M.S.   Cybersecurity Management

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Mission Statement

The mission of the Master of Science in Cybersecurity Management (M.S.C.M.) program is to provides students with the knowledge and skills necessary to identify, manage, and communicate cybersecurity risks in a global environment through a project-based curriculum delivered by highly qualified faculty.

Cybersecurity, the practice of protecting systems, networks, and data from attacks, is becoming increasingly important as individuals and organizations rely more heavily on technology, cloud computing, and remote workers.

According to the Hechinger Report (March 2023), the U.S. Department of Education and the National Security Administration (NSA) is calling for educators to address a talent gap in cybersecurity – there were more than 300,000 job openings in the growing sector and no one qualified to fill them. A report by the Bureau of Labor and Statistics suggests that the job market for Information Security Analysts is expected to grow 35% by 2031. *Cybersecurity Magazine* reports the global shortage of cybersecurity professionals is at an estimated 3.5 million unfilled positions in 2023, up from 1 million in 2014.

The M.S.C.M. program adheres to the requirements for a National Center of Academic Excellence in Cybersecurity Endorsement (NCAE), which encourages consistency in cybersecurity education within the United States. It is an initiative to continue the United States' competitive edge in cybersecurity. It also gives colleges an opportunity to apply for grants that non-NCAE schools cannot.

The National Center of Academic Excellence in Cybersecurity (NCAE-C) program is managed by NSA's National Cryptologic School. Federal partners include the Cybersecurity & Infrastructure Security Agency (CISA), the Federal Bureau of Investigation (FBI), the National Institute of Standards & Technology (NIST)/National Initiative on Cybersecurity Education (NICE), the National Science Foundation (NSF), the Department of Defense Office of the Chief Information Officer (DoD-CIO), and the U.S. Cyber Command (USCYBERCOM).

Curriculum

The School of Graduate Business & Technology's Master of Science in Cybersecurity Management program requires 33 credit hours of core coursework in management and cybersecurity. The courses are offered through a combination of a flexible online or hybrid format.

A. Core Curriculum: 30 hours
- Legal & Ethical Environment of Business (MBA 6023) – 3 hours
- Strategic Management (MBA 6043) – 3 hours
- Organizational Leadership (MBA 6093) – 3 hours
- Foundations of Project Management (PM 5003) – 3 hours
- Process Management (PM 6013) – 3 hours

- Cybersecurity Compliance & Auditing (MSCM 6203) – 3 hours
- Cybersecurity Risk Management (MSCM 6013) – 3 hours
- Cybersecurity Threats, Attacks & Defense (MSCM 6023) – 3 hours
- Strategic Cybersecurity Management (MSCM 6033) – 3 hours

B. Select One of the Following Options: 3 hours
- Internship (MSTM 5901) – 1.0 hour (*Students selecting this option must earn a minimum of 3 credit hours and be continually enrolled in the course during the program*)
- Cybersecurity Capstone Project (MSCM 6903) – 3 hours

TOTAL HOURS: 33-35 credit hours

Admission

Program Application Procedure
Applicants to the M.S.C.M. program will need to:
1. Complete the Graduate School Application for Admission form, which must be submitted online with non-refundable fees of USD 35.00; *and*
2. Submit either:
   a. Official undergraduate transcripts documenting the completion of a U.S. undergraduate degree from an institution with U.S. Department of Education recognized institutional accreditation or its equivalent from a governmentally recognized or similar authority as a postsecondary, academic degree-granting institution of higher learning with the equivalent of a 2.5 GPA; *or*
   b. Official graduate transcripts documenting completion of a graduate degree from an institution with U.S. Department of Education recognized institutional accreditation. Official graduate transcripts from a nationally accredited institution or its equivalent from governmentally recognized or similar authority as a postsecondary, academic degree-granting institution of higher learning will be considered for admission on a case-by-case basis.

Students who have not taken undergraduate courses in technology and management may want to consider taking coursework prior to enrolling.

International Student Application Procedures
An international student's success will rest on the ability to understand, read, write, and speak English as all classes in the program are delivered in English. Thus, in addition to the application materials required of students from the United States, international students applying to a graduate program must provide proof of English proficiency based on:
- TOEFL minimum score:
  - Internet-based (iBT): 79 composite,
  - Paper-based, 550; *or*
  - Revised Paper-delivered: 21 writing and 19 reading;
- IELTS minimum composite score of 6.5 (score of 6.0 may be considered);
- Duolingo 100;
- English is the student's native language; *or*
- Student completed undergraduate or graduate program at an accredited U.S. institution or equivalent English-speaking institution.

