Engineering & Science Mgmt (ESM)

Courses

ESM A450 Economic Analysis and Operations 3 Credits
Introduces fundamentals of engineering economy, project scheduling, estimating, legal principles, professional ethics and human relations. Prepares students to successfully complete engineering economy questions on the Fundamentals of Engineering licensing exam.

Special Note: Not available for credit toward the Master of Science in engineering management or science management.

Prerequisites: (MATH A151 with a minimum grade of C or MATH A152 with a minimum grade of C or MATH A155 with a minimum grade of C or MATH A221 with a minimum grade of C or MATH A251 with a minimum grade of C or MATH A251F with a minimum grade of C or MATH A252 with a minimum grade of C or MATH A252F with a minimum grade of C or MATH A253 with a minimum grade of C) and (WRTG A211 with a minimum grade of C or MATH A212 with a minimum grade of C or WRTG A213 with a minimum grade of C or WRTG A214 with a minimum grade of C or WRTG A22 with a minimum grade of C).

ESM A601 Engineers and Scientists in Organizations 3 Credits
Introduces contemporary organization structures and the techniques needed to manage engineering and scientific effort. Includes discussion and application of technical leadership theory related to group dynamics and personnel practices in an engineering or scientific organization. Demonstrates the leadership and management skills required to organize, motivate, evaluate, develop and coordinate technical professionals.

Registration Restrictions: Graduate standing or instructor permission

ESM A605 Engineering Economy 3 Credits
Introduces methods for economic justification used to select science or engineering projects and programs and to effectively manage organizational assets. Develops students’ capability to define, model and solve practical problems using discounted cash-flow analysis.

Registration Restrictions: Graduate standing or instructor permission

ESM A608 Legal Environment for Engineering, Science and Project Management 3 Credits
Introduces aspects of design, management and construction law applicable to engineers, contractors, project managers and owners. Covers contract law, tort liability and statutory applications for most common legal situations. Emphasizes methods to avoid litigation. Discusses actual cases and outcomes dealing with factually based examples.

Registration Restrictions: Graduate standing or instructor permission

ESM A610 Cost Estimating 3 Credits
Introduces methods used to estimate costs and resources required by the scope of an asset investment option, activity or project. Discusses risks and uncertainties in estimating costs. Demonstrates how the outputs of cost estimating are used as inputs for budget, cost or value analysis; decision-making in business, asset and project planning; and project control processes.

Registration Restrictions: Graduate standing or instructor permission

ESM A617 Technology Management 3 Credits
Explores technology management models and practices. Presents the nature and importance of technological change. Introduces tools to analyze and manage changes in technology-driven organizations.

Registration Restrictions: Graduate standing or instructor approval

Crosslisted With: BA A617

ESM A619 Computer Simulation of Systems 3 Credits
Introduces simulation concepts and methods applied to engineering and science management systems. Introduces most commonly used simulation languages and tools in a hands-on environment. Presents examples of simulation tools applied within a range of professional environments, such as transportation, health care, financial services, etc. Demonstrates how animated simulation models can be used to represent complicated systems to support decision making.

Registration Restrictions: Graduate standing or instructor permission

ESM A620 Statistics for Engineering, Science and Project Management 3 Credits
How to make practical engineering/science/project management decisions through data sampling, using statistical software and interpreting the statistical results. Tools covered include statistical inference, regression analysis, design of experiments, and non-parametric methods.

Registration Restrictions: Graduate level standing or instructor permission

ESM A621 Operations Research 3 Credits
Introduces mathematical techniques for aiding managerial decision making. Topics include linear programming, non-linear programming, network optimization problems, decision analysis, inventory models, dynamic programming, PERT/CPM, queuing models and computer simulation basics. Emphasis is on the application of techniques to engineering and science management situations.

Registration Restrictions: Graduate standing or instructor permission

ESM A623 Total Quality Management 3 Credits
Introduces the concepts and practice of quality management as it relates to sustainability, reliability, maintainability/availability and quality functions within an organization. Demonstrates how quality practices impact business, customer requirements and ongoing operational results. Covers quality management tools including quality management as a system, Kaizen, statistical process control, Lean Six Sigma and creative problem-solving tools.

Registration Restrictions: Graduate standing or instructor permission

ESM A684 ESM Project 3 Credits
Individual study of an actual engineering or science management problem or opportunity, resulting in a written report and presentation including data analysis, results and recommendations for action.

Registration Restrictions: Graduate standing or instructor permission
ESM A699 ESM Thesis 3-9 Credits
Individual research on an existing engineering or science management problem, resulting in a thesis including data analysis, research results, and recommendations for action.

**Special Note:** May be repeated for a maximum of 9 credits.

**Registration Restrictions:** Graduate standing or instructor permission