EMGT - ENGINEERING MANAGEMENT (EMGT)

EMGT E445 - Quality Methods 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: MA 223 or MA 382

EMGT E446 - Statistical Methods in Six Sigma 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: MA 223 or MA 382

A course on statistical methods used in the Six Sigma to include the following topics: the history of Six Sigma, certification and belts, the Define-Measure-Analyze-Improve-Control (DMAIC) methodology, review of statistical tools associated Six Sigma (e.g., the "Magnificent Seven," inference, graphics), project election tools (e.g., Voice of Customer, Affinity Diagram, Critical to Quality Diagram), Define phase tools (e.g., Spaghetti Diagram, Kano Model, Root Cause Analysis, Cause and Effect Diagram), computation of Sigma Levels and Defects per Million, Measure phase tools (e.g., Gage Repeatability and Reproducibility, Attribute Agreement Analysis, descriptive and inferential statistics), Analyze phase tools (e.g., Cause and Effect Matrix, Failure Modes and Effects Analysis, Design of Experiments), Improve phase tools (e.g., practical applications to improve a real-world process), Control phase tools (e.g., control charts, capability analysis), cost of poor quality, and the use of statistical software for data analysis. The use of real-world data in exercises will be emphasized. Other topics to be included as time allows: lean methodologies, team formations, Taguchi's loss function, regression, process tampering.

EMGT E524 - Production/Operations Management 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This course provides an introduction to operations management for the technical manager including contemporary management principles and technical methods. Topics covered include development of operations strategies, process analysis, aggregate planning, supply chains, lean manufacturing, and Manufacturing Resource Planning (MRP) and Just in Time (JIT) topics. Case studies and simulation exercises are used to illustrate class concepts.

EMGT E527 - Project Management 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This course examines the major themes of project management including defining the project, developing and monitoring a project plan, and being an effective project manager. Topics include developing project documents, estimating task durations, developing project networks and Gantt charts, reducing project duration, and project tracking.Course topics and approaches align with the Project Management Institute (PMI) body of knowledge. A software tool is used to develop project plans and explore resource allocation and leveling. Effective project management is explored through assignments and leadership scenarios. A student may not receive credit for both EMGT427 and EMGT527. Students enrolled in EMGT527 must fulfill additional course objectives and assignments not required of students enrolled in EMGT427.

EMGT E537 - Facilities Management 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This course provides comprehensive analysis of the major issues in facilities management and planning of production and service facilities. The course emphasizes the use of quantitative and qualitative analysis in the design process. Topics include facility location, plant layout, space requirements, materials handling, personal requirements, system flow analysis, facility design, design algorithms, and distribution systems.

EMGT E540 - Human Factors 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

Human factors engineering aims to improve human interaction with systems by enhancing safety (reducing the risk of injury), performance (increasing productivity), and satisfaction (acceptance, comfort). Students will learn and be able to identify critical human factors in a system that affect safety, performance, and satisfaction. Some topics include the basic knowledge of human sensory mechanism (visual, auditory, tactile), cognition (perception, attention, information processing, memory, learning), and macrocognition (levels of behavior, decision making, situation awareness), their capabilities and limitations in interacting with products and systems.

EMGT E541 - Work Analysis and Design 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This course is about fundamentals of work method in human-production systems. The course focuses on operation and process analysis, manual work analysis, engineering anthropometry in a workspace, physical variabilities, principles of workspace layout to arrange equipment and work flow, stress and workload, hazard management, and applying engineering methods to improve the workspace with increasing the efficiency, productivity and safety.

EMGT E542 - Measuring User Experience 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This course discusses users' goals and needs interacting with products or systems (e.g. web and mobile applications) and introduces customer/user experience research methods. The course provides methods to quantify the user experience. It includes the basics of design of experiments, collecting, analyzing, and presenting usability metrics, including performance, issue-based, self-reported, behavioral, physiological, and emotional metrics. Topics include case studies discussing how organizations have successfully used usability metrics and how user experience research helps practitioners make business cases to stakeholders.

EMGT E561 - Failures of Engineered Systems 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

Reviews past failures of engineered systems in order to improve an engineering manager's ability to anticipate, prevent, and respond to failures. The technical, human factor, and organizational root causes of the failures of engineered systems are examined. Case studies are used to illustrate the techniques that have been developed to analyze, investigate and prevent failures. Additionally, regulatory and legal responses to failures are also explored.

