CYBERSECURITY AND INFORMATION ASSURANCE

The Master of Science in Cybersecurity and Information Assurance (CIA) is a 30-credit hour graduate degree offered by the Department of Computer and Information Science (CIS). This initiative reflects the University's eagerness to address rising needs of cybersecurity professionals in both the private and public sectors. The CIA program educates and trains an elite, diverse group of students who want to pursue a career in cybersecurity, such as cybersecurity analysts/specialists, cybersecurity engineers, network engineers/architects, software developers, etc. The program will also benefit anyone on this campus who is interested in advancing their knowledge of computer security and privacy, and it will offer a great opportunity for interdisciplinary inquiry and teaching.

This program can be completed fully online, in person, or a combination of both.

Curriculum

To satisfy the requirements for the MS degree in Cybersecurity and Information Assurance, all students admitted to the program are expected to complete a minimum of 30 credit hours of graduate coursework, with a cumulative grade point average of B or better. The program of study consists of core courses, concentration courses and electives with coursework/project/thesis options. Students are required to choose one of the following three concentration areas for the program: (1) Network & System Security, (2) Data & Application Security, and (3) Software Security.

[1]Please contact the Computer and Information Science Department about the policy on the minimum grade for a course to satisfy graduation requirements

Option 1: MS Coursework. This option requires a minimum of 30 credits be earned through coursework. The minimum requirements are as follows:

- Core courses - 9 credit hours
- Concentration courses -12 credit hours
- Elective courses - 9 credit hours

Option 2: MS Project. This option requires a project report describing the results of an independent study project under the supervision of the advisor. The minimum requirements are as follows:

- Core courses - 9 credit hours
- Concentration courses -12 credit hours
- Elective courses - 6 credit hours
- Master's Project - 3 credit hours

Option 3: MS Thesis. This option requires a research thesis prepared under the supervision of the advisor. The minimum requirements are as follows:

- Core courses - 9 credit hours
- One concentration area - 12 credit hours
- Elective courses - 3 credit hours
- Master's Thesis - 6 credit hours

Requirements

Core Courses

Code	Title	Credit Hours
Required:		**6**
CIS 540	Foundation of Information Security	
CIS 564/ IMSE 570	Enterprise Information Systems	
Select one of the following:		**3**
ACC 601	Information Technology Auditing	
CIS 546	Security and Privacy in Wireless Networks	
CIS 548	Security and Privacy in Cloud Computing	
Total credit hours		**9**

Elective Courses

The following specializations are provided for guidance only. Students are allowed to select elective courses from the same or different specializations. **An elective course should not be the same as any course taken to satisfy concentration course requirements.**

- **Option 1:** MS Coursework. Choose 9 credit hours (or 3 courses) from the following list below
- **Option 2:** MS Project. Choose 6 credit hours (or 2 courses) from the following list below and CIS 695 Master's Project for 3 credits.
- **Option 3:** MS Thesis. Choose 3 credit hours (or 1 course) from the following list below and CIS 699 Master's Thesis for 6 credits.

Code	Title	Credit Hours
Specialization 1: Security, Privacy, Forensics, and Auditing		
ACC 505	Devel & Interp Financial Info	3
CIS 544	Computer and Network Security	3
CIS 545	Data Security and Privacy	3
CIS 546	Security and Privacy in Wireless Networks	3
CIS 548	Security and Privacy in Cloud Computing	3
CIS 549	Software Security	3
CIS 584	Advanced Computer and Network Security	3
ECE 527	Multimedia Secur & Forensics	3
HHS 570	Information Science and Ethics	3
ISM 642	Information Assurance	3
Specialization 2: Systems, Networks and Communications		
CIS 527	Computer Networks	3
CIS 537	Advanced Networking and Distributed Systems	3
CIS 574	Compiler Design	3
CIS 578	Advanced Operating Systems	3
CIS 589	Edge Computing	3
CIS 647	Research Advances in Networking and Distributed Systems	3
ECE 526	Multimedia Comm Sys	3
ECE 535	Mob Dev & Ubiqys Comp Sys	3
ECE 550	Communication Theory	3
ECE 5541	Embedded Networks	3
ECE 570	Computer Networks	3
ECE 5701	Intro to Wireless Comm	3

