Department of Information Systems and Cyber Security

All graduate programs in Information Systems and Cyber Security are accredited by AACSB International—The Association to Advance Collegiate Schools of Business—and conform to recommended guidelines.

- Master of Business Administration Degree – Cyber Security Concentration (p. 1)
- Master of Business Administration Degree – Information Systems Concentration (p. 1)
- Master of Business Administration Degree – Management of Technology Concentration (p. 1)
- Master of Business Administration Degree – Project Management Concentration (p. 2)
- Master of Science Degree in Information Technology (p. 2)
- Master of Science Degree in Information Technology – Cyber Security Concentration (p. 3)
- Master of Science Degree in Management of Technology (p. 3)
- Doctor of Philosophy Degree in Business Administration with an Emphasis in Information Technology (p. 4)

Master of Business Administration Degree – Cyber Security Concentration

This concentration is designed to offer the opportunity for qualified students to study business administration while developing special expertise in cyber security. To achieve this end, students can focus their elective courses on cyber security subjects such as voice and data security, risk assessment, computer forensics, and incident response. These course offerings require previous academic credit or professional experience in information security, information systems or computer science.

Students choosing to concentrate in cyber security must complete the 24 semester credit hours of courses containing the M.B.A. Core in addition to 12 semester credit hours of graduate cyber security courses from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 5143</td>
<td>Information Technology</td>
</tr>
<tr>
<td>IS 5193</td>
<td>Software Engineering Management</td>
</tr>
<tr>
<td>IS 5203</td>
<td>Telecommunication Systems</td>
</tr>
<tr>
<td>IS 6333</td>
<td>Introduction to Voice and Data Security</td>
</tr>
<tr>
<td>IS 6323</td>
<td>Security Risk Analysis</td>
</tr>
<tr>
<td>IS 6343</td>
<td>Secure Network Designs</td>
</tr>
<tr>
<td>IS 6353</td>
<td>Security Incident Response</td>
</tr>
<tr>
<td>IS 6363</td>
<td>Computer Forensics</td>
</tr>
<tr>
<td>IS 6373</td>
<td>Cyber Law</td>
</tr>
<tr>
<td>IS 6383</td>
<td>Policy Assurance for Infrastructure Assurance</td>
</tr>
</tbody>
</table>

Master of Business Administration Degree – Information Systems Concentration

This concentration is designed to offer the opportunity for qualified graduate students to study business administration while developing special expertise in information systems. To achieve this end, students can focus their elective courses on developing general managerial knowledge in the design and implementation of information systems, management of communications technologies, and principles of database management systems. Some of the course offerings require previous academic credit or professional experience in information systems.

Students choosing to concentrate in information systems must complete the 24 semester credit hours of courses containing the M.B.A. Core in addition to 12 semester credit hours of graduate information systems courses from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 5113</td>
<td>Electronic Commerce and Web Site Design</td>
</tr>
<tr>
<td>IS 5143</td>
<td>Information Technology</td>
</tr>
<tr>
<td>IS 5193</td>
<td>Software Engineering Management</td>
</tr>
<tr>
<td>IS 5203</td>
<td>Telecommunication Systems</td>
</tr>
<tr>
<td>IS 6103</td>
<td>Object Oriented Analysis and Design</td>
</tr>
<tr>
<td>IS 6303</td>
<td>Introduction to Voice and Data Security</td>
</tr>
<tr>
<td>IS 6323</td>
<td>Security Risk Analysis</td>
</tr>
<tr>
<td>IS 6343</td>
<td>Secure Network Designs</td>
</tr>
<tr>
<td>IS 6353</td>
<td>Security Incident Response</td>
</tr>
<tr>
<td>IS 6363</td>
<td>Computer Forensics</td>
</tr>
<tr>
<td>IS 6373</td>
<td>Cyber Law</td>
</tr>
<tr>
<td>IS 6383</td>
<td>Policy Assurance for Infrastructure Assurance</td>
</tr>
<tr>
<td>IS 6423</td>
<td>Secure Software Design</td>
</tr>
<tr>
<td>IS 6433</td>
<td>Supervisory Control and Data Acquisition</td>
</tr>
<tr>
<td>IS 6503</td>
<td>Principles of Database Management</td>
</tr>
<tr>
<td>IS 6703</td>
<td>Introduction to Data Mining</td>
</tr>
<tr>
<td>IS 6813</td>
<td>Strategic Management of Information Technology</td>
</tr>
</tbody>
</table>

Master of Business Administration Degree – Management of Technology Concentration

This concentration is designed to offer the opportunity for qualified graduate students, primarily with a nontechnical background, to study business administration while developing special expertise in the management of technology. To achieve this end, students can focus their elective courses on developing general managerial skills applicable to technology-based organizations, leading professional and technical employees, and integrating the various functions of an organization in today’s rapidly changing technological environment.