EMGT E564 - Systems Architecture 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This class will introduce students to the art and science of systems architecting, where systems architecting refers to uncovering the fundamental structure of a system (functional, physical, logical, operational) defined in terms of system's elements, interfaces, processes, constraints, and behaviors that must operate under specific requirements and constraints. Focus will be placed on investigating the broader meaning of architectures, as they relate to organizations and businesses, in addition to engineered systems and products. Students will be introduced to heuristic and model-based approaches for systems architecting. Through case-studies and example problems in areas of production and manufacturing systems, intelligent transportation systems, social systems, and others, students will be able to apply the principles, processes and tools of systems architecting in order to structure and support the system development process of a balanced, well-integrated and socially and financially acceptable system. A student may not receive credit for both EMGT464 and EMGT564. Students enrolled in EMGT564 must complete a project not covered in EMGT464.

EMGT E572 - Lean Manufacturing 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This course introduces lean manufacturing concepts. Students will learn theoretical concepts, practical tools, and implementation strategies for lean principles, including types of waste, visual management, 5S, value stream mapping, and other appropriate topics. This course connects contemporary manufacturing practices with lean principles, which enables students to execute lean projects and create organizational improvements.

EMGT E581 - Multi-Objective Optimization 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This course will consider how humans make optimal decisions in an uncertain environment, when they have to simultaneously satisfy multiple objectives/goals under limited resources. Specifically we will consider: how to structure multi-objective problems, different methods and theories of quantifying preferences over multiple objectives a priori or a posteriori, multi-objective optimization methods without preference specification, multi-attribute utility theory, value trade-offs, risk attitudes, and other topics like fuzzy methods. We will also consider the applications of these theories and methods to various problems, including managerial and operational business issues, public policy issues, development of new businesses, etc. A student may not receive credit for both EMGT481 and EMGT581. Students enrolled in EMGT581 must complete a project not covered in EMGT481.

EMGT E586 - Supply Chain Management 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

Examines disruptions to traditional operations within supply chains due to changes in both technology and globalization. Shows how relationships between suppliers, customers, and competitors have changed dramatically to affect the entire manner in which organizations perform their manufacturing and business operations. Describes product supply chain complexity and the implications of expanding global customer bases, increasing supplier dependence, and larger ranges of locations and customers. Outcomes include the abilities to identify and define the critical components of supply chains, apply best practices in the buyer-seller relationship and understand why managing a supply chain is an important strategic capability for an organization. Cross-listed with EMGT 486.

EMGT E589 - Manufacturing Systems 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

Provides a comprehensive introduction to manufacturing systems covering the behavior laws at work in batch production or assembly lines. Includes production strategy, scheduling, and control methods and detailed analysis of fundamental manufacturing measures such as cycle time, throughput, capacity, work-in-process, inventory, and variability. Explores historical practices and the natural behaviors that are described in laws for manufacturing that help managers understand basic factory physics.

EMGT E598 - Special Technical Topics in Engineering Management 1-4 Credits

Hours: (1 - 4)R-0L-(1 - 4)C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

Examines particular technical topics of current interest and/or new courses for engineering management and other graduate students and upper level undergraduates. May require consent of instructor or specific prerequisites.

EMGT M520 - Managerial Accounting 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

An introduction to accounting principles and practices as related to financial and managerial accounting. The uses of accounting information and the means by which pertinent accounting data are gathered and analyzed for internal purposes and management decisions.

EMGT M521 - Financial Management 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

A comprehensive survey of financial concepts, techniques, instruments, and procedures which are related to the financial structure, assets management, dividend policy, and the capital budgeting decisions of a firm. Basic skills in financial analysis are developed. Operations of domestic and international financial markets are covered.

EMGT M523 - Marketing in New Product Development 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This course explores marketing concepts and marketing strategy within the context of new product development. Topics addressed include: market research methods, market segmentation, product positioning (4 Ps), pricing strategies, alliances, elasticity, advertising & brands, and the champion role. Student projects define a new product idea, apply course concepts to the development of that idea (segmentation, pricing, etc.) and present their analysis to the class. The course includes the 'NPDChallenge'simulation that demonstrates marketing issues an entrepreneur faces in developing a new product.

EMGT M525 - Human Resources Management 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

EMGT M529 - Organizational Behavior 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

EMGT M536 - Leadership & Global Changes 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

EMGT M552 - Business Law for Technical Managers 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

EMGT M555 - Financial Risk Analysis 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This course will introduce students to principles and methods of risk analysis and management in financial systems through topics covering credit risk, market risk, and operational risk of financial institutions. Students will learn about different types of financial institutions, risks associated with various types of financial instruments and structures (e.g., bonds, mutual funds, hedge funds), various credit and market risk models (e.g., value at risk, expected shortfall, credit value at risk) and risk management approaches. Using real-life examples and case studies, students will develop a toolbox of financial risk analysis and management models and methods and understand the appropriate application of these models and methods in effective decision-making.