Students who fail to demonstrate English proficiency may still be considered for admission but will be required to successfully complete a provisional ESL (English as a Second Language) course before being officially accepted into the program and enrolling in classes.

The English proficiency standards apply to domestic students who have not received an undergraduate degree from an English-speaking institution.

Transfer of Credit
The program will accept up to six credit hours in transfer for equivalent courses from institutions with U.S. Department of Education recognized institutional accreditation.

All master's students who wish to transfer graduate credit from other institutions to be applied to Lindsey Wilson College's M.S.D.S. degree should be aware of the following criteria:
- Transfer credit must carry a grade of B- or higher and must be earned at the graduate level.
- Transfer credit must be consistent with the program's curriculum.

Graduate Credit without the Bachelor's Degree
The following criteria apply to those students who wish to enroll in master's coursework but who have not earned a bachelor's degree:
- Undergraduates must have senior status;
- They must have a cumulative quality point average of at least 3.0; *and*
- They must have the permission of the director.

No coursework applied toward undergraduate graduation requirements may be counted toward requirements for a graduate degree. A maximum of nine graduate credit hours may be taken by an undergraduate.

M.S.   Data Science

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Mission Statement
The mission of the Master of Science in data science (M.S.D.S.) program is to prepare students for employment in various data science and data management related areas and/or the pursuit of advanced degrees in data science fields by educating them in the knowledge and application of data science concepts and methods.

Employers are increasingly recognizing the value of employees who have this expertise. Today, data scientists are working at a range of organizations, including in fields such as product development, marketing, and public health as well as scientific research in areas such as genomics, drug discovery, climate science, neuroscience, particle physics, and research institutions. The sheer amount of data available to firms and the tools used to analyze this information have expanded tremendously in the past decade.

Curriculum

The School of Graduate Business & Technology's Master of Science in data science is an application-based program which requires 33 credit hours of core coursework in statistics, data science and machine learning. The courses are all offered in a flexible online or hybrid format.

A. Core Curriculum: 30 hours
- Python Programming (MSDS 5033) – 3 hours
- Probability & Inference for Data Science (MSDS) 5103) – 3 hours
- Introduction to Statistical Modeling (MSDS 5113) – 3 hours
- Fundamentals of Data Science (MSDS 5123) – 3 hours
- Data Systems & Algorithms (MSDS 6203) – 3 hours
- Programming in Data Science (MSDS 6213) – 3 hours
- Data & Database Management with SQL (MSDS 6403) – 3 hours
- Presentation & Visualization of Data (MSDS 6413) – 3 hours
- Machine Learning & Artificial Intelligence (MSDS 6503) – 3 hours
- Applied Capstone Project (MSDS 6903) – 3 hours

B. Select One of the Following Options: 3 hours
- Internship (MSTM 5901) – 1.0 hour (*Students selecting this option must earn a minimum of 3 credit hours and be continually enrolled in the course during the program*)
- Advanced Topics in Data Science (MSDS 6913) – 3 hours

TOTAL HOURS: 33-35 credit hours

Admission

Program Application Procedure

Applicants to the M.S.D.S. program will need to:

3. Complete the Graduate School Application for Admission form, which must be submitted online with non-refundable fees of USD 35.00; *and*
4. Submit either:
   c. Official undergraduate transcripts documenting the completion of a U.S. undergraduate degree from an institution with U.S. Department of Education recognized institutional accreditation or its equivalent from a governmentally recognized or similar authority as a postsecondary, academic degree-granting institution of higher learning with the equivalent of a 2.5 GPA; *or*
   d. Official graduate transcripts documenting completion of a graduate degree from an institution with U.S. Department of Education recognized institutional accreditation. Official graduate transcripts from a nationally accredited institution or its equivalent from governmentally recognized or similar authority as a postsecondary, academic degree-granting institution of higher learning will be considered for admission on a case-by-case basis.

International Student Application Procedures

An international student's success will rest on the ability to understand, read, write, and speak English as all classes in the program are delivered in English. Thus, in addition to the application materials required of students from the United States, international students applying to a graduate program must provide proof of English proficiency based on:

- TOEFL minimum score:
  - Internet-based (iBT): 79 composite,
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  - Revised Paper-delivered: 21 writing and 19 reading;
- IELTS minimum composite score of 6.5 (score of 6.0 may be considered);
- Duolingo 100;
- English is the student's native language; *or*
- Student completed undergraduate or graduate program at an accredited U.S. institution or equivalent English-speaking institution.