Students choosing to concentrate in management of technology must complete the 24 semester credit hours of courses that constitute the M.B.A. Core and 12 semester credit hours as follows:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 5143</td>
<td>Information Technology</td>
</tr>
<tr>
<td>IS 5193</td>
<td>Software Engineering Management</td>
</tr>
<tr>
<td>IS 5203</td>
<td>Telecommunication Systems</td>
</tr>
<tr>
<td>IS 6303</td>
<td>Introduction to Voice and Data Security</td>
</tr>
<tr>
<td>IS 6323</td>
<td>Security Risk Analysis</td>
</tr>
<tr>
<td>IS 6343</td>
<td>Secure Network Designs</td>
</tr>
<tr>
<td>IS 6353</td>
<td>Security Incident Response</td>
</tr>
<tr>
<td>IS 6363</td>
<td>Computer Forensics</td>
</tr>
<tr>
<td>IS 6373</td>
<td>Cyber Law</td>
</tr>
<tr>
<td>IS 6383</td>
<td>Policy Assurance for Infrastructure Assurance</td>
</tr>
<tr>
<td>IS 6423</td>
<td>Secure Software Design</td>
</tr>
<tr>
<td>IS 6433</td>
<td>Supervisory Control and Data Acquisition</td>
</tr>
<tr>
<td>IS 6503</td>
<td>Principles of Database Management</td>
</tr>
<tr>
<td>IS 6703</td>
<td>Introduction to Data Mining</td>
</tr>
<tr>
<td>IS 6813</td>
<td>Strategic Management of Information Technology</td>
</tr>
</tbody>
</table>
A. Required courses
MOT 5163 Management of Technology 3
MOT 5223 Management of Professional Personnel 3

B. Elective courses
Students must complete an additional 6 semester credit hours of graduate Management of Technology courses.

Total Credit Hours 12

Master of Business Administration Degree – Project Management Concentration

This concentration is designed to offer qualified graduate students the opportunity to study business administration while developing special expertise in project management. To achieve this end, students will complete courses that will enable them to manage projects successfully. Additionally, students will focus their elective choices to improve their understanding of the business environment in which contemporary projects are managed. Students choosing to concentrate in project management must complete the 24 semester credit hours of the courses that constitute the M.B.A. Core and 12 semester credit hours as follows:

A. Required courses
MOT 5233 Advanced Topics in Project Management 3
MOT 5243 Essentials of Project and Program Management 3

B. Elective courses
6
Students are required to take 6 semester credit hours of graduate elective courses. Students are encouraged to select courses which will develop their knowledge of a specific project management domain such as e-commerce, healthcare management, information systems, or technology management. The Graduate Programs Committee must approve the 6 elective hours.

Total Credit Hours 12

Master of Science Degree in Information Technology

The Master of Science degree in Information Technology (M.S.I.T.) provides information systems and computer science professionals with the opportunity to acquire technical knowledge in a variety of specialized information technology fields and the management skills to create, plan, organize, lead, and control the information technology in their organizations. The program is designed for students with a technical background and preferably an undergraduate or graduate degree in information systems or computer science.

Program Admission Requirements

For admission to the M.S.I.T. program, applicants must meet University-wide graduate admission requirements. Applicants are further considered on the basis of demonstrated potential for success in graduate study in information technology as indicated by a combination of prior academic achievement, Graduate Management Admission Test (GMAT) scores, personal statement, résumé (optional), and references (optional).

The M.S.I.T. Graduate Program Committee evaluates each applicant individually based on the complete package of submitted materials.

A complete application package will include:

• a completed application form
• transcripts from all universities attended
• official Graduate Management Admission Test (GMAT) scores
• a personal statement
• a current résumé with employment or other experience (optional)
• letters of reference (optional).

Degree Requirements

Candidates for the degree of Master of Science in Information Technology (M.S.I.T.) must complete the following:

A. 9 semester credit hours of required courses:
IS 5143 Information Technology 3
IS 5203 Telecommunication Systems 3
IS 6813 Strategic Management of Information Technology (Students who earn a grade of “B” (3.0) or better in this course will satisfy the comprehensive examination requirement. A student who receives a grade of “B-,” “C+,” or “C” may still satisfy the requirement by successfully passing a comprehensive examination as set out in this catalog.) 3

