GRADUATE CERTIFICATE IN MODELING AND SIMULATION FOR DECISION SYSTEMS

OFFERED BY:
Department of Engineering Management and Systems Engineering

PARENT DEPARTMENT AND DEGREE:
Department of Engineering Management and Systems Engineering, MS-EM, MS-SE

INTENDED AUDIENCE: _Main Campus Students _Distance Students _X_ Both

PROGRAM DESCRIPTION:
The Department of Engineering Management and Systems Engineering will offer a graduate certificate in Modeling and Simulation for Decision Making Systems for practicing engineers and technology professionals seeking to develop key competencies associated with decision making. The courses are scheduled and offered on campus and as an augmented online offering for maximum flexibility.

PURPOSE:
A significant audience for our program includes engineers, scientists, and other technical professionals who seek to develop sophisticated expertise in modeling decision processes and actually making decisions in complex technological enterprises. The knowledge gained and the affirmation of relevant competencies indicated by a graduate level credential strongly facilitates career progression. Learners completing this certificate will gain real-world knowledge and competencies needed to model and simulate decision problems as well as to understand and use models of human judgment and decision making processes, especially in managerial and technical contexts.

ADMISSION:
The MODELING AND SIMULATION FOR DECISION SYSTEMS CERTIFICATE is open to all persons holding a B.S., M.S., or Ph.D. degree in engineering, science, mathematics, or quantitative business degrees or who are currently accepted into a graduate degree program at Missouri S&T. Once admitted to the program, the student must take the four designated courses (provided in the curriculum section). In order to receive a Graduate Certificate, the student must have an average cumulative grade point of 3.0 or better in the certificate courses. Once admitted to the program, a student will be given three years to complete the program.

Students admitted to the MODELING AND SIMULATION FOR DECISION MAKING Certificate Program will have non-degree graduate status, however, they will earn graduate credit for the course they complete. If the student completes the four-course sequence with a grade of B or better in each of the courses taken, they, upon application, will be admitted to the M.S. degree program in Engineering Management or the M.S. degree program in Systems Engineering. The certificate credits taken by the students admitted to the M.S. degree program will count towards their master's degrees. Students who do not have all of the prerequisite courses necessary to begin the courses in
the MODELING AND SIMULATION FOR DECISION MAKING Certificate Program will be allowed to take "bridge" courses at either the graduate or undergraduate level to prepare for the formal certificate courses.

CONTRIBUTING FACULTY:
David Spurlock
Steven Corns
Robert Marley
Benjamin Kwasa

CURRICULUM:
EM 5110, Managerial Decision Making
EM 6310, Human Systems Integration
EM 6411, Advanced Topics in Simulation Modeling
EM 6415/SE 6110, Optimization under Uncertainty

COURSE DESCRIPTIONS:
ALL courses will be available to be delivered in both on-campus and online modes

ENG MGT 5110 Managerial Decision Making (LEC 3.0)
Individual and group decision making processes and principles for engineers and technical managers with emphasis on the limitations of human rationality and the roles of social influence and organizational contexts; principles and skills of negotiation. Prerequisite: Senior or graduate standing.

ENG MGT 6310 Human Systems Integration (LEC 3.0)
This course considers Human Systems Integration (HSI) in a variety of applications including systems acquisition and training, HSI tools, techniques, and procedures. Prerequisite: Eng Mgt 4330 or Psych 4710.

ENG MGT 6411 Advanced Topics in Simulation Modeling (LEC 3.0)
Design and analysis of distributed systems using discrete-event simulations and synchronization of distributed models. Design and implementation of finite state automata and simulation models as control execution systems. Functioning of real-time, agent-based, and multipass simulations. Prerequisite: Eng Mgt 5410 or Graduate standing.

ENG MGT 6415 Optimization under Uncertainty (LEC 3.0)
Optimization in the presence of model uncertainty or system stochasticity is discussed. The course covers fundamentals of stochastic programming, robust optimization, and dynamic programming. Prerequisites: Graduate standing. (Co-listed with Sys Eng 6110).