EMGT M597 - Special Management Topics in Engineering Management 1-4 Credits

Hours: (1 - 4)R-0L-(1 - 4)C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

EMGT 100 - Introduction to Entrepreneurship 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: None

This course provides an overview of the principles of entrepreneurship and becoming an entrepreneur in today's society.Topics include opportunity identification, market investigation, product development, developing marketing and business plans, and understanding business, financial, and legal matters related to venture creation.Concepts from the lean startup and canvas tools will be applied.

EMGT 175 - Personal Finance 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: None

The purpose of this course is to provide knowledge on personal finance so that students can learn how to make quality financial decisions that enable them to manage their money daily and to build wealth over a lifetime.Topical areas include saving, spending, paying taxes, and investing, with consideration of insurance to mitigate risk.This course explores conventional and online banking to establish credit and to use debt to achieve goals.Considerable attention is paid to budgeting, with an emphasis on saving for short term needs and longer-term retirement goals through investments in stocks and bonds.

EMGT 197 - Special Topics in Engineering Management 1-4 Credits

Hours: 0R-0L-(1 - 4)C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: None

Examines engineering management topics of current interest and/or new courses for engineering management.

EMGT 330 - Introduction to Engineering Management 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: None

Surveys issues important to the management of engineering activities and technological organizations. Topics include such things as the relationship of engineering and technology to management disciplines, the functions of a technical manager, principles and techniques for quality processes, project management, process management, logistics, legal issues, ethics, human resources, communication and organizational behavior.

EMGT 397 - Special Topics in Engineering Management 1-4 Credits

Hours: 0R-0L-(1 - 4)C
Term Available: F,W,S
Graduate Studies Eligible: No
Prerequisites: None

Examines engineering management topics of current interest and/or new courses for engineering management.

EMGT 447 - Six Sigma in Practice 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: EMGT 446 or EMGT E446

EMGT 483 - Management Information Systems 4 Credits

Hours: 4R-0L-4C
Graduate Studies Eligible: Yes
Prerequisites: None

EMGT 492 - Directed Independent Study 1-4 Credits

Hours: (1 - 4)R-0L-(1 - 4)C
Graduate Studies Eligible: No
Prerequisites: None

EMGT 497 - Special Topics in Engineering Management 1-4 Credits

Hours: (1 - 4)R-0L-(1 - 4)C
Term Available: See Department
Graduate Studies Eligible: No
Prerequisites: None

Examines particular engineering management topics of current interest and/or new courses for engineering management and other students. May require consent of instructor or specific prerequisites.

EMGT 511 - Graduate Seminar I 1 Credit

Hours: 1R-0L-1C
Term Available: F
Graduate Studies Eligible: Yes
Prerequisites: None

Selected topics relevant to Engineering management are discussed by graduate students, faculty, and guest speakers.

EMGT 512 - Graduate Seminar II 1 Credit

Hours: 1R-0L-1C
Term Available: W
Graduate Studies Eligible: Yes
Prerequisites: None

Selected topics relevant to Engineering management are discussed by graduate students, faculty, and guest speakers.

EMGT 513 - Graduate Seminar III 1 Credit

Hours: 1R-0L-1C
Term Available: S
Graduate Studies Eligible: Yes
Prerequisites: None

Selected topics relevant to Engineering management are discussed by graduate students, faculty, and guest speakers.

EMGT 514 - Graduate Seminar IV 1 Credit

Hours: 1R-0L-1C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

Selected topics relevant to Engineering management are discussed by graduate students, faculty, and guest speakers.

EMGT 532 - Technical Entrepreneurship 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

Examines the principles and tools for innovation and entrepreneurship in technologically based businesses. Includes perspectives for both independent entrepreneurs and intrapreneurs. Develops basic concepts of business planning. Emphasizes a major group business plan based upon a technological innovation. May be used as a management core class.

EMGT 543 - Safety Engineering 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

The Safety Engineering course offers a comprehensive exploration into the critical aspects of systems safety, particularly in work systems. The course delves into accident causation theories, discusses the direct and indirect costs of incidents, and explores the legal and practical aspects of product safety and liability. Students will apply hazard analysis, prevention, and safety management through various methodologies like FMEA, HAZOP, and Risk Analysis. The course also introduces the Occupational Safety and Health (OSH) Act and Total Safety Management, highlighting the integration of safety principles into broader management systems to foster safer work environments.

EMGT 544 - Manufacturing Plan & Control 4 Credits

Hours: 4R-0L-4C
Graduate Studies Eligible: Yes
Prerequisites: None

This course offers a comprehensive exploration of Manufacturing Planning and Control (MPC) mechanisms within the framework of production systems, emphasizing its critical role in conjunction with Enterprise Resource Planning (ERP) systems. Different manufacturing environments and associated production requirements and strategies are discussed. Central to the course is the study of how businesses employ demand management and forecasting techniques to devise material requirements planning, master production scheduling, and inventory management to enhance overall operational efficiency and responsiveness to market changes, considering their constraints.