B. All candidates for the degree must complete an additional 24 semester credit hours of elective courses:

1. 18 semester credit hours selected from the following:
CS 5103 Software Engineering 3
CS 5443 Database Management Systems 3
CS 6543 Networks 3
CS 6553 Performance Evaluation 3
IS 5113 Electronic Commerce and Web Site Design 3
IS 5193 Software Engineering Management 3
IS 6103 Object Oriented Analysis and Design 3
IS 6303 Introduction to Voice and Data Security 3
IS 6323 Security Risk Analysis 3
IS 6343 Secure Network Designs 3
IS 6353 Security Incident Response 3
IS 6363 Computer Forensics 3
IS 6373 Cyber Law 3
IS 6383 Policy Assurance for Infrastructure Assurance 3
IS 6403 Information Resource Management 3
IS 6423 Secure Software Design 3
IS 6433 Supervisory Control and Data Acquisition 3
IS 6503 Principles of Database Management 3
IS 6703 Introduction to Data Mining 3

2. 6 semester credit hours selected from the following:
MGT 5043 Management and Behavior in Organizations 3
MGT 5093 Leadership 3
Any of the graduate courses from Management of Technology (MOT) other than MOT 6203 Strategic Management of Technology.

Total Credit Hours 33
Master of Science Degree in Information Technology – Cyber Security Concentration

This concentration is designed to offer the opportunity for qualified graduate students to study information technology while developing the special expertise in cyber security. To achieve this end, students can focus their elective courses on developing the specialized knowledge requirements for the computer and information security area while at the same time completing the requirements for the Master of Science (M.S.) degree.

Program Admission Requirements

For admission to the M.S.I.T. program with a Cyber Security concentration, applicants must meet University-wide graduate admission requirements. Applicants are further considered on the basis of demonstrated potential for success in graduate study in information technology as indicated by a combination of prior academic achievement, Graduate Management Admission Test (GMAT) scores, personal statement, résumé (optional), and references (optional).

The M.S.I.T. Graduate Program Committee evaluates each applicant individually based on the complete package of submitted materials.

A complete application package will include:

- a completed application form
- transcripts from all universities attended
- official Graduate Management Admission Test (GMAT) scores
- a personal statement
- a current résumé with employment or other experience (optional)
- letters of reference (optional).

Degree Requirements

Candidates for the degree of Master of Science in Information Technology (M.S.I.T.) with a concentration in Cyber Security must complete the following:

A. 15 semester credit hours of required courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 5143</td>
<td>Information Technology</td>
<td>3</td>
</tr>
<tr>
<td>IS 5203</td>
<td>Telecommunication Systems</td>
<td>3</td>
</tr>
<tr>
<td>IS 6303</td>
<td>Introduction to Voice and Data Security</td>
<td>3</td>
</tr>
<tr>
<td>IS 6323</td>
<td>Security Risk Analysis</td>
<td>3</td>
</tr>
<tr>
<td>IS 6813</td>
<td>Strategic Management of Information Technology (MOT 6203) Strategic Management of Technology)</td>
<td>3</td>
</tr>
</tbody>
</table>

B. All candidates for the degree must complete an additional 18 semester credit hours of elective courses:

1. 12 semester credit hours selected from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 6343</td>
<td>Secure Network Design</td>
<td>3</td>
</tr>
<tr>
<td>IS 6353</td>
<td>Security Incident Response</td>
<td>3</td>
</tr>
<tr>
<td>IS 6363</td>
<td>Computer Forensics</td>
<td>3</td>
</tr>
<tr>
<td>IS 6373</td>
<td>Cyber Law</td>
<td>3</td>
</tr>
</tbody>
</table>

2. 6 semester credit hours selected from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGT 5043</td>
<td>Management and Behavior in Organizations</td>
<td>3</td>
</tr>
<tr>
<td>MGT 5903</td>
<td>Leadership</td>
<td>3</td>
</tr>
</tbody>
</table>

Any of the graduate courses from Management of Technology (MOT) other than MOT 6203 Strategic Management of Technology.

Total Credit Hours 33

Master of Science Degree in Management of Technology

The Master of Science in Management of Technology (M.S. MOT) differs significantly from both the M.B.A. and the M.B.A. with a concentration in Management of Technology. The M.S. MOT focuses on leadership issues and skills required to stimulate and manage technological innovation and creativity as well as, for the entrepreneurial student, bringing valuable technological ideas, goods, and services to the marketplace. Courses may be available through distance learning.

Program Admission Requirements

For admission to the M.S. MOT program, the ideal applicant should have an undergraduate or graduate degree in a scientific, engineering, mathematical, or other technology-based discipline from an accredited university or college and meet University-wide graduate admission requirements. In addition, the Graduate Programs Committee evaluates each applicant individually, based on a combination of five factors:

- Prior academic achievement
- Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) scores
- At least two letters of recommendation
- A current résumé with employment or other experience
- A personal statement

Degree Requirements

Students must successfully complete 33 semester credit hours and a comprehensive examination.

