ENGINEERING MANAGEMENT (EMEN)

Courses

EMEN 3100 (3) Introduction to Engineering Management
Examines topics important to the management of engineering activities within organizations. Topics include the relationship of engineering to business and management disciplines, the functions of an engineering manager, principles and techniques for managing financial resource and business ownership. Explores best practices in global engineering management, process management, legal issues, ethics, organizational behavior and communications.
Requisites: Restricted to students with 27-180 credits (Sophomores, Juniors or Seniors) College of Engineering students only.

EMEN 4030 (3) Project Management Systems
Gain skills in project management best practices that fit any industry, sector or geography. This interactive class provides students with the tools necessary to effectively initiate, plan, execute, control and close any type of project. Students apply knowledge as they plan a group project, build and execute it, and ensure it meets stakeholder expectations and other project goals.
Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

EMEN 4050 (3) Leadership and Professional Skills
Accelerate your personal and professional growth with the essential skills required to become an effective leader/manager. Conduct personal development through exercises in communication and leadership effectiveness. Explore leadership styles, managing commitments, change management, negotiation, conflict resolution, organizational culture, emotional intelligence, team dynamics and business ethics.
Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

EMEN 4055 (3) Designing for Diversity, Equity and Inclusion in Engineering
Students will focus on the historical narrative of institutions and structures that have shaped instances of inclusion and exclusion in engineering, how their own identity and background shape their thoughts and actions, how transformational leadership is enacted for diversity, equity, and inclusion (DEI), and how involving DEI in the strategic planning process of designing can create additional innovations and opportunities.
Requisites: Restricted to College of Engineering (ENGRU) undergraduates only.

EMEN 4100 (3) Engineering Economics
Introduces engineering cost concepts, financial statements and the corporate economic environment. Includes concepts and methods of analysis of the time value of money, comparison of project alternatives before and after taxes, cash flow, replacement analysis, risk management and financial case statements.
Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

EMEN 4110 (3) Supply Chain Management
Explores the key issues related to the design and management of supply chains. Covers the efficient integration of suppliers, production facilities, warehouses, and stores so that the right products in the right quantity reach customers at the right time. Focuses on the minimization of the total supply chain cost subject to service requirements imposed by a variety of industries.
Equivalent - Duplicate Degree Credit Not Granted: MGMT 4110
Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

EMEN 4120 (3) Managing Business Processes
Covers the concepts and tools to design and manage business processes. Emphasizes modeling an analysis, information technology support for process activities, and management of process flows. Graphical simulation software is used to create dynamic models of business processes and predict the effect of changes. Prepares students for a strong management or consulting career path in business processes.
Equivalent - Duplicate Degree Credit Not Granted: MGMT 4120 and MGMT 5120
Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

EMEN 4200 (3) Engineering and Entrepreneurship for the Developing World
Use your engineering and problem solving skills, combined with market/industry research, customer interviews, design for manufacturability, stakeholder management and financial modeling to promote entrepreneurship and sustainable change in the developing world. Explore alternative energy, medical devices, phones, internet, recycling, cook stoves, clean water, sanitation and infrastructure.
Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

EMEN 4400 (3) Quality Management
Introduces the concepts, tools and techniques used in the management and measurement of quality and productivity in a business environment. Associated topics include: statistics methods, design quality, measurement, control and process improvement. Discover the basics of performance excellence management including Baldridge Award criteria, strategic planning, leadership and daily quality management.
Equivalent - Duplicate Degree Credit Not Granted: MGMT 4400
Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

EMEN 4405 (3) Systems Engineering
Introduces students to system engineering in terms of defining objectives, applications and the major steps in the systems engineering process. Learn to work effectively with diverse project teams. Industry standards are covered that lay out the steps of the classic Systems Engineering lifecycle. Real world engineering examples from concept exploration to hardware retirement are used.
Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.
EMEN 4800 (3) Technology Ventures and Marketing
This course introduces the framework for 'technology entrepreneurship,' which has driven change by empowering individuals to seek opportunities when presented with what others see as insurmountable problems. Technology entrepreneurship is a dynamic approach that involves identifying opportunities, gathering resources, and managing rapid growth using significant risks. This process will be explained by using principled decision-making and critical thinking skills through a collection of lectures, speakers, workshops, and projects to successfully identify a real business opportunity and start and grow a technology enterprise.

