



## Volgenau School of Engineering

# SYSTEMS ENGINEERING, B.S. 2017- 2018

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.

### **Admission Requirements**

Admission to George Mason is competitive in that the number of qualified candidates for admission generally exceeds the number of new students who can be accommodated. Each candidate who presents sufficient admission qualifications is reviewed in the context of other qualified applicants. An offer of admission is valid only for the semester for which the student applied. Application for undergraduate admission can be made online at George Mason's website <http://admissions.gmu.edu>. The Office of Admissions can also provide forms upon request.

### **Freshman Requirements**

The following factors are considered when reviewing applications for admission:

- Cumulative high school grade point average for course work completed in grades 9 through 12.
- Level of difficulty of course work elected throughout the high school years particularly in English, mathematics, laboratory science, and foreign language.
- Scores from the Scholastic Aptitude Test (SAT) and/or American College Test (ACT), and Test of English as a Foreign Language (TOEFL) if appropriate.

### **Transfer Requirements**

The university accepts qualified students who wish to transfer from other colleges. A transfer applicant who has completed at least 30 semester hours of transferable credit must submit two copies of official transcripts from each collegiate institution attended. Transfer applicants with fewer than 30 semester hours of transferable credit must also submit a copy of their secondary school record, as well as SAT or ACT scores.

## 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
<b>15</b>	

### 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
<b>15</b>	

### 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
<b>16</b>	

### 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
<b>17</b>	

### 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
<b>15</b>	

### 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
<b>15</b>	

### 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
<b>15</b>	

### Eighth Semester

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

\* <http://catalog.gmu.edu/mason-core> Mason Core Categories: One course from each: Oral Communication, 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 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.

- PHYS 262 - University Physics III Credits: 3 AND PHYS 263 - University Physics III Laboratory Credits: 1
- CHEM 251 - General Chemistry for Engineers Credits: 4
- 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 nine specialization areas: Aviation Systems, Bioengineering, Computer Network Systems, Control Systems, Data Analytics, 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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