative research, idea generation and the ability to synthesize information from design education. It is a balance of quantitative and qualitative thinking. Design Inquiry is a question-based framework to structure this problem solving process to create innovative solutions that are user-centered, socially, culturally and functionally meaningful and economically sustainable. The challenge associated with this course will be an enterprise risk assessment featuring a specific company and including interviews, tours and other primary (as well as secondary) data gathering principles and processes.

**Level Registration Restrictions:** Must be enrolled in one of the following Levels: Graduate.

**College Restrictions:** Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

**Repeatability:** This course may be repeated for additional credit.

MIS 5601. Database Analytics. 1.5 to 3 Credit Hour.
This course provides a foundation for, and practice in, designing database systems and analyzing business data to enhance firm competitiveness. Concepts introduced in this course aim to develop an understanding of the different types of business data, various analytical approaches, and application of these approaches to solve business problems. Students will have hands-on experience with current, cutting-edge tools such as MySQL and SAS Enterprise Miner.

**Level Registration Restrictions:** Must be enrolled in one of the following Levels: Graduate.

**College Restrictions:** Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

**Repeatability:** This course may be repeated for additional credit.

MIS 5602. Applied Predictive Analytics. 1.5 to 3 Credit Hour.
Students will learn how to select relevant variables for analysis, apply the appropriate analytic technique, and interpret the practical implications of the results. Topics also include unstructured “big” data, sentiment analysis, and articulating results to a business audience. Students will have hands-on experience with current, cutting-edge tools such as SAS Enterprise Miner. This course will cover advanced topics needed to resolve more complicated business problems including but not limited to data cleansing and reporting. The foundation, set in MIS 5101, will be strengthened and expanded with more concepts and applications appropriate for solving more challenging business problems and effectively communicating and presenting the output needed to resolve the problem.

**Level Registration Restrictions:** Must be enrolled in one of the following Levels: Graduate.

**College Restrictions:** Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

**Repeatability:** This course may be repeated for additional credit.
MIS 5603. Social Media Innovation. 1.5 to 3 Credit Hour.
This course prepares students to strategically deploy social media solutions to support enterprise innovation. It covers key concepts and principles related to new business models supported by innovative use of Web 2.0 and social media. Through a combination of readings, discussions, presentations, and hands-on projects, we examine (i) the organizational use of key media technologies such as photo and website editing, blogs, web analytics, and search engine optimization, (ii) the business models underlying successful innovative new media organizations including Wikipedia, Craigslist, YouTube, and Facebook, and (iii) the role of centralized, decentralized, and crowdsourced information resources in online media innovation.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

MIS 5651. Digital Innovation in Marketing Capstone. 6 Credit Hours.
In this course students are given the opportunity to demonstrate the capabilities they have developed in other portions of the program. This course makes extensive use of case studies and role playing exercises, and/or real world projects. The objective of this course is to expose students to each of the domains covered in the curriculum. Sample contexts for these case studies/projects will be designing and measuring the efficacy of a web marketing strategy across multiple channels, evaluating the suitability for a new digital marketing technology such as mobile apps, portfolio management of digital marketing assets such as mobile apps, websites, social media and others. This is a cohort based program, the first enrollment must be for 6 credits.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

MIS 5801. Managing Information. 2 to 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5882. Independent Study. 1 to 6 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

MIS 5890. Special Topics. 1 to 6 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

MIS 5901. Capstone in Information Technology. 3 Credit Hours.
Open only to M.S. in MIS students who must have completed all 4 core courses and 2 electives. For this capstone experience, students select a topic in their area of interest and write a research paper or implement an information system.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 5902. IT Auditing Capstone. 3 Credit Hours.
In this course students are given the opportunity to demonstrate the capabilities they have developed in other portions of the program. This course makes extensive use of case studies and role playing exercises. Students will explore a comprehensive case study which exposes them to each of the domains covered in the curriculum.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

MIS 5903. Cyber Security Capstone. 3 Credit Hours.
This is the final course in the ITACS cyber security track. The course has two purposes. First, it reviews all of the topics covered in earlier courses and further prepares the students for the SSCP exam. Second, it requires students to integrate what they have learned and research an emerging topic in the field of IT assurance.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.
MIS 9001. Qual & Interpret Meth-IS. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 9002. Inf Sys Found & Theory. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 9003. Foundations of Electronic Commerce Research. 3 Credit Hours.
This course offers an overview of electronic commerce research in the domain of Information Systems (IS). An impressive body of work on electronic commerce has developed over the last two decades in IS research, and this course aims at reviewing and integrating this large body of research toward identifying gaps in the literature and proposing new opportunities for research that students can pursue as part of independent research projects. This course overviews the electronic commerce literature in IS research under a framework based on the main entities involved in electronic commerce - businesses and consumers that interact with the aid of Internet technologies, resulting in three broad research areas - (1) Business to Consumer (B2C), (2) Consumer to Consumer (C2C), and (3) Business to Business (B2B). These three broad research areas are further categorized into sixteen specialized topics and sub-areas, which help summarize the literature and integrate the body of work.

Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Philosophy.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may not be repeated for additional credits.

MIS 9004. Adv Research Methods-IS. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may not be repeated for additional credits.

MIS 9011. Proseminar in Management Information Systems. 1 to 3 Credit Hour.
This course is required for all first year PhD in Business Administration - MIS students. It offers an overview of electronic commerce research in the domain of Information Systems (IS) under a framework based on the main entities involved in electronic commerce - businesses and consumers that interact with the aid of Internet technologies, resulting in three broad research areas - (1) Business to Consumer (B2C), (2) Consumer to Consumer (C2C), and (3) Business to Business (B2B). These three broad research areas are further categorized into sixteen specialized topics and sub-areas, which help summarize the literature and integrate the body of work. An impressive body of work on electronic commerce has developed over the last two decades in IS research, and this course aims at reviewing and integrating this large body of research toward identifying gaps in the literature and proposing new opportunities for research that students can pursue as part of independent research projects.

Field of Study Restrictions: Must be enrolled in one of the following Majors: Business Administration.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Philosophy.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School, Sport Tourism Hospitality Mgt.

Repeatability: This course may be repeated for additional credit.

MIS 9090. Contemp Topics & Res-IS. 1 to 6 Credit Hour.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.

Repeatability: This course may be repeated for additional credit.

MIS 9183. Directed Study in MIS. 3 Credit Hours.
Level Registration Restrictions: Must be enrolled in one of the following Levels: Graduate.
Degree Restrictions: Must be enrolled in one of the following Degrees: Doctor of Philosophy.
College Restrictions: Must be enrolled in one of the following Colleges: Business & Mngmnt, Fox School.

Repeatability: This course may be repeated for additional credit.