

GEORGE MASON UNIVERSITY
SCHOOL OF INFORMATION TECHNOLOGY AND ENGINEERING
B.S. DEGREE IN SYSTEMS ENGINEERING (2100 Nguyen Engineering Building, 703-993-1785)
<http://seor.gmu.edu/undergrad.html>
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 (circle choice) (3)			
c. Quantitative Reasoning (satisfied by completion of mathematics and basic sciences requirements)			
d. Literature (3)	_____	_____	_____
e. Arts (3)	_____	_____	_____
f. Western Civilization (3)	_____	_____	_____
g. ECON 103 (3)	_____	_____	_____
h. Natural Science (satisfied by completion of mathematics and basic sciences requirements)			
i. Global Understanding (3)	_____	_____	_____
j. Information Technology (satisfied by completion of major requirements)			
k. Synthesis (satisfied by SYST 495)			

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

MATHEMATICS AND BASIC SCIENCES (35 credit hours required)

a. MATH 113, MATH 114 (4,4)		a. _____	
b. MATH 213, MATH 214 (3,3)		b. _____	
c. MATH 203 (3)		c. _____	
d. CHEM 251 (4) or CHEM 211/213 (3/1) or PHYS 262/263 (3/1) or BIOL 213 (4)(circle choice)		d. _____	
e. PHYS 160, PHYS 161 (3,1)		e. _____	
f. PHYS 260, PHYS 261 (3,1)		f. _____	
g. STAT 344 (3)		g. _____	
h. STAT 354 (3)		h. _____	

ENGINEERING SCIENCES (64 credit hours required)

a. CS 112 (4)		a. _____	
b. ENGR 107 (2)		b. _____	
c. CS 211 (3)		c. _____	
d. SYST 101 (3)		d. _____	
e. SYST 210 (3)		e. _____	
f. SYST 220 (3)		f. _____	
g. SYST 221 (1)		g. _____	
h. SYST 320 (3)		h. _____	
i. SYST 330 (3)		i. _____	
j. SYST 335 (3)		j. _____	
k. SYST 371 (3)		k. _____	
l. SYST 395 (3)		l. _____	
m. SYST 470 (3)		m. _____	
n. SYST 473 (3)		n. _____	
o. SYST 489 (3) (writing intensive course)		o. _____	
p. SYST 490 (3)		p. _____	
q. SYST 495 (3)		q. _____	
r. OR 441 (3)		r. _____	
s. OR 442 (3)		s. _____	
t. Technical Emphasis Ares: The systems engineering program requires nine credits of technical electives. Students must select one of the following technical emphases, each containing three courses. See http://catalog.gmu.edu/preview_program.php?catoid=29&pooid=28552#TECH for details (9)			
1. _____		1. _____	
2. _____		2. _____	
3. _____		3. _____	

Students in the Systems Engineering, BS program must complete all systems engineering courses (SYST and OR), three courses in the technical emphasis area, and the following courses with a grade of C or better: MATH 203, 214; CS 211; PYS 260; STAT 344, STAT 354

MINIMUM 123 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.



Volgenau School of Engineering

SYSTEMS ENGINEERING, B.S.

2018 – 2019

As the systems around us grow more complex, the need grows for engineers who understand not just the pieces, but how they interact. Whereas other engineering disciplines concentrate on individual aspects of a system (electronics, ergonomics, software, etc.), systems engineers focus on the system as a whole. Systems engineers work as the lead of their projects, integrating all the disciplines and specialty groups into a team effort, forming a structured development process that proceeds from concept to design to production to operation. Systems engineers consider both the business and the technical needs of all customers with the goal of providing a quality product that meets the user needs.

Our nationally recognized program in systems engineering at George Mason University prepares students for immediate employment as well as for a lifetime of learning. Our program is accredited by the Engineering Accreditation Commission of ABET, <http://www.abet.org>. Our educational program reflects the systems engineer's unique perspective that considers all aspects of a system throughout the entire lifetime of that system. The systems engineering program at George Mason is interdisciplinary, drawing from other engineering disciplines, computer science, operations research, psychology and economics. The core systems engineering courses tie together these diverse threads to provide a global understanding of how individual disciplines fit into the development of complex, large scale systems.