A. All candidates are required to successfully complete the following 21 semester credit hours:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOT 5053</td>
<td>Technology Commercialization</td>
<td>3</td>
</tr>
<tr>
<td>MOT 5163</td>
<td>Management of Technology</td>
<td>3</td>
</tr>
<tr>
<td>MOT 5223</td>
<td>Management of Professional Personnel</td>
<td>3</td>
</tr>
<tr>
<td>MOT 5243</td>
<td>Essentials of Project and Program Management</td>
<td>3</td>
</tr>
<tr>
<td>MOT 5313</td>
<td>Emerging Technologies</td>
<td>3</td>
</tr>
<tr>
<td>MOT 5343</td>
<td>Financial Aspects of Management of Technology</td>
<td>3</td>
</tr>
<tr>
<td>MOT 6203</td>
<td>Strategic Management of Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

B. All candidates must complete 12 semester credit hours of electives as approved by the M.S. MOT Graduate Advisor of Record

C. Candidates must pass a comprehensive examination administered by the Graduate Programs Committee.

Total Credit Hours 33
Doctor of Philosophy Degree in Business Administration with an Emphasis in Information Technology

The College of Business offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Business Administration with an emphasis in Information Technology. See Ph.D. in Business Administration requirements (http://catalog.utsa.edu/graduate/business/#degreestext) in this catalog for a detailed description of the general requirements for the Doctoral degree. The Doctoral Studies Committee of the Department of Information Systems and Cyber Security will advise students admitted to the program who pursue a Ph.D. in Business Administration with an emphasis in Information Technology.

To satisfy the Major Area Coursework for the information technology emphasis, a student must complete:

A. Required courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS 7013</td>
<td>Foundations of Information Systems Research</td>
<td>3</td>
</tr>
<tr>
<td>IS 7023</td>
<td>Behavioral and Organizational Information Systems Research</td>
<td>3</td>
</tr>
<tr>
<td>IS 7033</td>
<td>Topics in Information Systems Technology Research</td>
<td>3</td>
</tr>
<tr>
<td>IS 7043</td>
<td>Seminar in Software Development</td>
<td>3</td>
</tr>
</tbody>
</table>

B. Three directed electives (9 semester credit hours) as approved by the Doctoral Studies Committee. 9

Total Credit Hours 21

Graduate Certificate in Technology Entrepreneurship and Management

This certificate program is designed for current graduate students in technology and science-related disciplines who wish to expand their skills at translating new technologies into new products and companies. The program also supports professionals who have earned a bachelor’s degree and are currently interested in pursuing advanced education in Technology Entrepreneurship and Management without committing to a full graduate degree program. Students who are currently enrolled in a graduate degree program at UTSA are eligible for admission to this certificate program. Professionals interested in enrolling in this certificate program will be considered on a case by case basis.

Students who wish to earn the Graduate Certificate in Technology Entrepreneurship and Management (TEM) must complete 12 semester credit hours as follows:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOT 5053</td>
<td>Technology Commercialization</td>
<td>3</td>
</tr>
<tr>
<td>MOT 5243</td>
<td>Essentials of Project and Program Management</td>
<td>3</td>
</tr>
<tr>
<td>MOT 5253</td>
<td>Starting the High-Tech Firm</td>
<td>3</td>
</tr>
<tr>
<td>MOT 5343</td>
<td>Financial Aspects of Management of Technology</td>
<td>3</td>
</tr>
</tbody>
</table>

Total Credit Hours 12

Information Systems (IS) Courses

IS 5003. Introduction to Information Systems. (3-0) 3 Credit Hours.
A conceptual study of information systems in organizations. A survey of information systems concepts will be presented, including a historical perspective of information systems, the structure of the information systems function, an introduction to information systems technologies (hardware and software), application planning, system development, end user computing, decision support systems, and the management of information systems resources. Small cases and application problems which illustrate the concepts studied will be assigned. Credit for this course cannot be counted toward the M.B.A. concentration in Information Systems or the Master of Science degree in Information Technology.

IS 5113. Electronic Commerce and Web Site Design. (3-0) 3 Credit Hours.
Prerequisite: IS 5003 or an equivalent. Addresses the technological aspects of doing business on the Internet, including the technology underlying the Internet, common services required for all electronic commerce such as authentication and electronic payment systems, and the problems associated with some electronic commerce applications. Examines the principles of Web site design as it relates to electronic commerce.

IS 5143. Information Technology. (3-0) 3 Credit Hours.
Prerequisite: Undergraduate degree in information systems or computer science, or consent of instructor. Broad coverage of technology concepts underlying modern computing and information management. Topics include computer architecture and operating systems, information retrieval techniques, graphical user interfaces, networks, groupware, computer performance evaluation, efficiency of algorithms, and cryptography. Hands-on exposure to Internet services, SQL database language, PowerBuilder graphical interface language, and object-oriented programming language.

