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 and provides a foundation 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, statistics, psychology and economics. The core systems engineering courses tie together these diverse threads to provide a comprehensive 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.

We invite requests for additional information. Please contact:
Volgenau School of Engineering, Department of Systems Engineering and Operations Research
George Mason University, Mail Stop 4A6, Nguyen Engineering Building Suite 2100, Fairfax, VA 22030
Phone: (703) 993-1670   Fax: (703) 993-1521   http://seor.gmu.edu   email: seor@gmu.edu
# 2019-2020 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 Core¹  
  3  
  Mason Core¹  
  3  
  **Total:** 15

**Second Semester**
- CDS 130 Computing for Scientists or CS 112 Introduction to Computer Programming  
  3/4  
  MATH 114 Analytic Geometry and Calculus II  
  4  
  PHYS 161 University Physics I  
  3  
  PHYS 161 University Physics I Laboratory  
  3  
  SYST 101 Understanding Systems Engineering  
  3  
  **Total:** 14/15

**Third Semester**
- SYST 230 Object-Oriented Modeling and Design or CS 211 Object-Oriented Programming  
  4/3  
  PHYS 260 University Physics II  
  3  
  PHYS 261 University Physics II Laboratory  
  1  
  SYST 210 Systems Design  
  3  
  SYST 210 Systems Design  
  3  
  **Total:** 16/17

**Fourth Semester**
- Natural Science (see list below) ³  
  3  
  MATH 203 Linear Algebra  
  3  
  MATH 214 Elementary Differential Equations  
  3  
  SYST 220 Dynamical Systems I  
  3  
  SYST 221 Systems Modeling Laboratory  
  1  
  Mason Core¹  
  3  
  Mason Core¹  
  3  
  **Total:** 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) ²  
  3  
  Technical Elective⁴  
  3  
  **Total:** 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  
  **Total:** 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 Elective⁴  
  3  
  **Total:** 15

**Eighth Semester**
- SYST 495 Senior Design Project II  
  3  
  OR 442 Stochastic Operations Research  
  3  
  Technical Elective⁴  
  3  
  Mason Core¹  
  3  
  Mason Core¹  
  3  
  **Total:** 15

¹ [http://catalog.gmu.edu/mason-core](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. SYST majors do not need to seek out Science, Math, IT, and Social Science categories as they are built into the major curriculum.

² ENGH 100 or 101 and Mason Core-Literature must be completed before taking ENGH 302.

³ 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 271/272.
   - PHYS 262 - University Physics III Credits: 3 AND PHYS 263 - University Physics III Laboratory Credits: 1
   - CHEM 271 - General Chemistry for Engineers Credits: 3 and CHEM 272 General Chemistry for Engineers Lab Credit: 1 (or)
     - CHEM 211 - General Chemistr Credits: 3 and CHEM 213 General Chemistry Laboratory I Credit:1
   - BIOL 213 - Cell Structure and Function Credits: 4

⁴ The Systems Engineering program requires nine credit 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. Some courses in the above specializations have additional pre-requisites. Refer to the catalog for the list of courses [https://catalog.gmu.edu/](https://catalog.gmu.edu/)

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).