

Master of Science in Engineering and Operations Management (MS EOM)
Course Descriptions

EM 604: Concepts of Engineering & Quality Management-Introduction to contemporary engineering management concepts as they appear in organizations. Review of the challenges faced by such organizations, and the various methodologies in use to meet these challenges. Review of the complex and dominant role that quality plays in creating excellent customer-supplier relationships. Discussion of quality goals and management strategies to achieve them.

EM 607: Decision Making Under Uncertainty-Concepts of probability and applications of probability theory for dealing with uncertain situations in engineering and technology management. Topics include random variables, probability functions, expectations, discrete and continuous distributions, probability computation, summary measure, data presentation schemes and their applications in process control, forecasting, lead time estimation, queues and customer demand functions. Excel and other software will be used.

EM 609: Applied Statistics for Quality & Engineering Management-Comprehensive survey of the many roles of statistics in TQM, quality assurance, simulation, experimentation, risk assessment and performance evaluation. Topics include confidence intervals, statistical process control, analysis of variance, regression, and nonparametric methods and their applications in engineering management. Excel and other software will be used. Deming, Juran, Taguchi and ASQ contributions are presented as engineering management resources.

EM 613: Organizational Change & Development-The course is targeted towards managers and other change agents within organizations. Organizational Change fosters the development of competency in skills necessary during all phases of the planned change process – from diagnosis, to interventions, through evaluation. Organizational change issues are critically examined, and case studies, exercises, and assessments are utilized to better understand change from organizational, group, and individual levels. Credits: 2

EM 615: Applied Marketing for Engineers and Operations Managers-An intensive study of modern marketing fundamentals in a diverse, global economy; a study of the decision-making problems encountered by marketing managers, using lectures and case studies. Credits: 2

EM 617: Financial Management/Engineering Applications-An examination of the valuation, investment, and financing of the firm and its business activities. Includes valuation of investment under uncertainty and its implications for investment strategy; the cost of capital and capital structure and its implications for financing strategy; leasing; dividend policy; fundamental risk management concepts and implications; mergers; acquisitions; divestiture; the market for corporate control; and the hedging of corporate risk exposure. Engineering applications: for College of Engineering students only.

EM 627: Value Engineering and Design (Prerequisite: EM 609 or equivalent)-A framework for optimal design based on internal and external issues related to value-added criteria is provided. Topics to be covered include: function analysis and costing, the technology roadmap, and techniques involving customer-oriented product concepts in the areas of performance, maintenance/service, user friendliness, and quality. Case studies and real world situations are presented.

EM 628: Six Sigma Quality Planning (Prerequisite: EM 609 or equivalent)-Review of six sigma and its role in managing quality at all levels of an organization, including its relationship to lean initiatives. Presentation of six sigma history, philosophy, tools, processes, and significant case studies. Projects utilize the techniques to generate hands-on experience.

EM 630: Project Management (Prerequisite: EM 609 or equivalent)- Review of CPM-PERT methodologies and use in managing complex engineering related projects. Analysis of bias in estimating and in forecast preparation. Strategies for achieving on-time task completion and minimizing critical chains. Credits: 2

EM 639: Achieving Optimal Operations (Prerequisites: EM 604 and EM 609 or equivalent)-Concepts of lean production, Japanese production systems, push vs. pull production systems, benchmarking and evaluation schemes, schedule management, overcoming bottlenecks, and performance and productivity improvement techniques applicable to service and manufacturing systems. Workforce issues (affairs) including union acceptance, productivity, and workforce education, training and compensation.

EM 641: Supply Chain Management-Introduction to global supply chain management in support of manufacturing and technical services, with emphasis on procurement, use of Web-based information technology, logistics, and integration with JIT scheduling at the customer level.

EM 673: Special Topics in Engineering Management (Prerequisite: Permission of the program coordinator)-Current topics relevant to engineering management but focusing on specific themes including but not limited to technology leadership & entrepreneurship, conflict management & negotiation techniques, safety organization and management, corporate law (contracts and patents), and environmental laws and regulations.

EM 681: Simulation Techniques & Applications (Prerequisite: EM 609 and EM 639 or equivalent)-Review of the role of computer simulation in analyzing complex systems and operations. Emphasis on problem formulation, model building, input and output data analysis, experimentation and evaluation of alternative designs/processes in complex systems/operations. Case studies of successful implementations are reviewed together with guidelines for using state-of-the-art simulation software to solve system problems.

EM 690: Research Project (Prerequisites: Fifteen graduate hours or permission of the program coordinator)-Independent study and research focused on a problem of interest in either a work environment or in a community or non-profit organization. Guided by a faculty advisor, a project report is written that describes the problem, outlines the scope of work and presents recommendations and solutions in a professional manner. An oral presentation is made to program colleagues, a capstone experience ending the program of study.

Note: The research project is designed to pull together all that a candidate has learned in the MSEOM degree program. A faculty advisor works closely with the candidate to simulate a real-life engineering or operations project in a manufacturing plant or related organization. The candidate is expected to prepare a report of thesis quality, and to present it to a peer audience.