IS 5193. Software Engineering Management. (3-0) 3 Credit Hours.
Prerequisite: Undergraduate degree in information systems or computer science, or consent of instructor. Focuses on managing and improving the delivery of software in organizations, especially projects that include the development of large, multidisciplined systems. Students are exposed to the tools and techniques used on commercial systems, and will present research on how best to manage information technology projects. Emphasis on measurement tools for effective managerial planning and control.

IS 5203. Telecommunication Systems. (3-0) 3 Credit Hours.
Prerequisite: Undergraduate degree in information systems or computer science, or consent of instructor. Examines current, future, and basic technical concepts and related telecommunications operations; explores critical issues of communications and connectivity among information systems from strategic, organizational, and technical perspectives. An in-depth examination of basic telecommunications terminology and concepts. Topics include signaling, modulation, multiplexing, frequency bands and propagation characteristics, spectral analysis of signals, digital coding, switching systems, OSI models, and traffic analysis.

IS 5513. Fundamentals of Information Assurance. (3-0) 3 Credit Hours.
Prerequisite: Graduate standing. This course examines the principle areas of information assurance. Topics will include protecting networks, intrusion detection, digital forensics, and supervisory control and data acquisition. Application to business environments will be emphasized. Credit for this course cannot be counted toward the Master of Science degree in Information Technology. (Same as ACC 5513. Credit cannot be earned for both IS 5513 and ACC 5513.).
IS 5523. Fundamentals of Cyber Forensics. (3-0) 3 Credit Hours.
Prerequisite: Graduate standing. This course examines cyber forensics and includes hands-on projects using current industry technologies. Methods for retrieving data from disk drives and memory will be discussed. Retrieving data from mobile devices such as cell phones and PDA’s will be included. Credit for this course cannot be counted toward the Master of Science degree in Information Technology. (Same as ACC 5523. Credit cannot be earned for both IS 5523 and ACC 5523.)

IS 6103. Object Oriented Analysis and Design. (3-0) 3 Credit Hours.
Prerequisite: IS 4053 or consent of instructor. Integrates the areas of computer technology, systems analysis, and systems design in designing large-scale systems. A strong introduction to the formalization of the information systems design process is provided. The course explores state of the art systems design and specification techniques and stresses the frontiers of knowledge in the specification, design, implementation, and testing of information systems. (Formerly titled “Information Systems Design and Implementation.”)

IS 6303. Introduction to Voice and Data Security. (3-0) 3 Credit Hours.
Prerequisite: Completion of or concurrent enrollment in IS 5203. A study of security in both the voice and data networks and an examination of the security issues associated with the movement toward a convergence of the two infrastructures. Topics to be covered include voice and data network connectivity, modern security, VOIP security, wireless security, cryptography, intrusion detection systems, voice and data firewalls, malicious software, information operations and warfare, and denial of service attacks.

IS 6323. Security Risk Analysis. (3-0) 3 Credit Hours.
Prerequisites: IS 5203 and IS 6303, or consent of instructor. Addresses the tools, techniques, and methodologies in performing computer system and network security risk analyses. Computer system and network vulnerabilities will be examined as well as tools designed to discover or exploit them. Security Best Practices and audit requirements for specific environments will be studied. Topics to be covered include internal and external penetration tests, wardialing, wireless security technology, risk analysis methodology, and security audits.

IS 6343. Secure Network Designs. (3-0) 3 Credit Hours.
Prerequisites: IS 5203 and IS 6303, or consent of instructor. The course is intended to provide the background on issues related to secure network design and management. Subjects included in the class are network design, firewalls, security, fault management, and performance management. Current network management software, network security evaluation, and the role of the network architecture and protocols will also be discussed.

IS 6353. Security Incident Response. (3-0) 3 Credit Hours.
Prerequisite: IS 6303. Addresses the detection and response portion of the security operational model. Takes an in-depth look at intrusion detection methodologies and tools and the approaches to handling intrusions when they occur. Examines the laws that address cybercrime and intellectual property issues. Includes a study of proper computer and network forensics procedures to aid in the identification and tracking of intruders and in the potential prosecution of criminal activity.

IS 6363. Computer Forensics. (3-0) 3 Credit Hours.
Prerequisite: IS 6303 or consent of instructor. This class will examine the role of computer forensics in the security process. Technical issues concerning how to conduct a forensic examination as well as the legal issues associated with the process will be studied. Current forensics software will be used to illustrate the process.

IS 6373. Cyber Law. (3-0) 3 Credit Hours.
Prerequisite: Consent of instructor. Legal issues associated with cybercrimes will be studied. Laws associated with cybercrime, and rules of evidence will be the main issues discussed in this class. Intellectual property and privacy will also be included.

