M.S. in Engineering Management

Candidates must satisfy a total of 30 credit hours (CH) with a minimum G.P.A. of 3.000 on a 4.000 scale.

All students must complete 3 credit hours (CH) from one of the following analytics courses.

EMIS 7300 Systems Analysis Methods

Introduction to modeling and analysis concepts, methods and techniques used in systems engineering, design of products and associated production, and logistics systems and analysis of operational system performance. Specific topics include probabilistic and statistical methods, Monte Carlo simulation, optimization techniques, applications of utility and game theory, and decision analysis.

EMIS 7357 Analytics for Decision Support

In a rapidly changing, complex environment, successful enterprises make mission-critical choices using decision-support systems, which apply analytical methods to massive organizational data sets to evaluate options, give insight to likely outcomes, and make recommendations of the "best" decisions to pursue. Course topics include 1) framing and understanding decision-making needs and processes to define, evaluate, and identify appropriate strategic, operational, or execution-level decisions; 2) identifying, collecting, and managing large-scale data needed for decision support; and 3) employing decision-support software in areas such as optimization and data mining. Credit not allowed for both EMIS 7357 and EMIS 3309.

All students must complete 12 credit hours (CH) from the following four core courses.

EMIS 7301 Systems Engineering Process

The discipline, theory, economics, and methodology of systems engineering is examined. The historical evolution of the practice of systems engineering is reviewed, as are the principles that underpin modern systems methods. The economic benefits of investment in systems engineering and the risks of failure to adhere to sound principles are emphasized. An overview perspective distinct from the traditional design and analytical-specific disciplines is developed.

EMIS 7362 Production Systems Engineering

Applies the principles of engineering, or "design under constraint," to modern production systems. Topics include production systems analysis and design considerations, system design and optimization models and methods, pull- and push-based production systems, quality engineering, and process improvement. Also, techniques for engineering and managing systems with specific architectures: batch-oriented, continuous-flow, projects, and just-in-time. *Prerequisite:* EMIS 8360 recommended.

EMIS 7370 Probability and Statistics for Scientists and Engineers

Introduces fundamentals of probability, probability distributions, and statistical techniques used by engineers and physical scientists. Topics include basic concepts and rules of probability, random variables, probability distributions, expectation and variance, sampling and sampling distributions, statistical analysis techniques, statistical inference estimation and tests of hypothesis, correlation and regression, and analysis of variance. *Prerequisite*: Knowledge of calculus.

EMIS 8364 Engineering Management

How to manage technology and technical functions from a pragmatic point of view. How to keep from becoming technically obsolete as an individual contributor and how to keep the corporation technically astute. This course will look at the management of technology from three distinct viewpoints: 1) the management of technology from both an individual and a corporate perspective, 2) the management of technical functions and projects, and 3) the management of technical professionals within the organization. *Prerequisite*: Graduate standing in engineering.

All students must complete 6 credit hours (CH) from two of the following courses addressing the financial aspects of engineering management.

EMIS 8361 Engineering Economics and Decision Analysis

Introduction to economic analysis methodology. Topics include engineering economy and cost concepts, interest formulas and equivalence, economic analysis of alternatives, technical rate-of-return analysis, and economic analysis under risk and uncertainty. Credit is not allowed for both EMIS 2360 and EMIS 8361. *Prerequisite*: Knowledge of introductory probability and statistics.

EMIS 8362 Engineering Accounting

An introduction to and overview of financial and managerial accounting for engineering management. Topics include basic accounting concepts and terminology; preparation and interpretation of financial statements; and uses of accounting information for planning, budgeting, decision-making, control, and quality improvement. The focus is on concepts and applications in industry today.

EMIS 8363 Engineering Finance

Develops an understanding of corporate financial decisions for engineers. Topics include cost of capital, capital budgeting, capital structure theory and policy, working capital management, financial analysis and planning, and multinational finance.
Prerequisite: EMIS 8361 or a knowledge of time value of money.

All students must complete 9 credit hours (CH) of a coherent concentration approved by the adviser.