CYBERSECURITY, M.S.

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PROGRAM MISSION

The Master of Science in Cybersecurity (MS.CYB) program seeks to empower graduates from multidisciplinary fields with the knowledge and skills to realize their full potential as next generation technical and organizational leaders in the ongoing war against cyber crime and cyber terrorism.

STANDARD M.S. PROGRAM

The M.S. in Cybersecurity consists of 36 graduate credit hours: 30 credits of course work and a 6 credit capstone experience. All degree requirements must be completed within four calendar years. No more than 6 graduate credits may be transferred from other graduate schools. Full-time students should expect to complete the degree in 1-1/2 to 2 years.

B.S./M.S. ACCELERATED PROGRAM

Well-qualified students enrolled in the BS in Computer Science program, including any of its tracks, can apply for admission to the Accelerated Master of Science in Cybersecurity program (MS.CYB.ACC) at Norfolk State University. Upon completion of the program, students will have earned both the BS in Computer Science and the MS in Cybersecurity degrees.

Students who meet the eligibility requirements can enter the MS.CYB.ACC program, and upon attaining Senior standing can take up to four (4) 500-level courses (12 credits) with the subject designation CYB toward the MS degree. Depending on the program and track, these credits also may dual-count toward BS degree requirements. The dual-counted courses allow completion of the combined degrees on an accelerated timeline.

How to Apply

Contact the Cybersecurity Graduate Program Coordinator, Dr. Mary Ann Hoppa, at mahoppa@nsu.edu

Expected Learning Outcomes

- Students will have the ability to work with a team of individuals to analyze and solve an assigned problem scenario.

- Students will be able to identify vulnerabilities, assess threats, and implement security controls to protect an IT environment.

- Students will be able to explain the fundamentals of digital forensics for both computers and mobile devices and the use of popular digital forensics software and tools.

- Students will be able to use ethical hacking techniques to assess the security of enterprise systems.

- Students will be able to apply knowledge gained in previous courses to conduct in-depth research into a specific Cybersecurity topic, including finding and integrating relevant research results of others.

- Students will analyze the security challenges of operating an e-commerce venture; specifically, securing the data, ensuring safe transactions, and suggesting feasible solutions.

- Students will demonstrate knowledge of security policies as an important complement to security technology.

- Students will demonstrate knowledge of the challenges involved in managing the security of enterprise information systems.

Summary of Graduation Requirements

Subject Area	Credits
Major Requirements	36
Total Credit Hours	**36**

CYBERSECURITY Curriculum

The curriculum for the M.S. in Cybersecurity degree requires 36 graduate credit hours: 30 credits of coursework and a 6-credit capstone experience consisting of CYS 798 Cybersecurity Capstone I and CYS 799 Cybersecurity Capstone II. All courses are required.

Code	Title	Credits
Core Courses		
CSC 535	Computer Security I	3
CSC 555	Management of Information Security	3
CYS 564	Secure Operating Systems	3
CYS 573	Network Fundamentals	3
CYS 672	Computer and Network Forensics	3
CYS 688	Human Aspects of Cybersecurity	3
CYS 697	Ethical Hacking and Penetration Testing	3
CYS 721	Database Security	3
CYS 755	Healthcare Information Security	3
CYS 765	Advanced Topics in Cybersecurity	3
CYS 798	Cybersecurity Capstone I	3
CYS 799	Cybersecurity Capstone II	3
Total Credits		**36**

Sequence (Full-time)

Course	Title	Credits
First Year		
CSC 535	Computer Security I	3
CSC 555	Management of Information Security	3
CYS 564	Secure Operating Systems	3
CYS 573	Network Fundamentals	3
CYS 672	Computer and Network Forensics	3
CYS 721	Database Security	3
	Credits	18
Second Year		
CYS 697	Ethical Hacking and Penetration Testing	3
CYS 755	Healthcare Information Security	3
CYS 798	Cybersecurity Capstone I	3
CYS 765	Advanced Topics in Cybersecurity	3
CYS 688	Human Aspects of Cybersecurity	3

CYS 799	Cybersecurity Capstone II	3
	Credits	**18**
	Total Credits	**36**

Sequence (Part-time)