IS 6383. Policy Assurance for Infrastructure Assurance. (3-0) 3 Credit Hours.
Prerequisite: Consent of instructor. This course will examine the policies associated with infrastructure assurance. This will include the laws and regulations from a governmental body as well as policies generated by a business organization. The emphasis will be to examine the effect that policies and policy decisions have on the security function. Current case studies will be included.

IS 6403. Information Resource Management. (3-0) 3 Credit Hours.
Prerequisite: MGT 5043 or consent of instructor. Study of the problems and techniques associated with managing information resources. Topics include information systems project planning and control, staffing, and costing alternatives. The role of the information systems function in relation to the business firm is also studied.

IS 6423. Secure Software Design. (3-0) 3 Credit Hours.
Prerequisites: IS 5143 and IS 6303, or consent of instructor. This class will present ways of designing and implementing secure software. Techniques for developing interconnected software that is secure from outside attack will be explored. Modifying legacy code will also be discussed. Case studies and class projects will be used to illustrate the design principles discussed in class.

IS 6433. Supervisory Control and Data Acquisition. (3-0) 3 Credit Hours.
Prerequisite: IS 6303 or consent of instructor. Supervisory control and data acquisition systems are used to control many utility networks, chemical plants, pipelines and many other types of industries. This course will examine the vulnerabilities associated with these systems and discuss how they can be made secure from outside attack. Fundamentals of software-controlled processes will also be discussed.

IS 6503. Principles of Database Management. (3-0) 3 Credit Hours.
Prerequisite: IS 3063 or consent of instructor. Discussion and in-depth analysis of topics associated with the definition, creation, and management of databases for business-oriented applications. Topics include current developments in the field of database management systems. Design and implementation of a database system will be done as a major project in the course.

IS 6703. Introduction to Data Mining. (3-0) 3 Credit Hours.
This course introduces the fundamental data mining concepts and techniques that are applicable to business research. The course covers basic skills required to assemble analyses for both pattern discovery and predictive modeling. It provides extensive hands-on instruction using data mining software. This course is open to all graduate students. (Same as ACC 6703. Credit cannot be earned for both IS 6703 and ACC 6703.) (Formerly titled “Advanced Business Information Systems.”).
IS 6813. Strategic Management of Information Technology. (3-0) 3 Credit Hours.
Prerequisite: Semester of graduation or consent of Graduate Advisor of Record. This course develops a conceptual framework for strategy, its definition, elements, and relationships to the basic business functions of management of information technology. Considers the impact of technology and environmental forces on strategic management of organizations. Examines the role of information technology in business process re-engineering, product life cycles, and new business models. (Same as MOT 5203 and MOT 6203. Credit can be earned for only one of the following: IS 6813, MOT 5203, or MOT 6203.).

IS 6953. Independent Study. (0-0) 3 Credit Hours.
Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student’s Graduate Advisor of Record. Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the degree.

IS 6961. Comprehensive Examination. (0-0) 1 Credit Hour.
Prerequisite: Approval of the appropriate committee on graduate studies to take the Comprehensive Examination. Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Committee on Graduate Studies. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either “CR” (satisfactory performance on the Comprehensive Examination) or “NC” (unsatisfactory performance on the Comprehensive Examination).

IS 6971. Special Problems. (1-0) 1 Credit Hour.
Prerequisite: Consent of instructor. An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the degree.

IS 6973. Special Problems. (3-0) 3 Credit Hours.
Prerequisite: Consent of instructor. An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the degree.

IS 6983. Master’s Thesis. (0-0) 3 Credit Hours.
Prerequisites: Permission of the Graduate Advisor of Record and thesis director (form available). Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master’s degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

IS 7013. Foundations of Information Systems Research. (3-0) 3 Credit Hours.
Prerequisite: Consent of instructor. A survey of the foundations of information systems (IS) research. Students gain an understanding of both the foundations and the current research directions in a variety of IS topic areas. The course addresses frameworks, research concepts, and exemplary Management Information Systems (MIS) research. Students develop the ability to critically evaluate MIS journal articles and are exposed to diverse topics, research methodologies, and journals.

IS 7023. Behavioral and Organizational Information Systems Research. (3-0) 3 Credit Hours.
Prerequisite: Consent of instructor. This course focuses on one or more areas of emerging IS behavioral research. Topics may include individual, group, or organizational decision making, issues for e-commerce, knowledge management, management of information, and human factors. May be repeated for credit when topics vary.

IS 7033. Topics in Information Systems Technology Research. (3-0) 3 Credit Hours.
Prerequisite: Consent of instructor. This research seminar focuses on issues and methods in one or more areas having to do with the technology of information systems. Topics may include communication systems, infrastructure assurance, and data management. May be repeated for credit when topics vary.