Requisites: Requires prerequisite course of EMEN 4820 (minimum grade C). Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

EMEN 4820 (3) Entrepreneurial Product Development
Organizations are increasingly looking for employees with training and experience in design thinking and innovation. This course will look at product development through a design thinking lens. In addition, this course will be teamwork-oriented, but you will also complete readings and independent activities that will support the group work and ensure your depth of knowledge.

Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

EMEN 4825 (3) New Venture Creation
Relevant to students seeking to acquire an entrepreneurial toolkit of knowledge and skills for working in the startup world or launching a new venture. Covers the techniques for evaluating the probability of success for a new venture and develops a methodology for entrepreneurial thinking that provides benefits for big and small ventures. The final deliverable is a professional pitch to a group of seasoned investors and the submission of a complete business plan.

Equivalent - Duplicate Degree Credit Not Granted: ESBM 4830
Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

EMEN 4830 (1-3) Special Topics
Repeatable: Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.

Requisites: Restricted to students with 57-180 credits (Junior or Senior) College of Engineering students only.

EMEN 4840 (1-3) Independent Study Project
Available only through approval of Engineering Management Program. Subjects arranged to fit the needs of the particular student.

Repeatable: Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.

EMEN 4850 (3) Entrepreneurial Leadership
Investigate the importance of entrepreneurship, value creation, and the entrepreneurial leader's role in driving innovation and growth. Explore and discuss building a culture of practical, ethical, and empowered leaders, developing a shared purpose, understanding the meaning of values in an organizational setting, and identifying potential negative issues in different roles within an entrepreneurial team. Essential skills learned will facilitate the development of capabilities to adapt leadership approaches/practices in various business and organizational contexts.

Repeatable: Repeatable for up to 6.00 total credit hours.

EMEN 4875 (3) Entrepreneurial Finance
Teaches the importance of company formation, what metrics are important to investors, types of investments and their pros and cons, company valuation as well as when and how to fundraise.

EMEN 5000 (3) Engineering Principles
Provides an appreciation, understanding, and perspective of the tasks and challenges faced in engineering disciplines. This introductory course offers non-engineers insight into how engineers think and approach problems. Explores different engineering disciplines by evaluating the tools used, main concepts, and how the discipline impacts daily life. Through a series of case studies, students will review successful and unsuccessful engineering projects.

Requisites: Restricted to graduate students in Engineering Management Program (EMEN) only.

EMEN 5005 (3) Introduction to Applied Statistical Methods
Covers statistical reasoning and analysis in support of business and engineering decision making. Topics include: engineering and applied research, descriptive and inferential statistics to include estimation and hypothesis testing using both traditional parametric as well as nonparametric procedures for research situations involving one or two groups of treatment conditions. The R statistical analysis and programming system is used.

Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5010 (3) Introduction to Engineering Management
Learn concept, methods, activities and philosophies of business and be encouraged to utilize them in your professional activities. Interact with engineering management faculty who share what works based upon their engineering management experiences. Engage with our classmates on their business experience, thereby preparing you to interact more thoughtfully and knowledgeably with your professional colleagues.

Requisites: Restricted to Engineering Management (EMEN) graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5015 (3) Engineering Communication
Enables students to communicate their thoughts and ideas in written and oral form in professional environments. Understand and demonstrate the ability to write a correctly-formed document. Develop active listening skills, particularly when providing and receiving feedback. Learn to orally communicate ideas by speaking clearly, persuasively, energetically, and with appropriate non-verbal elements. Present in various environments and to various audiences.

Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5020 (3) Finance for Engineering Managers
Confidently engage in topics of financial performance, financial statements, time value of money and your own personal finances. The course focuses on areas relevant to engineering and technical managers, including product and process cost analyses, cost-volume-profitability calculations, discounted cash flow techniques for project selection, creating and departmental budgets, valuation of intellectual property and entrepreneurial finance.

Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5030 (3) Fundamentals of Project Management
Provides an in-depth introduction to the project management discipline, including the concepts, tools and techniques used in the management and leadership of projects small and large alike. Key topics covered include the role of the project manager; project team selection and management; cost, schedule and risk management; quality in projects; introduction to creating and maintaining project plans through the project lifecycle.

Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.
EMEN 5031 (3) Software Project Management
Introduces software project management as a critical element of software development activities throughout every area of human endeavor. Learn the software life cycle, software configuration management, code reviews, architectural influences and quality assurance with automated testing. Explore the impact on project success of the Capability Maturity Model (CMM) and United Modeling Language (UML).
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.
Recommended: Prerequisite software development experience.

EMEN 5032 (3) Project Management Application and Execution
Emphasizes judgment-intensive decision-making and team leadership. Analyze and debate complex case studies drawn from multiple industries to illuminate best and worst practices that impact businesses, careers and lives. Advanced PM tools are reviewed and assessed for real-world utility. Students present a mini case drawn from a prominent event or their own experience.
Requisites: Requires prerequisite courses of EMEN 5030 or MBAX 6440 (all minimum grade B). Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5042 (3) Data Science for Quality Improvement
Develop in-depth expertise in the concepts, tools and techniques used in the management and measurement of quality and productivity. Apply statistics and probability to the topics of process variation and statistical process control and capability analysis for process, product, and measurement systems. Explore an introduction to design of experiments (DOE) in business and industry to improve both quality and performance.
Requisites: Requires prerequisite course of EMEN 5005 (minimum grade B). Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5043 (3) Systems for Quality Improvement
Advanced study of methods, tools and systems associated with advanced quality applications. Includes a survey of advanced process control technologies, control schemes and measurement system analysis.
Requisites: Requires prerequisite course of EMEN 5042 (minimum grade B). Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5050 (3) Leading Oneself
Provides working professionals the framework to build leadership skills by first starting with oneself because the foundation for great leadership starts with personal excellence. Topics include accountability, authentic leadership, personal branding, self-awareness, growth mindset, emotional intelligence, personal mastery, feedback and communication skills.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5052 (3) Leading Others
Understand and apply leadership techniques that develop and sustain a high-powered technical organization. Specifically, students evaluate qualities associated with successful leaders, learn practical leadership skills such as defining roles and responsibilities, setting vision, coaching, and dealing with conflicts. The course then addresses team building, from hiring the right team members, to managing the team, and conducting effective team meetings.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5053 (3) Leading Technical Organizations
Examining relevant technical organization leadership skills using the context of stakeholder value creation is the basis of this course. The class explores how leaders multiply their abilities by leading through others, developing an accountable team, building enduring employees, managing customer and supplier relationships, exhibiting leadership presence, dealing with challenging situations and creating and executing strategies.
Repeatable: Repeatable for up to 3.00 total credit hours.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5054 (3) Neuroscience of Leadership
Examines leadership techniques through the lens of social cognitive neuroscience and psychology. Utilizing the latest research, we develop a leadership practice based on neuroscience. Consideration for leading oneself, leading others and leading organizations is covered. Topics include neuroplasticity, psychological safety, resilience, mental toughness, primal power of storytelling, improv and creativity, as well as the subtle power of influence.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5055 (3) Leading for Diversity, Equity and Inclusion in Engineering
This course focuses on the importance of embedding diversity equity inclusion (DEI) in engineering workplace environments. Students focus on the historical narrative of institutions and institutional structures that have shaped instances of inclusion and exclusion in engineering, how their own identity and background shape their thoughts and actions, and how transformational leadership is enacted for DEI in a challenging atmosphere.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5056 (3) Global Topics in Aerospace
Examining current international space topics including civil, military, and commercial activities forms the basis for this course. The origins and evolution of space policy and laws, current organizational and governance structures, space economics, space sustainability, international human exploration strategies, the future of space exploration, deregulation and space traffic management and recent developments in the commercial space sector will be analyzed.
Repeatable: Repeatable for up to 6.00 total credit hours.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5060 (3) Ethical Decision-Making in Engineering Management
Learn how to recognize ethical issues and dilemmas affecting managers in the workplace. Understand various models and practices offering solutions to these issues and how to create a culture of ethics and integrity in supporting and/or building a profitable, healthy and responsible organization.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5090 (3) Marketing and Technology Ventures
Why do great products often lose in tech markets? This course analyzes processes for developing the customer bases essential for commercial success. Student teams develop strategic launch programs for actual tech startups of their choosing. Students will analyze and discuss real-world case studies and alternative strategies. Structured towards professional applicability for engineers in large enterprises as well as startups.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.
EMEN 5094 (3) Technology Entrepreneurship
Explores the process of new venture creation as it relates to both launching a technology-based startup (entrepreneurship), and the introduction of new products and services within an existing firm (intrapreneurship). The course features a semester project that incorporates all elements of the new venture process, enabling engineers to transform their own innovative ideas into viable and sustainable business opportunities.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only. 
Repeatable: Repeatable for up to 6.00 total credit hours.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5215 (3) Applied Sustainability for Engineering Managers
Provides students the tools to integrate sustainability into technology-intensive businesses. The course explores the sustainability imperative for today’s businesses, and how sustainability is requiring engineers to have a deeper knowledge of how successful market solutions also impact society and the environment. The course addresses the engineer’s role in developing sustainable products and packaging, the triple bottom line and circular economy.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5220 (3) Product Design for the Circular Economy
Product Design for the Circular Economy provides the tools and knowledge necessary to implement Circular Economy (CE) principles, including design frameworks defined by Design for Reuse, Cradle-to-Cradle, Biomimicry, ISO 14000 and several EU Directives. Products can be certified if they meet certain criteria, and the course covers the major certifications available today. Finally, the course shows how companies report their progress using methods prescribed by the Global Reporting Initiative (GRI).