Course	Title	Credits
First Year		
CSC 535	Computer Security I	3
CSC 555	Management of Information Security	3
CYS 564	Secure Operating Systems	3
CYS 573	Network Fundamentals	3
	Credits	**12**
Second Year		
CYS 672	Computer and Network Forensics	3
CYS 697	Ethical Hacking and Penetration Testing	3
CYS 721	Database Security	3
CYS 765	Advanced Topics in Cybersecurity	3
	Credits	**12**
Third Year		
CYS 755	Healthcare Information Security	3
CYS 798	Cybersecurity Capstone I	3
CYS 688	Human Aspects of Cybersecurity	3
CYS 799	Cybersecurity Capstone II	3
	Credits	**12**
	Total Credits	**36**

B.S./M.S. ACCELERATED PROGRAM

Program Expectations

Accelerated students must:

- maintain the required minimum CGPA's overall and in undergraduate Computer Science courses

- maintain good standing and continuous enrollment except summer semesters

- earn a B-grade or higher in all attempted dual-credit courses

- earn the MS degree within two regular semesters of the conferral semester projected at the time of admission to the Accelerated Master of Science Cybersecurity program; otherwise, they shall be dismissed from the Accelerated Master's program.

- If a student in the Accelerated Master of Science in Cybersecurity program already has earned credit for the undergraduate equivalent of any course(s) eligible for dual-counting in the selected BS.CSC program track, then to fulfill the total course credits required for the MS.CYB program s/he will be required to take suitable substitutions for the graduate-level course(s), subject to approval by the GPC and the School of Graduate Studies as applicable.

- Students dismissed from the Accelerated program may not re-apply to it; however, they may:

  - remain eligible to complete any remaining requirements to earn the BS.CSC as applicable;

- apply for regular admission to NSU graduate programs for which they qualify, including but not limited to MS.CYB.

Summary of Graduation Requirements

Subject Area	Credits
BS Degree Requirements	108 - 123
MS Core Courses	30
Capstone Project	6
Total Credit Hours	**144-159**

Any 500 level courses with subject designation CYS may be eligible for dual-credit, depending on the selected BS program and track. Students must earn a B grade or better in designated 500-level courses to count towards MS.CYB degree requirements. Therefore, combined total degree requirements range from 144 to 159 credit hours.

Plans of Study

The following plans of study are not prescriptive but show possible senior year course selections for accelerated students within respective BS.CSC tracks. Courses may be taken in alternative orders, subject to meeting prerequisites, degree requirements, and additional considerations including potential course transfers, substitutions, and overloads.

BS.CSC/MS.CYB

Course	Title	Credits
Senior		
CSC 464	Operating Systems	3
CSC 498	Computer Science Seminar I	2
CSC 499	Computer Science Seminar II	2
Computer Science or Math Elective (300+)		3
Social Science Cultural Elective		3
Humanities Cultural Elective		3
Free Elective		3
CSC 535	Computer Security I	3
CSC 555	Management of Information Security	3
CYS 564	Secure Operating Systems	3
CYS 573	Network Fundamentals	3
	Credits	**31**
	Total Credits	**31**

BS.CSC.D/MS.CYB

Course	Title	Credits
Senior		
CSC 430	Data Communications	3
CSC 464	Operating Systems	3
CSC 468	Computer Architecture	3
CSC 498	Computer Science Seminar I	2
CSC 499	Computer Science Seminar II	2
Social Science Cultural Elective		3
Humanities Cultural Elective		3
APS 410	Applied Science Seminar	0
APS 411	Applied Science Seminar	0
CSC 535	Computer Security I	3
CSC 555	Management of Information Security	3
CYS 564	Secure Operating Systems	3

Course	Title	Credits
CYS 573	Network Fundamentals	3
	Credits	**31**
	Total Credits	**31**

BS.CSC.CYBT/MS.CYB

Course	Title	Credits
Senior		
CSC 313	Network Administration	3
CSC 445	Computer Network Defense	3
CSC 464	Operating Systems	3
CSC 494	Digital Forensics	3
CSC 498	Computer Science Seminar I	2
CSC 499	Computer Science Seminar II	2
Social Science Cultural Elective		3
Humanities Cultural Elective		3
CSC 535	Computer Security I	3
CSC 555	Management of Information Security	3
CYS 564	Secure Operating Systems (overload to maximize acceleration)	3
CYS 573	Network Fundamentals (overload to maximize acceleration)	3
	Credits	**34**
	Total Credits	**34**

