UMBC
AN HONORS UNIVERSITY IN MARYLAND

SYSTEMS ENGINEERING GRADUATE PROGRAMS

The Systems Engineering (SE) Program at UMBC is designed to accelerate the development of systems engineers by providing practical experience that can be immediately applied on the job. Students learn from industry experts how to develop operable systems that meet customer requirements, while successfully navigating the complexities of system design.

Courses are developed and taught by senior systems engineers and address the entire systems engineering life cycle, including requirements analysis, systems architecture and design, modeling, simulation and analysis, and system implementation and test. Classes are held at convenient late afternoon times or early evenings to accommodate working professionals.

Our offerings include:

Master of Science (M.S.)
SYSTEMS ENGINEERING (30 Credits)

The M.S. in Systems Engineering provides the student with the knowledge required to participate in the system engineering of large complex systems. The program teaches the technical aspects of systems engineering through a combination of theory and application. The program culminates with a team-based project that brings together the elements of system engineering.

M.S. SYSTEMS ENGINEERING WITH CERTIFICATE IN ENGINEERING MANAGEMENT (33 Credits)

Upon completing the M.S. degree and certificate requirements the students will have the necessary skills to participate in the system engineering of large complex systems, and have the skills in leadership and management necessary to succeed in leading teams.

M.S. SYSTEMS ENGINEERING WITH CERTIFICATE IN CYBERSECURITY (30 Credits)

Upon completing the M.S. degree and certificate requirements the students will have the necessary skills to participate in the system engineering of large complex systems and possess advanced knowledge of strategy, policy, and analytic aspects of cybersecurity.

Post-Baccalaureate Certificate:
SYSTEMS ENGINEERING (15 Credits)

The five-course (15 credit) Graduate Certificate in Systems Engineering provides the core processes, techniques and tools required to develop complex systems.

Systems Engineering Tracks in Other Engineering Majors

- M.S. Engineering Management (30 credits)
- M.S. Electrical Engineering (33 credits)
- M.S. Computer Science (33 credits)

ADMISSION REQUIREMENTS

For Masters and Graduate Certificates:

- B.S. degree in Engineering, Information Systems, Computer Science or Mathematics
- Minimum undergraduate G.P.A. of 3.0 on a 4.0 scale.
- GRE scores are not required if undergraduate degree was completed at an accredited U.S. university
- Current resume: submit as additional document during application process or email to kedmonds@umbc.edu

International Students:

- GRE minimum scores: Quantitative Reasoning: 153, Verbal Reasoning 150, and Analytical Writing 3.5
- English language proficiency minimum scores (no more than 2 years old): TOEFL iBT: 99 or IELTS: 7.0
- GRE scores are **not** required if your undergraduate degree was completed at an accredited U.S. university.

APPLICATION INFORMATION

Applications are accepted year round. International applications are accepted for the fall and spring semesters in order to accommodate full time enrollment. Students may enter the program as a master's degree or graduate certificate student. Those interested in enrolling in a course or two for professional development, should pursue the non-degree option.

COSTS

Maryland Resident
Tuition per credit: $585 (plus mandatory fees)*

Non-Resident
Tuition per credit: $968 (plus mandatory fees)*

This program does not offer merit-based financial aid or graduate assistantships of any kind. For more information on tuition and fees, please visit: www.umbc.edu/sbs.

**For Academic Year 2015/2016*

MRP20150813

Master of Science:
SYSTEMS ENGINEERING (30 Credits)

Degree Requirements

Required Core Courses (18 credits)

ENEE 660: Systems Engineering Principles
ENEE 661: System Architecture and Design
ENEE 662: Modeling, Simulation, and Analysis
ENEE 663: System Implementation, Integration & Test
ENEE 670: Systems Engineering Project
ENEE 672: Decision & Risk Analysis

Elective Courses (12 credits)

Twelve credits of breadth and depth electives in systems engineering and related disciplines, such as electrical engineering, computer engineering, engineering management, computer science and mechanical engineering. Suggested electives are listed below.

Examples of appropriate breadth courses:
ENMG 652: Management, Leadership and Communications
ENMG 668: Project and Systems Engineering Management
CYBR 621: Cyber Warfare
CYBR 622: Global Cyber Capabilities and Trends
CYBR 623: Cybersecurity Law and Policy

Examples of appropriate depth courses:
(at least one required)
CYBR 620: Introduction to Cybersecurity
CMSC 626: Principles of Computer Security
ENEE 664: Advanced Systems Architecture
ENEE 666: Architecting Security
ENEE 667: Advanced Systems Engineering Processes
ENMG 664: Quality Engineering and Management
CMPE 684: Wireless Sensor Networks
CMPE 685: Introduction to Communications Networks

Post-Baccalaureate Certificate:
SYSTEMS ENGINEERING (15 Credits)

Five Required Courses

ENEE 660: Systems Engineering Principles
ENEE 661: System Architecture and Design
ENEE 662: Modeling, Simulation and Analysis
OR
ENEE 672: Decision & Risk Analysis
ENEE 663: Systems Implementation, Integration and Test
ENEE 670: Systems Engineering Project (Capstone Project)

All certificate courses can be applied toward the Master of Science in Systems Engineering or Engineering Management.

Master of Science:
SYSTEMS ENGINEERING WITH CERTIFICATE

Complete required core courses for M.S. degree, and:

Engineering Management (15 credits)

ENMG 668: Project & Systems Engineering Mgmt.
ENMG 652: Mgmt. Leadership & Communications
ENMG 656: Engineering Law & Ethics
ENMG 658: Financial Mgmt.
One elective depth course in engineering or computer science

Cybersecurity (12 credits)

CYBR 620: Introduction to Cybersecurity
CYBR 621: Cyber Warfare
CYBR 622: Global Cyber Capabilities and Trends
CYBR 623: Cybersecurity Law and Policy

ACCELERATED BACHELOR'S/MASTER'S

The accelerated degree program is designed to let students start taking courses toward a master's degree at UMBC while still an undergraduate. Once admitted to a participating UMBC master's program, students can apply up to three graduate-level courses, taken as an undergraduate, toward a master's degree. Learn more:
umbc.edu/gradschool/gradcatalog/admissions.html

FACULTY & CURRICULUM

The Systems Engineering Program at UMBC is taught by the region's top systems engineers from leading companies and overseen by a board of faculty and industry leaders.

WHY SYSTEMS ENGINEERING?

There is a strong demand for Systems Engineering experts who can integrate all the aspects of the engineering process into a coherent and effective system. Additionally, System Engineering professionals play the critical role of acting as the primary liaison between management, customers, suppliers, and specialty engineers in the systems development process.

WHY UMBC?

- Classes are conveniently offered in the evening on UMBC's main campus, located just five minutes from BWI Airport, with easy access to I-95 and the 695 Beltway.
- Some courses utilize a hybrid on-line/in-person model that provides the convenience of on-line with benefits of classroom interactions with instructors and classmates.
- For six years running (2009-2014), UMBC was ranked #1 in the U.S. News and World Report's list of "national up-and-coming" universities.
- UMBC is classified by the Carnegie Foundation as a Research University (High Research Activity).
- UMBC is uniquely positioned to provide education and training that respond to the state's need for qualified technical professionals in the engineering field.

FOR MORE DETAILS

umbc.edu/se

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