Students who fail to demonstrate English proficiency may still be considered for admission but will be required to successfully complete a provisional ESL (English as a Second Language) course before being officially accepted into the program and enrolling in classes.

The English proficiency standards apply to domestic students who have not received an undergraduate degree from an English-speaking institution.

Transfer of Credit

The program will accept up to six credit hours in transfer for equivalent courses from institutions with U.S. Department of Education recognized institutional accreditation.

All master's students who wish to transfer graduate credit from other institutions to be applied to Lindsey Wilson College's M.S.D.S. degree should be aware of the following criteria:

- Transfer credit must carry a grade of B- or higher and must be earned at the graduate level.
- Transfer credit must be consistent with the program's curriculum.

Graduate Credit without the Bachelor's Degree
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- Undergraduates must have senior status;
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- They must have the permission of the director.

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Mission Statement

The mission of the Lindsey Wilson College Master of Science in technology management (M.S.T.M.) program is to provide a quality graduate program building upon undergraduate studies and experience in management and technology to serve a newly evolving portion of the business world.

M.S.T.M. program graduates will enjoy a wide range of career options and greater earning potential. An M.S.T.M. degree will prepare graduates for managerial positions and to develop needed skills to start their own business within the technology area.

The M.S.T.M. program prepares students for employment in the United States Department of Labor's Standard Occupational Classification code 15-1244 Network and Computer Systems Administration.

It is possible to earn the M.S. in technology management simultaneously with the M.B.A. Interested students should contact the Director of Graduate Business Studies.

Curriculum

The School of Graduate Business & Technology's Master of Science in technology management program is a 33-credit hour course of study that is offered through a combination of hybrid and fully online courses. The program is designed to integrate academic concepts and work experience through educational coursework and case studies.

A. Core Requirements: 21 hours
- Organizational Communications (MBA 5013) – 3 hours
- International Business Management (MBA 6033) – 3 hours
- Organizational Behavior (MBA 6083) – 3 hours
- Computer & Network Security (MSTM 5003) – 3 hours
- Disaster & Recovery Planning (MSTM 5013) – 3 hours
- Emerging Technologies (MSTM 5023) – 3 hours
- ~~Internship (MSTM 5901) *or* Graduate Research (MSTM 5700) – 3 hours*~~
- Issues in Cyberlaw (MSTM 6003) – 3 hours

  *~~*Students must earn a minimum of 3 credit hours and be continually enrolled in the course during the program.~~*

B. Emphasis Area (select one of the following areas): 9 hours

1 – General Technology Management Emphasis Requirements
- Information Infrastructure (MSTM 5033) – 3 hours
- Management Information Systems (MSTM 6013) – 3 hours
- Project Management (MSTM 6023) – 3 hours

2 – Project Management Emphasis Requirements
- Foundations of Project Management (PM 5003) – 3 hours
- Project Management Principles & Practices (PM 6003) – 3 hours
- Process Management (PM 6013) – 3 hours

C. Select One of the Following Options: 3 hours
- Internship (MSTM 5901) – 1.0 hour (*Students selecting this option must earn a minimum of 3 credit hours and be continually enrolled in the course during the program*)
- Technology Management Capstone Project (MSDS 6903) – 3 hours

TOTAL HOURS: 33-35 credit hours

Exit Assessment
To graduate the program, all students must successfully complete an exit assessment. The exit assessment requires the following:
- Successful completion of program key assessments;
- Completion of the M.S.T.M. Exit Exam (fee may apply); *and*
- Completion of the M.S.T.M. Exit Survey.

Admission

Program Application Procedure
Applicants to the M.S.T.M. program will need to:
1. Complete the Graduate School Application for Admission form, which must be submitted online with non-refundable fees of USD 35.00; *and*
2. Submit either:
    a. Official undergraduate transcripts documenting the completion of a U.S. undergraduate degree from an institution with U.S. Department of Education recognized institutional accreditation or its equivalent from a governmentally recognized or similar authority as a postsecondary, academic degree-granting institution of higher learning with the equivalent of a 2.5 GPA; *or*
    b. Official graduate transcripts documenting completion of a graduate degree from an institution with U.S. Department of Education recognized institutional accreditation. Official graduate transcripts from a nationally accredited institution or its equivalent from governmentally recognized or similar authority as a postsecondary, academic degree-granting institution of higher learning will be considered for admission on a case-by-case basis.