EMGT 548 - Six Sigma's Body of Knowledge 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: (EMGT 445 or EMGT E445 and (EMGT 446 or EMGT E446

EMGT 549 - Black Belt Probability and Statistics 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: EMGT 447

This course introduces applied probability and statistics topics that must be mastered to pass a professional society's Six Sigma Black Belt exam. Topics include probability basics and rules, conditional probability, and Bayes' theorem; popular continuous probability distributions used in reliability; popular discrete probability distributions used in quality and reliability; reliability topics and applications; advanced statistical hypothesis testing, including variances and proportions; acceptance sampling; biased versus non-biased estimators, and DOEs beyond factorial designs. When possible, the course will examine censored and uncensored data and the practice of fitting appropriate models to data, assessing the fit and adequacy of a model with parameter estimates to reliability data, and the use of statistical software to aid in the investigation of parameter estimation and model adequacy for reliability data.

EMGT 551 - Intellectual Property for Engineers and Scientists 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

Examines the influence intellectual property law has on the professional practice of engineers, scientists and engineering managers. Topics to be considered include: extracting value from intellectual property; patentable subject matter; novelty and loss of right; non-obviousness requirement; utility requirement; patent prosecution; patent litigation; designing around valid US patents; international patent rights; copyrights; trade secrets; and trademarks.

EMGT 562 - Risk Analysis and Management 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This course will introduce students to principles and methods of risk analysis and risk management, as related to diverse engineering and socio-technical systems. Students will learn how to: identify, prioritize and quantify risks; perform qualitative and quantitative risk assessments and develop risk models; assess uncertainty; identify, evaluate, and prioritize risk management alternatives; and communicate risk to stakeholders. Through the use of varied example problems and case studies, students will develop an understanding of the appropriate use of risk analysis and management methods for engineering and policy decision making under uncertainty. A student may not receive credit for both EMGT462 and EMGT562. Students enrolled in EMGT562 must complete a project not covered in EMGT462.

EMGT 567 - Economic Analysis of Engineering Projects 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This class will introduce students to critical principles of economic analysis of engineering projects. In particular, students will explore the process of making economic decisions under the influence of possibly uncertain future conditions and events. These economic decisions might involve investing in new facilities, improving existing production processes, or developing and marketing new products or services in the private and public sectors. Deterministic and multi-attribute evaluation approaches will be discussed. Students will be introduced to methodologies including capital budgeting, cost estimating, various alternative comparison methods, and life cycle costing. Additionally, students will be introduced to the concept of welfare economics through which they will explore economic impacts of infrastructure projects in the public sector. Emphasis will be placed on systems thinking and a systems approach to defining and solving economic problems. A student may not receive credit for both EMGT467 and EMGT567. Students enrolled in EMGT567 must complete a project not covered in EMGT467.

EMGT 583 - Management Info Systems 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

The class provides a broad understanding of information technology in organizations. It includes case studies to understand different strategies in using information systems in E-business. Topics include business processes, competitive advantages, business pressures on organizations, and strategies to response to the pressures, the value of information and organizing information by databases. The tools used include Microsoft Excel and Access.

EMGT 584 - Systems Thinking & Evaluation 4 Credits

Hours: 4R-0L-4C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

This course will focus on applying systems thinking and methodologies, as well as parametric and nonparametric statistical methods to evaluate alternative system designs and design performance measures. Students will learn how to: identify and evaluate system goals, requirements and performance measures; design experiments to assess system performance; apply decision analysis techniques to diverse trade studies; and generate a business case for presenting technical analysis results. A student may not receive credit for both EMGT484 and EMGT584. Students enrolled in EMGT584 must complete a project not covered in EMGT484.

EMGT 590 - Integrated Project 0-8 Credits

Hours: 0R-0L-(0 - 8)C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

The integration of business and technical considerations in new product development. The identification of managerial and engineering challenges faced in developing a commercially viable new product within the context of a rapidly changing and highly competitive business environment. Readings, case studies and individual projects dealing with strategic planning, entrepreneurship, new product development, and related topics. The focus is on a major team project. This integrated project must include the identification of a new product including all relevant business and technical issues and the development of a detailed plan for profitably bringing this new product to market. A final report with oral presentations is required.

EMGT 699 - Professional Experience 1 Credit

Hours: 1R-0L-1C
Term Available: See Department
Graduate Studies Eligible: Yes
Prerequisites: None

The professional experiences course captures the practical work experiences related to the student's academic discipline. Students are required to submit a formal document of their reflections, which communicates how their employment opportunity reinforced and enhanced their academic studies. The work experiences should be informative or integral to the advancement or completion of the student's program requirements.