IS 7043. Seminar in Software Development. (3-0) 3 Credit Hours.
Prerequisite: Consent of instructor. In this course, theories and models applicable to the analysis of systems structure and the processes of systems analysis and design are studied in relation to software engineering concepts. Emerging or advanced topics in the development of information system applications, such as socio-technical or soft-system methods, methodology engineering, or workflow system design, are included.

IS 7211. Doctoral Research. (0-0) 1 Credit Hour.
May be repeated for credit, but not more than 24 hours may be applied to the Doctoral degree.

IS 7212. Doctoral Research. (0-0) 2 Credit Hours.
May be repeated for credit, but not more than 24 hours may be applied to the Doctoral degree.

IS 7213. Doctoral Research. (0-0) 3 Credit Hours.
May be repeated for credit, but not more than 24 hours may be applied to the Doctoral degree.

IS 7214. Doctoral Research. (0-0) 4 Credit Hours.
May be repeated for credit, but not more than 24 hours may be applied to the Doctoral degree.

IS 7215. Doctoral Research. (0-0) 5 Credit Hours.
May be repeated for credit, but not more than 24 hours may be applied to the Doctoral degree.

IS 7216. Doctoral Research. (0-0) 6 Credit Hours.
May be repeated for credit, but not more than 24 hours may be applied to the Doctoral degree.

IS 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.
Prerequisite: Admission to candidacy for the Doctoral degree in Business Administration. May be repeated for credit, but not more than 12 hours may be applied to the Doctoral degree.

IS 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.
Prerequisite: Admission to candidacy for the Doctoral degree in Business Administration. May be repeated for credit, but not more than 12 hours may be applied to the Doctoral degree.

IS 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.
Prerequisite: Admission to candidacy for the Doctoral degree in Business Administration. May be repeated for credit, but not more than 12 hours may be applied to the Doctoral degree.

IS 7315. Doctoral Dissertation. (0-0) 5 Credit Hours.
Prerequisite: Admission to candidacy for the Doctoral degree in Business Administration. May be repeated for credit, but not more than 12 hours may be applied to the Doctoral degree.
**Management of Technology (MOT) Courses**

**MOT 5053. Technology Commercialization. (3-0) 3 Credit Hours.**
Prerequisite: MKT 5023 or consent of instructor. Examines the process of bringing technological innovation to the marketplace. Key factors are considered, including, but not limited to, the following four: intellectual property; perceived value; competitive positioning; and supply chains. Emphasis is on managing change to develop enterprise opportunities and competitive advantage. The concepts and tools covered aim to make the tasks of innovation and product portfolio management more understandable and controllable.

**MOT 5163. Management of Technology. (3-0) 3 Credit Hours.**
Prerequisite: Consent of instructor. Examines a broad range of topics and issues involved in the management of technology, including the international research and development environment and infrastructure; government, industry, and university roles in technology development; managing the research and development function; technology forecasting and assessment; and new product development.

**MOT 5173. Technology Transfer: The Theory and Practice of Knowledge Utilization. (3-0) 3 Credit Hours.**
Prerequisite: Consent of instructor. Examines the organizational, behavioral, and communication challenges involved in transferring technology from the research laboratory to the marketplace. Key factors related to licensing technology that others have patented, and the nuances of licensing one's own technology to create a revenue stream are considered. Emphasis is on valuing technology in diverse areas: for example, information systems, energy systems, and biotechnology. The concepts and tools covered aim to make the task of negotiating the acquisition and protection of intellectual property more understandable.

**MOT 5213. Organizational Systems for Management of Technology. (3-0) 3 Credit Hours.**
Prerequisite: Consent of instructor. Focuses on organizational systems commonly found in modern organizations dealing with technology, innovation, and creativity. Considers alternative organizing concepts, interfacing and integrating considerations, and decision-making and control systems.

**MOT 5223. Management of Professional Personnel. (3-0) 3 Credit Hours.**
Prerequisite: Consent of instructor. The study of behavior in professional and technical organizations. Focuses on the characteristics of professional and technical personnel, status and role systems within the professional organization, communication and conflict within and among professional groups, and implications for leadership.

**MOT 5233. Advanced Topics in Project Management. (3-0) 3 Credit Hours.**
Prerequisite: MOT 5243 or consent of instructor. An advanced course that examines contemporary issues in project management. Includes topics such as the value of project management, organizational project management maturity, project selection models, enterprise project management, and project office implementation. Synthesis and evaluation are emphasized. A basic understanding of project management is required.

**MOT 5243. Essentials of Project and Program Management. (3-0) 3 Credit Hours.**
Prerequisite: Consent of instructor. This course addresses concepts and techniques for the management of business and technology projects. Includes topics such as the project life cycle, project planning, project scheduling, project cost estimating, project risk analysis, project control techniques, earned value management, project organizations and functions, project manager responsibilities, and team building.

