

**GEORGE MASON UNIVERSITY
VOLGENAU SCHOOL OF ENGINEERING
B.S. DEGREE IN CYBER SECURITY ENGINEERING
(2215 & 2229 Nguyen Engineering Building, 703-993-1502)
<http://volgenau.gmu.edu/cse>
2018 - 2019 CATALOG**

	<u>Department(s) & Course #(s)</u>	<u>Completed/ Grade(s)</u>	<u>Needed</u>
<u>MASON CORE REQUIREMENTS (24)</u>			
a. Written Communication: ENGH 101 (100), ENGH 302 Natural Science Section Only (C or better) (3,3)			
b. Oral Communication: COMM 100 or 101 (please circle choice) (3)			
c. Quantitative Reasoning (satisfied by MATH 113)			
d. Literature (3)			
e. Arts (3)			
f. Western Civilization (HIST 100, 125, or acceptable transfer course)(3)			
g. ECON 103 (3)			
h. Natural Science (satisfied by PHYS 160/161 and PHYS 260/261)			
i. Global Understanding (3)			
j. Information Technology (satisfied by CS 112 and ENGR 107)			
k. Synthesis (satisfied by CYSE 493)			

Go to: <http://catalog.gmu.edu/mason-core/> to link to information on Mason Core requirements.

MATHEMATICS, BASIC SCIENCES, and COMPUTER SCIENCE (35 hours required)

a. MATH 113, 114 (4,4)	a. _____	_____
b. MATH 213, 214 (3,3)	b. _____	_____
c. MATH 203 (3)	c. _____	_____
d. PHYS 160, 161 (3,1)	d. _____	_____
e. PHYS 260, 261 (3,1)	e. _____	_____
f. STAT 344 (3)	f. _____	_____
g. CS 112, CS 222 (4,3)	g. _____	_____

ENGINEERING CREDITS (67 hours required)

A grade of C or better is required for all CYSE courses

a. ENGR 107 (2)	a. _____	_____
c. CYSE 101, CYSE 205 (3,3)	c. _____	_____
d. CYSE 211, CYSE 220 (3,3)	d. _____	_____
e. CYSE 230, ECE 301 (3, 3)	e. _____	_____
f. CYSE 325, CYSE 330 (3,3)	f. _____	_____
g. CYSE 411, CYSE 421 (3,3)	g. _____	_____
h. CYSE 425, CYSE 430 (3,3)	h. _____	_____
i. CYSE 445, CYSE 450 (3,1)	i. _____	_____
j. CYSE 465, CYSE 470 (3,3)	j. _____	_____
j. CYSE 475, CYSE 491 (writing intensive course) (3,2)	j. _____	_____
j. CYSE 492, CYSE 493 (2,3)	j. _____	_____
l. Technical electives (from the department's list of pre-approved courses) (9)		
1. _____	1. _____	_____
2. _____	2. _____	_____
3. _____	3. _____	_____

All BS CYSE students must complete the following courses with a grade of C or better: MATH 203, MATH 214, CS 222, PHYS 260, STAT 344, and all CYSE courses.

MINIMUM 126 HOURS (including Minimum 45 UPPER DIVISION HOURS) to GRADUATE

This planning form is intended to be used in consultation with your academic advisor and reflects the requirements for the 2018 - 2019 Catalog; the University Catalog is the official reference for program requirements.

CYBER SECURITY ENGINEERING, B.S. 2018 - 2019

Cyber Security Engineering is concerned with the development of cyber resilient systems which include the protection of the physical as well as computer and network systems. It requires a proactive approach in engineering design of physical systems with cyber security incorporated from the beginning of system development. Cyber security engineering is an important quantitative methodology to be used in all industries to include, but not limited to, transportation, energy, healthcare, infrastructure, finance, government (federal, state, and local), and defense. The program is focused on the cyber security engineering of integrated cyber-physical systems. This degree provides a foundation in cyber security engineering, and is most appropriate for students with a strong mathematics and science background. The program is administered by the Dean's Office, Volgenau School of Engineering.