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    - Internet-based (iBT): 79 composite,
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    - Revised paper delivered: 21 writing and 19 reading;
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Transfer of Credit
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Master of Science – Cybersecurity Management

M.S.   **MSCM**

MSCM 5013 – Foundations in Cybersecurity Management – 3 credit hours

This course provides an overview and foundational understanding of concepts essential to the management of cybersecurity including implementation security systems, data security, privacy, and compliance. Students will review topics including security planning, risk management, security technologies, basic cryptography, application security management, intrusion detection and prevention, physical security, and privacy issues.

MSCM 6013 – Cybersecurity Risk Management – 3 credit hours

In this course, students will learn the practical skills necessary to perform regular risk assessments of their organizations. Topics include management of inventory, risk remediation, risk management analysis, planning, and reporting. The course will provide real-world examples and scenarios of cybersecurity risk management concepts and techniques.

MSCM 6023 – Cybersecurity Threats, Attacks & Defense – 3 credit hours

This course focuses on the practical application of techniques for detecting and documenting network vulnerabilities. Students will explore penetration testing, language-specific software vulnerabilities, mitigation, and input validation.

MSCM 6033 – Strategic Cybersecurity Management – 3 credit hours

The focus of this course is the application of cybersecurity principles, frameworks, standards, and best practices to organization-level strategies, policies, programs, plans, procedures, and processes. Students will implement knowledge gained throughout the program to design a policies and procedures manual appropriate for a small business and develop the communication skills necessary to present their projects to senior-level constituencies.

MSCM 6203 – Cybersecurity Compliance & Auditing – 3 credit hours

This course focuses on the principles, approaches, and the methodology in auditing information systems to ensure the processes and the procedures are in compliance with pertinent cybersecurity laws and regulatory provisions. Management of the complexities of security, compliance and legal obligation, including industry standards and general law. The outcomes of the course will equip students with the knowledge and skills needed to assess, audit and ensure compliance with cybersecurity standards, regulations, and best practices.

MSCM 6903 – Applied Capstone Project – 3 credit hours

Description: In the capstone project, student teams will work to demonstrate their ability to apply and communicate cybersecurity management concepts and processes to create a comprehensive cybersecurity solution. Students may produce a security assessment report, develop a cybersecurity policy framework, design an incident response plan, or implement another critical cybersecurity project.

Master of Science – Data Security

M.S.   **MSDS**

MSDS 5033 – Python Programming – 3 credit hours

This course will introduce the student to the Python Programming language as applied to data science. Python, along with the R programming languages, is extensively used in data science and data analytics.

The Python programming language is often used to a precursor to more complex languages, such as C++ and Java. The course covers coding, debugging, and documentation of Python code as well as the use of Python code to perform data science operations such as visualization, database access, spreadsheet access, statistics, and Web page access.

MSDS 5103 – Probability & Inference for Data Science – 3 credit hours
In this course, students will be introduced to inferential tools for applications in data science. Topics covered include hypothesis testing, confidence intervals, probability distributions, central limit theorem, and interval estimation.

MSDS 5113 – Introduction to Statistical Modeling – 3 credit hours
This course is an introduction to foundational concepts, theories, and techniques of statistical analysis for data science. Students will begin with descriptive statistics and probability and advance through multiple and logistic regression. Students will also conduct analyses in R. Additional topics covered include descriptive statistics, central tendency, exploratory data analysis, probability theory, discrete and continuous distributions, statistical inference, correlation, and multiple linear regression.

MSDS 5123 – Fundamentals of Data Science – 3 credit hours
This course provides an introduction to foundational concepts, technologies, and theories of data and data science. Students will gain a foundational understanding of the concepts and techniques used in data science and machine learning.

MSDS 6203 – Data Systems & Algorithms – 3 credit hours
In this course, students will work to develop their programming skills and learn the fundamentals of data structures and the practice use of algorithms. Students will review a variety of useful algorithms and analyze their complexity and gain insight into the principles and data structures used in algorithm design.

MSDS 6213 – Programming for Data Science – 3 credit hours
This course introduces students to programming language (Python, R, etc.) and its application in data science. Students will be introduced to platforms such as Jupytr Notebooks to learn the practical aspects of data manipulation, data cleaning, and exploratory data analysis.