ECE 5702	High-Speed and Adv Networks	3
ECE 531	Intelligent Vehicle Systems	3
ISM 525	Computer and Info Systems	3
Specialization 3: Data Management, Analytics, and Intelligent Systems		
CIS 536	Text Mining and Information Retrieval	3
CIS 556	Database Systems	3
CIS 5570	Introduction to Big Data	3
CIS 562	Web Information Management	3
CIS 568	Data Mining	3
CIS 5700	Advanced Data Mining	3
CIS 579	Artificial Intelligence	3
CIS 581	Computational Learning	3
CIS 583	Deep Learning	3
CIS 585	Advanced Artificial Intelligence	3
CIS 586	Advanced Data Management	3
CIS 658	Research Advances in Data Management	3
ECE 531	Intelligent Vehicle Systems	3
ECE 537	Data Mining	3
ECE 552	Fuzzy Systems	3
ECE 579	Intelligent Systems	3
ECE 5831	Pat Rec & Neural Netwks	3
Specialization 4: Software Engineering		
CIS 505	Algorithm Analysis and Design	3
CIS 525	Web Technology	3
CIS 535	Wireless Technologies and Pervasive Computing	3
CIS 550	Object-Oriented Programming and Its Applications	3
CIS 553	Software Engineering	3
CIS 565	Software Quality Assurance	3
CIS 566	Software Architecture and Design Patterns	3
CIS 571	Web Services	3
CIS 575	Software Engineering Mgmt	3
CIS 577	S/W User Interface Dsgn&Analys	3
CIS 580	Data Analytics in Software Engineering	3
CIS 678	Research Advances in Software Engineering	3
CIS 577	S/W User Interface Dsgn&Analys	3
Specialization 5: Human Computer Interface Design		
IMSE 514	Multivariate Statistics	3
IMSE 559	System Simulation	3
IMSE 577	Human-Computer Interaction	3
IMSE 586	Big Data Aanal & Visuliztn	3
HCDE 530	Information Visualization	3
HCDE 540	Integrated Design Thinking and Implementation in Business	3
HCDE 510	Foundation of HCDE	3
HCDE 501	Human Factors and Ergonomics	3

Concentrations

12 credit hours from one of the three concentrations listed below:

Data and Application Security

Code	Title	Credit Hours
Required:		**3**
CIS 545	Data Security and Privacy	
Select three from the following:		**9**
CIS 548	Security and Privacy in Cloud Computing	
CIS 556	Database Systems	
CIS 5570	Introduction to Big Data	
CIS 568	Data Mining	
CIS 581	Computational Learning	
ECE 527	Multimedia Secur & Forensics	
HHS 570	Information Science and Ethics	
ISM 642	Information Assurance	
Total credit hours		**12**

Network and System Security

Code	Title	Credit Hours
Required:		**3**
CIS 544	Computer and Network Security	
Select three from the following:		**9**
CIS 527	Computer Networks	
CIS 535	Wireless Technologies and Pervasive Computing	
CIS 537	Advanced Networking and Distributed Systems	
CIS 546	Security and Privacy in Wireless Networks	
CIS 578	Advanced Operating Systems	
CIS 584	Advanced Computer and Network Security	
CIS 624	Research Advances in Computer and Network Security	
ECE 5541	Embedded Networks	
Total credit hours		**12**

Software Security

Code	Title	Credit Hours
Required:		**3**
CIS 549	Software Security	
Select three from the following:		**9**
CIS 525	Web Technology	
CIS 553	Software Engineering	
CIS 565	Software Quality Assurance	
CIS 566	Software Architecture and Design Patterns	
CIS 574	Compiler Design	
CIS 578	Advanced Operating Systems	
CIS 579	Artificial Intelligence	
CIS 580	Data Analytics in Software Engineering	
Total credit hours		**12**

Learning Goals

1. Students will be able to understand fundamentals and the state of the art of cyber technology, their security and privacy risks, and defenses.

2. Students will be able to analyze and evaluate potential security risks of computer and information systems.

3. Students will be able to design, coordinate, and deliver cybersecurity solutions in a timely and cost-effective manner.

4. Students will be able to interpret security risks and solutions and communicate the implications to stakeholder