SYSTEMS AND INDUSTRIAL ENGINEERING MINOR

Banner Code: SSIE

Academic Advising

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Overview

The minor in systems and industrial engineering offers an attractive complement to many undergraduate majors. Systems and industrial engineers define, design, develop, integrate, and test systems. Whereas other engineering disciplines concentrate on individual aspects of a system (electronics, ergonomics, software, etc.), systems engineers focus on the system as a whole. This minor provides students with the fundamentals of systems engineering and operations research. In these courses, students learn how to deal with the system life cycle and to use scientific methods for analyzing operations of a system or organization. The structured set of courses helps students across the technical fields prepare for the information technology work now common in public and private industry. This minor is open to all majors, and especially appropriate for students in the natural sciences, computational sciences, information technology, finance, economics, mathematics, engineering, or computer science programs.

Admissions & Policies

Policies

Eight credits of coursework must be unique to the minor and students must complete all coursework with a minimum GPA of 2.00. For policies governing all minors, see AP.5.3.4 Minors (https://catalog.gmu.edu/policies/academic/undergraduate-policies/#ap-5-3-4).

Requirements

Minor Requirements

Total credits: 15

Required Courses

Code	Title	Credits
SYST 375	Engineering Economy	3
SYST 473	Decision and Risk Analysis	3
Select one from the following:		3
SYST 210	Systems Design [1]	
SYST 101	Understanding Systems and Industrial Engineering [2]	
or SYST 205	Systems Engineering Principles	
Total Credits		**9**

[1] SYST 210 cannot be counted as both a required and additional course.
[2] Credit cannot be received for both SYST 101 and SYST 205.

Two Additional Courses

Code	Title	Credits
Select any two additional courses from the following. Students are encouraged to take SYST 478 and SYST 479 for technical emphasis in Artificial Intelligence, SYST 414 and SYST 496 for technical emphasis in Climate Change, Energy, and Sustainability, SYST 460 and SYST 461 for technical emphasis in Aviation Systems, SYST 438 and SYST 468 for technical emphasis in Data Analytics, SYST 438 and SYST 488 for technical emphasis in Financial Engineering, SYST 470 and SYST 475 for technical emphasis in Industrial Engineering, and OR 441/MATH 441, and OR 442/MATH 442 for technical emphasis in Operations Research.		6
SYST 130	Introduction to Computing for Digital Systems Engineering (Mason Core) (https://catalog.gmu.edu/mason-core/)	
SYST 210	Systems Design	
SYST 220 & SYST 221	Dynamical Systems I and Systems Modeling Laboratory	
SYST 230	Object-oriented Modeling and Design	
SYST 320	Dynamical Systems II	
SYST 330	Systems Methods	
SYST 370	Systems Project Management [3]	
or SYST 371	Systems Engineering Management	
SYST 414	Systems Thinking	
SYST 438	Analytics for Financial Engineering and Econometrics	
SYST 440	Digital Twin for Systems and Industrial Engineering	
SYST 448	Technologies and Security for Cryptocurrencies and Financial Transactions	
SYST 460	Introduction to Air Traffic Control	
SYST 461	Air Transportation System Engineering	
SYST 468	Applied Predictive Analytics	
SYST 469	Human Computer Interaction [4]	
or SYST 470	Human Factors Engineering	
SYST 475	Production Systems Analysis	
SYST 478	Systems Engineering and Artificial Intelligence	
SYST 479	AI Design and Deployment Risks	
SYST 488	Financial Systems Engineering	
SYST 492	Innovation for Impact	
SYST 496	Sustainable Systems Methods Practicum	
OR 335	Discrete Systems Modeling and Simulation [5]	
or SYST 335	Discrete Systems Modeling and Simulation	

OR/MATH 441	Deterministic Optimization [6]	
OR/MATH 442	Stochastic Models [7]	
OR 481	Numerical Methods in Engineering [8]	
or MATH 446	Numerical Analysis I	
Total Credits		**6**

[3] Credit cannot be received for both SYST 370 and SYST 371.
[4] Credit cannot be received for both SYST 469 and SYST 470.
[5] Credit cannot be received for both SYST 335 and OR 335.
[6] Credit cannot be received for both OR 441 and MATH 441
[7] Credit cannot be received for both OR 442 and MATH 442
[8] Credit cannot be received for both OR 481 and MATH 446

Prerequisites

Some of the courses listed above have additional prerequisites. Students should pay careful attention to prerequisites when selecting courses.

Program Outcomes

The minor in systems and industrial engineering offers an attractive complement to many undergraduate majors. Systems and industrial engineers define, design, develop, integrate, and test systems. Whereas other engineering disciplines concentrate on individual aspects of a system (electronics, ergonomics, software, etc.), systems engineers focus on the system as a whole. This minor is open to all majors, and especially appropriate for students in the natural sciences, computational sciences, information technology, finance, economics, mathematics, engineering, or computer science programs.

Program Outcomes:

1. This minor provides students with the fundamentals of systems and industrial engineering, and operations research. In these courses, students learn how to deal with the system life cycle and to use scientific methods for analyzing operations of a system or organization.

2. The structured set of courses helps students across the technical fields prepare for the systems and industrial engineering, and operations research work such as define, design, develop, integrate, and test systems that are now common in public and private industry.