

University of Virginia Accelerated Master's Degree Program in Systems Engineering

Brief Course Descriptions

SYS 6001 - Introduction to Systems Engineering

An overview of systems engineering as a professional and intellectual discipline, and its relation to other disciplines, such as operations research, management science, and economics. Extensive use of case studies to introduce systems methodology and systems thinking.

SYS6043 - Applied Optimization

Foundations of mathematical modeling and optimization, with emphasis on problem formulation and solution techniques. Includes applications of linear programs, nonlinear programs, and combinatorial models, as well as a practical introduction to algorithms for solving these types of problems.

SYS6045 - Applied Probabilistic Modeling

Develops an operational understanding of the basic tools of probabilistic modeling, including (i) a review of undergraduate probability, (ii) introduction to Bernoulli and Poisson processes with applications, (iii) Markov chains and applications, and (iv) limit theorems.

SYS 5044 – Economics of Engineering

An introduction to the theory of the industrial organization (from a game-theoretic perspective) and its applications to industries with strong engineering content (electricity, telecommunications, software and hardware, etc.).

SYS 6050 - Risk Analysis

A study of technological systems, where decisions are made under conditions of risk and uncertainty. Topics include the nature, perception, and epistemology of risk, and the process of risk assessment and management; systems engineering tools for risk analysis; and methodologies for risk analysis.

APMA 6043 - Statistics for Engineers and Scientists

Analyzes the role of statistics in science; hypothesis tests of significance; confidence intervals; design of experiments; regression; correlation analysis; analysis of variance; and introduction to statistical computing with statistical software libraries.

SYS 6064 - Applied Human Factors Engineering

Covers principles of human factors engineering, understanding and designing systems that take into account human capabilities and limitations from cognitive, physical, and social perspectives.

SYS 6582 – Selected Topics in Systems Engineering – Management in Engineering

Taught by faculty of the Darden Graduate School of Business during the elective track, the course comprises topics such as corporate finance, bargaining and negotiating, entrepreneurship, marketing, and global economics.

SYS 7002 – Case Studies in Systems Engineering

Taught by faculty from the Department of Systems and Information Engineering and the Darden Graduate School of Business, the course comprises topics such as data mining, decision analysis, financial engineering, agent-based modeling, sustainability, and enterprise architecture.

SYS 6002 - Systems Integration

Uses a capstone project to develop skills in addressing problems encountered when integrating large systems. The capstone project is used to provide students with the opportunity to apply techniques for dealing with systems integration.

SYS 7096 – Systems Engineering Graduate Colloquium

Regular meeting of graduate students and faculty for presentation and discussion of contemporary systems problems and research. The colloquium for students in the Accelerated Master's Program comprises a year-long series of seminars by industry experts and academic specialists.

Questions about the Accelerated Master's Program in Systems Engineering curriculum should be directed to

Professor Michael C. Smith, Executive and Academic Director
Accelerated Master's Program in Systems Engineering

Email: mcs5f@virginia.edu Phone: (434) 924-0320 Fax: (434) 924-0705