Cyber security engineers are part of integrated design and development teams for physical systems that require embedded cyber security design, working with engineers from other disciplines (e.g. civil, mechanical, electrical, systems engineers as well as computer scientists and software engineers). Cyber security engineers are engineers who know technology, but who also have in-depth exposure to the application/domain area. Not only do they provide technological solutions to cyber security problems of engineering systems posed by others, but by having an understanding of the application/domain, they can formulate potential security threats, propose appropriate solutions, and then provide leadership in the design of a system to resist and survive these threats.

Because of their interdisciplinary training, cyber security engineers are expected to play an increasing role in attacking some of the most pressing current cyber security issues in the country. For example, while everyone welcomes new methods to identify and then mitigate cyber threats, hardly a day goes by without being reminded that mitigating these risks by incorporating prevention into our systems would be more appropriate. Cyber security engineers must become part of the solution by developing appropriate, effective, and affordable systems with security engineered in from the concept phase, through design, and into implementation and deployment.

Degree Requirements

The cyber security engineering curriculum requires 126 total credit hours, which can be completed within eight semesters. At least 45 semester hours of the degree requirements must be level 300 or above.

CYBER SECURITY ENGINEERING, B.S.

2018-2019 Sample Schedule for Undergraduate Cyber Security Engineering majors

First Semester

MATH 113 Analytic Geom. and Calculus I	4
CS 112 Intro to Computer Programming	4
ECON 103 Contemp. Microeconomic Prin.	3
ENGR 107 Intro to Engineering	2
Mason Core*	3

Total 16

Second Semester

MATH 114 Analytic Geom. And Calculus II	4
CS 222 Computer Programming for Engineers	3
CYSE 101 Introduction to Cyber Security Engineering	3
PHYS 160 University Physics I	3
PHYS 161 University Physics I Lab	1
Mason Core*	3

Total 17

Third Semester

CYSE 205 Systems Engineering Principles	3
MATH 213 Analytic Geom. & Calculus III	3
MATH 203 Linear Algebra	3
PHYS 260 University Physics II	3
PHYS 261 University Physics II Lab	1
Mason Core*	3

Total 16

Fourth Semester

CYSE 211 Operating Systems & Lab	3
CYSE 220 System Modeling	3
CYSE 230 Computer Networking	3
MATH 214 Elementary Differential Equations	3
STAT 344 Probability & Stat for Engineers & Scientists	3

Total 15

Fifth Semester

ECE 301 Digital Electronics	3
CYSE 325 Discrete Events Systems Modeling	3
CYSE 330 Introduction to Network Security	3
CYSE 425 Secure RF Communications	3
Mason Core*	3

Total 15

Sixth Semester

CYSE 411 Secure Software Engineering	3
CYSE 421 Industrial Control Systems (ICS) Security	3
CYSE 430 Critical Infrastructure Protection (seminar)	3
CYSE 470 User Experience Engineering (seminar)	3
ENGH 302 Advanced Composition (Multi-Disciplinary or Natural Science section) ***	3

Total 15

Seventh Semester

CYSE 445 Systems Security and Resilience	3
CYSE 450 Cyber Vulnerability Lab	1
CYSE 465 Transportation Systems Design	3
CYSE 492 Senior Advanced Design Project I	2
CYSE Technical Elective	3
Mason Core*	3

Total 15

Eighth Semester

CYSE 475 Cyber Physical Systems	3
CYSE 491 Engineering Senior Seminar	2
CYSE 493 Senior Advanced Design Project II	3
CYSE Technical Elective	3
CYSE Technical Elective	3
Mason Core*	3

Total 17

* <http://catalog.gmu.edu/mason-core> Mason Core Categories: One course from each: Oral Communication, ENGH 100 or ENGH101, Arts, Global Understanding, Literature, Western Civilization/World History. VSE students do not need to seek out Science, Math, and IT categories as they are built into the major curriculum.

*** ENGH 100 or ENGH 101 and Mason Core-Literature must be completed before taking ENGH 302.

-Technical Electives should be selected from the CYSE program's list of approved courses

We invite requests for additional information. Please contact:

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 Cyber Security Engineering Program
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