**MOT 5253. Starting the High-Tech Firm. (3-0) 3 Credit Hours.**
Prerequisite: Consent of instructor. A review of the steps and processes involved in starting a technology-based economic endeavor. The focus is built around the steps of identifying a problem area, identifying potential technological solutions to the identified need, and developing a proposed business entity to commercialize the technology solution.

**MOT 5313. Emerging Technologies. (3-0) 3 Credit Hours.**
Prerequisite: Consent of instructor. Examines science-based innovations with the potential to either create or transform a constellation: emerging technologies may involve either a single discovery or a bundle of innovations that converge to create a new technological system. This course focuses on the emergence of technology from basic research to implementation. Seminar format, case-study preparation, presentation, and cooperative learning are defining characteristics of this course.

**MOT 5323. Biotechnology Industry. (3-0) 3 Credit Hours.**
Prerequisite: Consent of instructor. An overview of the biotechnology industry, this course includes discussions covering biologics, pharmaceuticals and medical devices from discovery and design through commercialization and marketing. Focus is on strategic issues confronting management of an early stage biotech company from start-up through the venture capital phase. Seminar format, presentation, and cooperative learning are defining characteristics of this course.

**MOT 5333. Technological Drivers of Globalization. (3-0) 3 Credit Hours.**
Prerequisite: Consent of instructor. Examines science-based innovations contributing to the globalization of business, economic, political, and social systems. Emphasis is on identifying positive as well as negative consequences of technology-driven globalization and studying possible disruptions to globalization caused by economic or resource limitations.

**MOT 5343. Financial Aspects of Management of Technology. (3-0) 3 Credit Hours.**
Prerequisite: Consent of instructor. Examines the financial impacts on the enterprise through value creating ideas, goods, and services. The course presents a financial management view of enterprise operation, considering risk and growth scenarios, capital and cash needs, and means of financing innovation, development, and marketing opportunities.

**MOT 5353. Economic Analyses for Technology Management. (3-0) 3 Credit Hours.**
Prerequisite: Consent of instructor. This course is aimed at economic decision making in the high-technology environment. Each technology business decision is based on many factors, such as the optimal investment decision among several choices, or possibly the financial issues underlying the implementation of a project. The elements of capital allocation theory are applied for each type of scenario against both theoretical and actual projects drawn from real life situations. The course is quantitative in nature, but requires only basic math background.
MOT 6203. Strategic Management of Technology. (3-0) 3 Credit Hours.
Prerequisite: Consent of instructor. Development of a conceptual framework for strategy, its definition, elements, and relationships to the basic functions of management of technology. Considers the impact of technology and environmental forces on strategic management of the organization. (Formerly MOT 5203. Same as IS 6813. Credit can be earned for only one of the following: MOT 6203, MOT 5203, or IS 6813.).

MOT 6923. Directed Research in Management of Technology. (3-0) 3 Credit Hours.
Prerequisites: Completion of 18 semester credit hours of required Management of Technology (MOT) or Entrepreneurship (ENT) courses and consent of the M.S. MOT Graduate Advisor of Record. A directed research course in which students complete a faculty directed research project that addresses a contemporary management of technology issue or problem. Students will also develop an appreciation and understanding of contemporary management of technology research as published in leading management of technology journals.

MOT 6933. Management of Technology Professional Report. (0-0) 3 Credit Hours.
Prerequisites: MOT 6923 and consent of instructor. Research and preparation of an in-depth study of a complex problem in management of technology. Credit is awarded upon completion of the project, thesis, conference paper, or publishable article. The grade report for the course is either “CR” (satisfactory performance) or “NC” (unsatisfactory performance).

MOT 6943. Management of Technology Internship. (0-0) 3 Credit Hours.
Prerequisites: Graduate standing, 15 semester credit hours of graduate work, and consent of instructor. Internship must be approved in advance by the internship coordinator and the student’s Graduate Advisor of Record. Supervised full- or part-time off-campus work experience and training in management of technology. Individual conferences and written reports are required.

MOT 6953. Independent Study. (0-0) 3 Credit Hours.
Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student’s Graduate Advisor of Record. Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master’s degree.

MOT 6961. Comprehensive Examination. (0-0) 1 Credit Hour.
Prerequisite: Approval of the M.S. MOT Graduate Advisor of Record to take the Comprehensive Examination. Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the ETM Graduate Programs Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either “CR” (satisfactory performance on the Comprehensive Examination) or “NC” (unsatisfactory performance on the Comprehensive Examination).

MOT 6971. Special Problems. (1-0) 1 Credit Hour.
Prerequisite: Consent of instructor. An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to a Master’s degree.

MOT 6973. Special Problems. (3-0) 3 Credit Hours.
Prerequisite: Consent of instructor. An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to a Master’s degree.