

100% ONLINE

MASTERS DEGREE IN INFORMATION SECURITY

The Professional Master's Degree in Information Security program courses provide a broad breadth in information security foundations, plus flexibility for the student to tailor the program for individual preference.

PLAN OF STUDY

<i>PLAN OF STUDY</i>	<i>COURSES</i>
<i>FOUNDATION</i>	2
<i>CORE</i>	2
<i>FOCUS</i>	4
<i>ELECTIVES</i>	2
<i>GRAND TOTAL</i>	<i>10</i>

FOUNDATIONAL COURSES

The 10-course, 30-credit hour sequence begins with two foundational courses.

Foundational Principles of Information Security (CS 50010)

This course covers concepts and foundational principles relevant to information security, including data structures, algorithm design, and the basics of cryptography.



Introduction to Systems for Information Security (CS 50011)

This course covers principles, tools, and concepts in the area of computer systems relevant to information security.

CORE COURSES

The two required core courses are:

Information Security (CS 52600)

This course presents the theory and practice of information security. It covers the definitions of security, types of attacks, threats, risks, vulnerabilities, controls, types of computer crime and criminals, and methods of defense. Topics include user authentication, identification, and authorization; software security, operating system security, database security, network security, web security, privacy, malware, and security administration; law and ethics.



Department of Computer Science

Cryptography (CS 55500)

This course covers cryptography from a practical cyber-security perspective. It includes concepts and tools of modern cryptography, including 1-way hash functions, symmetric cryptography, public key cryptography, digital signatures, and the basic notions of cryptographic security. The course highlights and illustrates the use of these concepts in major application domains including secure communication, data integrity, authentication, identification, time-stamping, digital cash and cyber-currencies, anonymity, and simultaneity.

FOCUS COURSES

Four courses are required from the additional course offerings:

Social, Economic, and Legal Aspects of Security (CS 52300)

This course centers on understanding the policies, laws, and ethics underlying and defining information security; assessing the threat, risk, and realities of cyber warfare; and the impact of human factors and behavior in designing secure systems.

Software Security (CS 52700)

This course focuses on software security fundamentals, secure coding guidelines and principles, and advanced software security concepts. Students will learn to assess and understand threats, learn how to design and implement secure software systems, and get hands-on experience with common security pitfalls.

Network Security (CS 52800)

This course focuses on the principles and foundations of building secure network systems and on security and privacy challenges in existing and emerging networks. The course compares and analyzes network architectures and network protocols from the physical layer to the access control, network, transport and application layer from an adversarial standpoint to understand how to build more secure protocols that can withstand attacks.

Security Analytics (CS 52900)

This course covers basic data mining and machine learning techniques that are relevant for security analytics, as well as how to apply these analytics techniques to solve security problems.

Data Security and Privacy (CS 55600)

Offered as CS 59000-DSP

This course covers techniques and tools for protecting the security and privacy of data.

Professional Master's Degree students gain professional skills and competencies to build, evaluate and maintain secure systems through course lab assignments and projects. Lab assignments will utilize cutting edge security techniques and software, real-world examples, and require students to respond to simulated security challenges and learn to develop secure systems with appropriate defense mechanisms. In the majority of courses, students will select final projects whose scope provides a professional capstone experience.

ELECTIVE COURSES

Students in the 100% online program will choose two 3 credit hour elective courses from the list below:

Database Systems (CS 54100)

This course focuses on the fundamentals of the logical design of database systems, including the entity-relationship model, semantic model, relational model, hierarchical model, and network model. Students will learn design theory for relational databases, design of query languages, the use of semantics for query optimization, the design and verification of integrity assertions, and security. Students will also learn the introduction to intelligent query processing and database machines.

Data Mining (CS 57300)

This course introduces students to the process and main techniques in data mining, including classification, clustering, and pattern mining approaches. Data mining systems and applications are also covered, along with selected topics in current research.

Algorithm Design, Analysis and Implementation (CS 58000)

This course focuses on the basic techniques for designing and analyzing algorithms: dynamic programming, divide and conquer, balancing. Upper and lower bounds on time and space costs, worst case and expected cost measures. A selection of applications such as disjoint set union/find, graph algorithms, search trees, pattern matching. The polynomial complexity classes P, NP, and co-NP; intractable problems.

Individual Study (CS 59000)

Additional courses are under development