BS.CSC.CYBT.D/MS.CYB

Course	Title	Credits
Senior		
CSC 313	Network Administration	3
CSC 430	Data Communications	3
CSC 464	Operating Systems	3
CSC 468	Computer Architecture	3
CSC 494	Digital Forensics	3
CSC 498	Computer Science Seminar I	2
CSC 499	Computer Science Seminar II	2
Social Science Cultural Elective		3
APS 410	Applied Science Seminar	0
APS 411	Applied Science Seminar	0
CSC 535	Computer Security I	3
CSC 555	Management of Information Security	3
CYS 564	Secure Operating Systems (overload to maximize acceleration)	3
CYS 573	Network Fundamentals (overload to maximize acceleration)	3
	Credits	**34**
	Total Credits	**34**

BS.CSC.CET/MS.CYB

Course	Title	Credits
Senior		
CSC 275	Fundamentals of Cybersecurity	3
CSC 430	Data Communications	3
CSC 464	Operating Systems	3
CSC 468	Computer Architecture	3
CSC 498	Computer Science Seminar I	2
CSC 499	Computer Science Seminar II	2
EEE 431	Microcontrollers	3
ENG 285	Public Speaking	3
Social Science Cultural Elective		3
Humanities Cultural Elective		3
CSC 535	Computer Security I	3
CSC 555	Management of Information Security (overload to maximize acceleration)	3
CYS 564	Secure Operating Systems (overload to maximize acceleration)	3
CYS 573	Network Fundamentals (overload to maximize acceleration)	3
	Credits	**40**
	Total Credits	**40**

BS.CSC.CET.D/MS.CYB

Course	Title	Credits
Senior		
CSC 430	Data Communications	3
CSC 464	Operating Systems	3
CSC 468	Computer Architecture	3
CSC 498	Computer Science Seminar I	2
CSC 499	Computer Science Seminar II	2
EEN 231	Digital Electronics Logic Design	3
EEE 231	Digital Logic Design	3
EEE 231L	Digital Logic Design Laboratory	1
Social Science Cultural Elective		3
Humanities Cultural Elective		3
APS 410	Applied Science Seminar	0
APS 411	Applied Science Seminar	0
CSC 535	Computer Security I	3
CSC 555	Management of Information Security (overload to maximize acceleration)	3
CYS 564	Secure Operating Systems (overload to maximize acceleration)	3
CYS 573	Network Fundamentals (overload to maximize acceleration)	3
	Credits	**38**
	Total Credits	**38**

BS.CSC.SET/MS.CYB

Course	Title	Credits
Senior		
CSC 464	Operating Systems	3
CSC 468	Computer Architecture	3
CSC 485	Software Quality Assurance and Testing	3
CSC 486	Software Project Management	3
CSC 487	Engineering Secure Software Systems	3
CSC 488	Distributed Software Systems	3
CSC 498	Computer Science Seminar I	2
CSC 499	Computer Science Seminar II	2
Social Science Cultural Elective		3
Humanities Cultural Elective		3
CSC 535	Computer Security I	3

Code	Title	Credits
CSC 555	Management of Information Security (overload to maximize acceleration)	3
CYS 564	Secure Operating Systems (overload to maximize acceleration)	3
CYS 573	Network Fundamentals (overload to maximize acceleration)	3
	Credits	**40**
	Total Credits	**40**

MS.CYB

Students take 500-level courses as shown above for their program/track, then complete all remaining courses from the MS.CYB curriculum.

Code	Title	Credits
CSC 535	Computer Security I	3
CSC 555	Management of Information Security	3
CYS 564	Secure Operating Systems	3
CYS 573	Network Fundamentals	3
CYS 672	Computer and Network Forensics	3
CYS 688	Human Aspects of Cybersecurity	3
CYS 697	Ethical Hacking and Penetration Testing	3
CYS 721	Database Security	3
CYS 755	Healthcare Information Security	3
CYS 765	Advanced Topics in Cybersecurity	3
CYS 798	Cybersecurity Capstone I	3
CYS 799	Cybersecurity Capstone II	3

APPLICATION DEADLINE

The deadline to apply to the Master of Science in Cybersecurity program is April 15 for the subsequent Fall semester and November 15 for the subsequent Spring semester.