Students gain depth in a technical area by selecting a sequence of technical electives that constitute an emphasis. Students choose their own emphasis with the help of their advisor. A year-long senior design project provides hands-on experience in applying various systems engineering methods and tools. In the first two years, students obtain a basic foundation in mathematics, natural sciences, computing, writing, humanities, arts, and social sciences. The systems engineering program builds on this foundation, teaching theoretical knowledge, practical skills, and the ability to apply systems thinking to problems. Teamwork, collaborative learning, analytical skills, practical problem solving, and oral and written communication are strongly stressed.

The mission of the undergraduate program is to equip students with the ability to participate productively in the many professional activities associated with engineering a trustworthy system that satisfies client needs. The term "system" is interpreted broadly to include information, telecommunication, defense, health delivery, transportation, energy or manufacturing systems, as well as corporate processes.

To earn the Bachelor of Science degree, students must satisfy all baccalaureate degree requirements as described in the George Mason University Catalog. These requirements include the completion of at least 123 credits that count towards graduation including at least 45 credits of upper-division level courses (numbered 300 or above), and fulfillment of all degree requirements.

SYSTEMS ENGINEERING, B.S.

2018-2019 Sample Schedule for Undergraduate Systems Engineering Majors

First Semester

MATH 113 Analytic Geometry and Calculus I	4
ECON 103 Contemporary Microeconomic Principles	3
ENGR 107 Introduction to Engineering	2
Mason Core*	3
Mason Core*	3
	15

Second Semester

CS 112 Introduction to Computer Programming	4
MATH 114 Analytic Geometry and Calculus II	4
PHYS 160 University Physics I	3
PHYS 161 University Physics I Laboratory	1
SYST 101 Understanding Systems Engineering	3
	15

Third Semester

CS 211 Object-Oriented Programming	3
MATH 213 Analytic Geometry and Calculus III	3
PHYS 260 University Physics II	3
PHYS 261 University Physics II Laboratory	1
SYST 210 Systems Design	3
Mason Core*	3
	16

Fourth Semester

Natural Science (see list below)	4
MATH 203 Linear Algebra	3
MATH 214 Elementary Differential Equations	3
SYST 220 Dynamical Systems I	3
SYST 221 Systems Modeling Laboratory	1
Mason Core*	3
	17

Fifth Semester

STAT 344 Probability & Statistics for Engrs & Scientists I	3
SYST 320 Dynamical Systems II	3
OR 441 Deterministic Operations Research	3
ENGH 302 Adv Comp (Nat Sci section) **	3
Technical Elective	3
	15

Sixth Semester

STAT 354 Probability & Statistics for Engrs & Scientists II	3
SYST 330 Systems Methods	3
SYST 335 Discrete Systems Modeling & Simulation	3
SYST 371 Systems Engineering Management	3
SYST 395 Applied Systems Engineering	3
	15

Seventh Semester

SYST 470 Human Factors Engineering	3
SYST 473 Decision and Risk Analysis	3
SYST 489 Senior Seminar	3
SYST 490 Senior Design Project I	3
Technical Elective	3
	15

Eighth Semester

SYST 495 Senior Design Project II	3
OR 442 Stochastic Operations Research	3
Technical Elective	3
Mason Core*	3
Mason Core*	3
	15

* <http://catalog.gmu.edu/mason-core> Mason Core Categories: One course from each: Oral Communication, ENGH 100 or 101, 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 101 and Mason Core-Literature must be completed before taking ENGH 302.

The 4 credits of Natural Science must be chosen from the following list of courses. Students who select the Bioengineering technical emphasis area are strongly encouraged to take BIOL 213. Students who select the Environmental Engineering technical emphasis area must take CHEM 211/213 or CHEM 251.

- PHYS 262 - University Physics III Credits: 3 AND PHYS 263 - University Physics III Laboratory Credits: 1
- CHEM 251 - General Chemistry for Engineers Credits: 4 (or) CHEM 211 - General Chemistry I Credits: 3 and CHEM 213 General Chemistry Laboratory I Credit: 1
- BIOL 213 - Cell Structure and Function Credits: 4

The Systems Engineering program requires nine semester hours of technical electives. Students must select one of ten specialization areas: Aviation Systems, Bioengineering, Computer Network Systems, Control Systems, Data Analytics, Environmental Engineering, Financial Engineering, Mechanical Engineering, Operations Research or Software Intensive Systems. **All specializations and the corresponding plan of study must be approved by the student's advisor.**

Technical electives are normally composed of 300- and 400- level courses. Two hundred (200)- level courses are only included for special reasons (e.g., if they are prerequisites for other 300- and 400- level technical electives or if they are needed for the FE/EIT exam).

We invite requests for additional information. Please contact:

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