# CYBERSECURITY, M.S.

The Master of Science in Cybersecurity program provides students with the knowledge, skills, and professional practices needed for careers in the cybersecurity fields. The program also prepares students who desire to pursue further graduate work that leads to a Ph.D. degree. The curriculum covers several advanced topics in cybersecurity, such as; advanced cryptography, cybersecurity policy, cyber risk and vulnerability, cyber operation, wireless network security, web/mobile security, software security, security in Internet of Things (IoT), etc. These courses will be taught using the very latest, state-of-the-art security tools and technologies.

## Admission Requirements and Transfer Criteria

Applicants should follow the admissions process stated in the graduate catalog or the graduate admissions web site. Minimum requirements for admission is a four-year bachelor's degree with a GPA of 2.75 or higher out of 4.0 in Cybersecurity or computer science related programs.

Whether a student meets the above requirements will be determined by the chair or designee of the Weisberg Division of Computer Science, based on the information provided in the admission application and transcripts. Applicants with a four-year bachelor's degree in a major other than a cybersecurity or computer science related program may be admitted to the program with a condition of successful completion of the following three bridge courses with a grade of *B* or above in the first two semesters of the program:

- Data Structure and Algorithms (CS 210 Data Structures and Algorithms)
- Internetworking (CS 320 Internetworking)
- Statistics (STA 225 Introductory Statistics (CT) or STA 345 Applied Prob and Stat)

Foreign nationals must provide proof of English proficiency with a minimum score of 6.5 in IELTS or 80 on the TOEFL IBT (or 550 paper-based) and must have met all other admission criteria prior to registering for the first semester of courses.

## Program Requirements

The M.S. degree requires 30 credit hours (CR) of graduate work. At least 15 credit hours should be taken from 600 level courses.

## Plan of Study

| Code | Title | Credit Hours |
|---|---|---|
| **Core Required** | | |
| CYBR 510 | Intro to Cybersecurity | 3 |
| CYBR 530 | Cybersec Policies & Mgmt | 3 |
| CYBR 615 | Cyber Vulnerability Assess | 3 |
| CYBR 620 | Cyberwarfare | 3 |
| **Concentration** | | |
| Select two courses from one concentration area: | | 6 |
| Network Security (p. 1) | | |
| Application Security (p. 1) | | |
| Security Management (p. 2) | | |
| **Thesis Option or Core Electives Option** [1] | | |
| Select one of the following Options: | | 6 |
| *Thesis Option* | | |
| CYBR 680 | Research in Cybersecurity | |
| CYBR 681 | Thesis | |
| *Core Electives Option* | | |
| Select any two 600 level CYBR courses | | |
| **Free Electives** | | |
| Select two of the following: | | 6 |
| CYBR 500/400 | Computer Security Design | |
| CYBR 535/435 | Cyber Risk | |
| CYBR 542/442 | Cyber Operations | |
| CYBR 625 | Applied Cryptography (Independent Study also listed in the Network Security Concentration) | |
| CYBR 698 | Internship | |
| CS 504 | High Performance Computing | |
| CS 620 | Applied Algorithms | |
| CS 625 | AI Principles and Methods | |
| CS 630 | Machine Learning | |
| CS 660 | Big Data Systems | |
| IS 624 | Data Warehousing | |
| IS 625 | Software Engineering | |
| IS 692 | Image Processing | |
| IS 631 | Information Security | |
| IS 646 | Computer Sys Security | |
| IS 647 | IT Disaster Plan and Recovery | |
| IS 656 | Comm & Network Technologies | |
| Total Credit Hours | | 30 |

[1] The Thesis option offers a student an opportunity for serious investigation into an area of interest by completing a 3 credit research course (CYBR 680 Research in Cybersecurity) and a 3 credit thesis (CYBR 681 Thesis) course. Students must summarize their thesis work in the form of a formal written document and deliver an oral presentation. Thesis work is typically conducted over two semesters. A thesis option can be taken after the completion of 12 credit hours. The 6 CR of the thesis option courses cannot be combined in a semester.

### Network Security

| Code | Title | Credit Hours |
|---|---|---|
| CYBR 535/435 | Cyber Risk | 3 |
| CYBR 542/442 | Cyber Operations | 3 |
| CYBR 625 | Applied Cryptography | 3 |
| IS 656 | Comm & Network Technologies | 3 |

### Application Security

| Code | Title | Credit Hours |
|---|---|---|
| CYBR 500/400 | Computer Security Design | 3 |
| CYBR 535/435 | Cyber Risk | 3 |

| | | |
|---|---|---|
| CYBR 625 | Applied Cryptography (Also listed in the Network Security Concentration) | 3 |
| IS 646 | Computer Sys Security | 3 |

## Security Management

| Code | Title | Credit Hours |
|---|---|---|
| CYBR 500/400 | Computer Security Design | 3 |
| CYBR 542/442 | Cyber Operations | 3 |
| IS 631 | Information Security | 3 |
| IS 647 | IT Disaster Plan and Recovery | 3 |

## Plan of Study

Following is a typical two-year study plan for a full time (9 credit hours a semester) students:

| Course | Title | Credit Hours |
|---|---|---|
| **First Year** | | |
| **First Semester** | | |
| CYBR 510 | Intro to Cybersecurity | 3 |
| CYBR 530 | Cybersec Policies & Mgmt | 3 |
| CYBR 615 | Cyber Vulnerability Assess | 3 |
| | Credit Hours | 9 |
| **Second Semester** | | |
| CYBR 620 | Cyberwarfare | 3 |
| Concentration Course 1 | | 3 |
| Elective Course 1 | | 3 |
| | Credit Hours | 9 |
| **Second Year** | | |
| **Third Semester** | | |
| Select one of the following: | | 3 |
| CYBR 680 | Research in Cybersecurity [1] | |
| Core Elective 1 | | |
| Concentration Course 2 | | 3 |
| Elective Course 2 | | 3 |
| Select one of the following: | | 3 |
| CYBR 681 | Thesis [2] | |
| Core Elective 2 | | |
| | Credit Hours | 12 |
| | Total Credit Hours | 30 |

1 Prerequisite CYBR 510 Intro to Cybersecurity

2 Prerequisite CYBR 680 Research in Cybersecurity (thesis option)

*Note:* All four Core Required courses will be offered every semester. However, some elective courses may be offered just one semester a year. Students should work closely with an advisor in developing a study plan.