To provide sufficient lead time to receive and thoroughly examine decision-making materials, to ensure fair treatment of all applicants, and to foster on-time starts in the first semester for students admitted to the program, the above timelines shall not be waived or circumvented. Applicants who have missed cut-off deadlines may be eligible to take courses from the curriculum in a non-degree-seeking status while their applications are pending, and can contact the graduate school for further details.

Admissions

To be consider for admission, all application materials must be received by Norfolk State University on or before the relevant deadline. A Departmental Graduate Admissions Committee makes all admission decisions.

Applicants must complete an online application and upload the following supplemental items:

> 1. CV/Resume
>
> 2. Personal Statement that explains the applicant's interest in the cybersecurity profession, how they are prepared to commit to and succeed in this program, and how earning a masters degree fits into future career plans
>
> 3. Three (3) Reference Requests. Recommenders are contacted electronically by the graduate school to submit their

recommendations, which must be dated within one year of the application date and uploaded by the relevant deadline. References should be individuals who can attest to the applicant's personal character, past or anticipated academic or professional performance, and any relevant observations regarding potential as a cybersecurity professional. Examples include former professors, academic advisers, work or research supervisors or colleagues, or civic leaders.

> 4. Unofficial Transcript. An official transcript showing the degree conferred is required upon acceptance and prior to enrollment.

To be "official" transcripts must be transmitted directly from schools or service providers via email to graduateschool@nsu.edu. If electronic transmission is not possible, then the transcript should be mailed directly from the issuer to:

> Norfolk State University
> School of Graduate Studies and Research Suite 602
> McDemmond Center for Applied Research
> 700 Park Avenue
> Norfolk, VA 23504
> Phone: (757) 823-8015

If the applicant accepts delivery of the transcript, then s/he must mail it to the above address in its original, sealed envelope from the issuer. Applicants must not open or alter the original envelope in any way since this immediately renders the transcript unofficial.

Academic Preparation

An undergraduate degree in any discipline from a regionally accredited 4-year college or university is required to apply to this program. Most successful applicants have an overall undergraduate major GPA of 2.8 / 4.0 or better.

GRE

Taking the Graduate Register Exam (GRE) is not required to apply to this program. Some assistantships and fellowship may require applicants to take the GRE, and may specify minimum required scores or circumstances under which scores can be waived or offset.

B.S./M.S. Degree Requirements

1. Minimum CGPA: 3.0 / 4.0

2. Minimum CGPA: 3.0/4.0 across all Computer Science courses

3. Enrolled and in good academic standing in BS.CSC (any track)

4. Completion of BS program / track curriculum through the third year. Students must have earned at least **89** credits by the semester in which they seek to enroll in any MS.CYB course.

5. Personal Statement of motivation and career objectives (1 page)

6. Resume including experience and qualifications

7. Letter of Reference from one (1) CS, Engineering, Science or Mathematics faculty

Financial Assistance

Norfolk State University offers a wide variety of financial aid programs, including federal, state and institutional scholarships and grants, student assistantships, employment opportunities and loans; as

well as external options such as military veterans and employee benefits. Students should contact NSU's Financial Aid Office (https://www.nsu.edu/financial-aid/) and Career Services (https://www.nsu.edu/careerservices/) for help identifying ways to finance their graduate studies.

Unless otherwise stated, awards do not renew automatically and are subject to annual review and available funding. The total length of support also may be limited. Awards often represent a legal contract between the student and the funder; therefore, before accepting them, students should fully understand all terms of such agreements.

International Students

Admissions

For international students, an official evaluated transcript is required for the application to be considered complete.

Per the policies of the U.S. Department of Homeland Security, non-U.S. citizens living abroad will not be granted documents to enter the U.S. to participate in an all-online program like the MS.CYB. International students may apply to this program and, if admitted, they can complete their courses remotely.

English Proficiency

The TOEFL is waived if a student has completed at least one year of full-time study at a college or university in an English-speaking country. Otherwise a TOEFL score of 80 or better, or an IELTS score of 6.5 or better, is required.