Systems Engineering (MS/PhD)
Distance Graduate Degree Programs
Department of Engineering Management and Systems Engineering

Program Description
Systems Engineering is an interdisciplinary approach to managing complex systems and projects. Because systems engineering is central to many businesses and organizations, the demand for graduates is very high. Through this program, students take six core courses in theory and application of systems engineering and management. In addition, four courses can be taken in an area of specialization, allowing the student to design a program that best fits his/her career interest and goals.

Areas of specialization include computational intelligence, distributed systems modeling, computer engineering, aerospace engineering, modeling and simulation, network centric systems, quality and reliability risk modeling and assessment, statistics, structures, infrastructure systems, systems architecting and systems design optimization.

Credit Hours to Complete: Masters of Science in Systems Engineering can be pursued with or without a thesis. The non-thesis degree requires 30 credit hours; the thesis degree requires 36 credit hours and includes a research component. The non-thesis master's degree requires the completion of six core courses and four elective courses from a selected area of specialization, including:

- Systems and Software Architecting
- Infrastructure Systems
- Lean Systems Engineering
- Computer Security and Reliability

PhD in Systems Engineering is individually structured by the student in consultation with and approval by the student's advisory committee. The PhD requires a dissertation. The total credit requirements for graduation are a minimum of 60 credit hours after the successful completion of MS degree in Systems Engineering, or a minimum of 90 credit hours after a BS degree.

Delivery Format: Courses are delivered over the Internet, via live streaming video, live collaboration software; archived class recording; Blackboard learning management system.

Admission Requirements
Bachelor's in engineering, applied mathematics, computer science or a physical science; Cumulative GPA ≥ 3.0; GRE V+Q ≥303 (1150 based on old scale), A ≥ 4.5; International requirement: TOEFL ≥ 580/237/92. The PhD also requires an MS in Systems Engineering or related field with a 3.5 GPA and a minimum of three years of work experience.

Department Contact Information
Graduate Coordinator
Engineering Management and Systems Engineering
223 Engineering Management, 600 W. 14th St.
Rolla, MO 65409-0370
Phone: 573-341-7211 or 573-341-4990
Email: syseng@mst.edu | Web: http://emse.mst.edu/

Student Services Contact Information
Vicki Gibbons, Manager of Graduate Student Services
216 Centennial Hall, 300 West 12th St.
Rolla, MO 65409-0370 | Phone: 573-341-4892
Toll Free: 1-877-678-1870
Email: vgibbons@mst.edu | Web: http://dce.mst.edu

Application Deadlines:
Fall semester - August
Spring semester - December
Summer session - May

For more information, go online
distance.mst.edu
Systems Engineering Certificate Programs
Department of Engineering Management and Systems Engineering

Systems Engineering
The Graduate Certificate in Systems Engineering provides structured training in the fundamentals of systems engineering to equip engineers with the skills that can be used in the design, operation, and maintenance of systems throughout their life cycle. The techniques covered and concepts introduced are applicable to any industry.

Curriculum:* The following four courses are required:
- SYS ENG 368 Systems Engineering and Analysis I
- SYS ENG 413 Economic Analysis of Systems Engineering Projects
- SYS ENG 468 Systems Engineering Analysis II
- SYS ENG 469 Systems Architecting

Computational Intelligence
(Jointly offered with Computer Engineering and Computer Science)
This graduate certificate program provides practicing engineers the opportunity to develop the necessary skills in the use and development of computational intelligence algorithms based on evolutionary computation, neural networks, fuzzy logic, and complex systems theory. Engineers can also learn how to integrate common sense reasoning with computational intelligence elective courses such as data mining and knowledge discovery.

Curriculum:* The following course is required:
- COMP ENG 358/ ELEC ENG367/ SYS ENG 367 Computational Intelligence

Select one course from the following:
- COMP SCI 347 Introduction to Artificial Intelligence
- COMP SCI 348 Evolutionary Computing
- SYS ENG 378/ELEC ENG 368 Introduction to Neural Networks and Applications

Elective Courses (Select two courses not taken as a core course):
- ELEC ENG/COMP ENG/SYS ENG 301 Evolvable Hardware
- COMP SCI 347 Introduction to Artificial Intelligence

Model Based Systems Engineering
This graduate certificate program provides practicing engineers the opportunity to develop the necessary skills in the use of current modeling techniques to develop and simulate complex, multi-disciplinary engineering systems. In addition, engineers will learn methods to automate data acquisition for system development, establish rules for reusability of model resources, and acquire necessary skills for simulating the designed systems.

Curriculum:* The following courses are required:
- SYS ENG 433 Distributed Systems Modeling
- SYS ENG 435 Model Based Systems Engineering
- SYS ENG 479 Smart Engineering System Design
- ENG MGT 374 Engineering Design Optimization

COMP SCI 348 Evolutionary Computing
COMP SCI 447 Advanced Topics in Artificial Intelligence
COMP SCI 448 Advanced Evolutionary Computing
SYS ENG/CpE/EE 458 Adaptive Critic Designs
COMP SCI 434/SYS ENG/COMP ENG 404 Data Mining and Knowledge Discovery
EE 337 Neural Networks for Control
SYS ENG 378/EE 368 Introduction to Neural Networks and Applications
COMP ENG/SYS ENG/EE 457 Markov Decision Processes
SYS ENG 478 Advanced Neural Networks
Network Centric Systems
(Shared with Electrical and Computer Engineering)
This graduate certificate program allows practicing engineers to develop the necessary skills for the design and operation of network centric systems. The graduate courses selected for the program address the intersection between network engineering and systems engineering and architecting.

Curriculum:*
The following two courses are required:
SYS ENG/COMP ENG 419 Network Centric Systems Architecting and Engineering
SYS ENG/COMP ENG 449 Network Centric Systems Reliability and Security

Elective Courses (Select two of the following courses):
COMP ENG 317 Fault Tolerant Digital Systems
COMP ENG 319 Digital Network Design
COMP ENG/SYS ENG 348 Wireless Networks
COMP ENG 349 Trustworthy, Survivable Computer Networks
COMP ENG 448 High Speed Networks
COMP ENG/SYS ENG 443 Wireless Ad hoc and Sensor Network
COMP SCI 463 Computer Security
COMP SCI 467 Mobile and Sensor Data Management

Admission Requirements
Certificate programs are open to all persons holding a B.S., M.S., or Ph.D. degree (with at least one degree in engineering, applied mathematics, computer science, or a physical science) and who have a minimum of two years of professional employment experience, or are currently accepted into a graduate degree program at Missouri S&T.

Certificate programs consist of four courses, which consist of core and elective courses. In order to receive a graduate certificate, the student must have an average graduate cumulative grade point of 3.0 or better in the certificate courses taken.

Student admitted to the certificate program will have non-degree graduate status but will earn graduate credit for the courses they complete. If the four-course sequence approved by the graduate advisor is completed with a grade of “B” or better in each of the courses taken, the student will be admitted to the M.S. program in Systems Engineering, if they apply. The certificate courses taken by a student admitted to the program will count toward their master’s degree.

Once admitted to the program, a student will be given three years to complete the program as long as a “B” average is maintained in the courses taken.

* Curriculum is subject to change. Please contact the department for up-to-date information on courses. Other courses approved by the Systems Engineering faculty may be substituted for any of the listed courses on a case-by-case basis. The administrative coordinators must approve the substitution prior to enrolling in the course.