MSDS 6403 – Data & Database Management with SQL – 3 credit hours
In this course, students will focus on understanding how data can be organized, cleaned, and managed within and between data sets. Students will be introduced to database design and to the use of databases in data science applications with an emphasis on SQL.

MSDS 6413 – Presentation & Visualization of Data – 3 credit hours
In this course, students are introduced to computational tools for building interactive graphics and dashboards as well as commercial visualization software. Student s will use visualizations technique to identify the patterns, trends, correlations, and outliers of data sets.

MSDS 6503 – Machine Learning & Artificial Intelligence – 3 credit hours
This course introduces students to relevant machine learning methods, communicating results, and the ethical considerations in machine learning. Students will build, train, and test machine learning models such as logistic regression and neural networks. Throughout the course, students experiment with the concepts of data science process and apply them to real-world datasets.

MSDS 6903 – Applied Capstone Project – 3 credit hours
In the capstone project, student teams will work to demonstrate their ability to apply and communicate data science concepts and processes to create a digital project of their choosing. Students may produce a website, platform, tool, or other digital project.

MSDS 6913 – Advanced Topics in Data Science – 3 credit hours
This course exposes students to emerging or specialized topics in Data Science and is designed for students with an advanced understanding of programming, statistical modeling, data visualization, and machine learning. The hands-on project will enable students to apply their learning to practical scenarios, ensuring they are well-equipped to address data science problems and effectively communicate their solutions.

Master of Science – Technology Management

M.S. **MSTM**

MSTM 5003 – Computer & Network Security – 3 credit hours
This course provides the background on security issues relating to computers and communication systems including mobile and internet technologies. This course will develop security awareness for use and implementation of information processing components such as networks, applications, and operating systems. Procedures and algorithms for virus detection, encryption, and database security will be discussed.

MSTM 5013 – Disaster & Recovery Planning – 3 credit hours
This course focuses on practical processes of disaster response planning and mitigation for security professionals working in both public and private organizations. Almost every business and organization must deal with business continuity and IT disaster recovery at some level. Areas addressed include risks to companies' and organizations' critical business resources, IT systems and processes related to the onset of cloud computing technology, the proliferation of wireless mobile devices, severe weather-related incidents, and other types of disasters both human-engineered and natural.

MSTM 5023 – Emerging Technologies – 3 credit hours
This course addresses academic research and practical applications related to technological ventures. Topics focus on opportunity, strategy, laws covering intellectual property, and financial aspects of technology enterprise.

MSTM 5033 – Information Infrastructure – 3 credit hours
This course introduces fundamental concepts of data communication and networking, such as network structure, cybersecurity issues, and trends in communications and networking. Practical application of content is made through case study analysis.

MSTM 5700 – Graduate Research – 0.5 credit hours
Critical thinking expressed through solid research and clear writing serves as the foundation for all academic and professional pursuits. Each student will develop these skills through the research and composition of an essay that contains a clear thesis statement and produces an argument utilizing appropriate evidence.

MSTM 5901 – Internship – 1.0 credit hour
This course provides students with an opportunity to connect graduate coursework to the workplace. Students will develop a working resume, review rules for workplace etiquette, and complete written assignments designed to connect practical experiences with graduate coursework. This course may be taken for 1.0 credit hour per term with a minimum of 3 credit hours. **Students must be continuously enrolled in this course during the program.**

MSTM 6003 – Issues in Cyberlaw – 3 credit hours
This course explores the legal and policy issues associated with the Internet and cyberspace. The course will focus on cases, statutes, regulations, and constitutional provisions that affect people and business

interacting through computers and the Internet. Topics include intellectual property, e-commerce, online contracts, cybercrimes, torts, and privacy issues.

MSTM 6013 – Management Information Systems – 3 credit hours
The course focuses on how today's businesses use information technology to achieve expected outcomes and corporate missions. It covers the topics of organizational change, ethical issues of information systems, information systems processes, application of project management concepts to technology infrastructure, and compliance and security concern in information technology.

MSTM 6023 – Project Management – 3 credit hours
This course covers theories supporting effective communication, planning, and tools used in project management. Strategies for gaining internal support for change and mitigation of failure are discussed. Practical application is made through case studies of management change processes.

MSTM 6903 – Technology Management Capstone Project – 3 credit hours
In the capstone project, student teams will work to demonstrate their ability to apply and communicate technology management concepts and processes to create a comprehensive digital or technology-based project. Students may produce a software tool, develop a management platform, design an infrastructure solution, or deliver another innovative technology project.