EMEN 5225 (3) Sustainable and Resilient Operations and Supply Chains
Innovative organizations need leaders and managers who understand the complex nature of corporate social responsibility, sustainability, and resilience. In this course, students will learn strategies to become good corporate citizens while still creating value for stakeholders. Students will learn concepts and practices companies employ to manage business processes that meet business needs while reducing negative impacts on the pollution and waste. You will also learn to build a more sustainable and socially responsible supply chains.

EMEN 5315 (3) Business Law for Engineering Managers
Provides engineering students an introduction to important areas of business law likely to be encountered as technology and engineering managers. Topics include fundamental legal concepts, intellectual property and strategy, contracts, data privacy and product liability. The course uses experiential and practical approaches and exercises to enable the student to identify and address critical legal issues in real-world business contexts.
Requisites: Restricted to College of Engineering graduate students only.

EMEN 5316 (3) Engineering and the Legal Process
Provides engineering students the experience of working through a product litigation case, beginning with understanding why products fail, to the various stages of the litigation process culminating in a mock trial where engineers are on the stand as expert witnesses. This course meets concurrently with LAWS 7343, engaging both engineering and law students in the same learning environment.
Repeatable: Repeatable for up to 6.00 total credit hours.
Requisites: Restricted to College of Engineering graduate students only.

EMEN 5400 (3) Product Development and Design
Introduces contemporary methods of identifying and creating new products and services that both consumer and industrial customers really want. The course takes students on a project-based journey of ideation, concept development, prototyping, customer validation, costs and the new product launch process. Students ultimately showcase their products in a tradeshow-like setting. Environmental impact analyses and cradle-to-cradle design methods are also addressed.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5405 (3) Fundamentals of Systems Engineering
Examines the disciplined processes of designing and managing complex systems over their life cycle. Requirements engineering, reliability, logistics, team leadership, testing and evaluation, maintainability and other disciplines are examined with focus on the system engineering of small spacecraft.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5500 (3) Lean and Agile Management
Learn lean and agile concepts and tools to improve customer value, improve processes and reduce waste. Examine and apply lean and agile principles in diverse circumstances including hardware/software, product development/ongoing operations and manufacturing products/ providing services. Apply your learning to improving performance in current responsibilities, whether as an individual contributor or as a manager.
Equivalent - Duplicate Degree Credit Not Granted: OPIM 6080
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5510 (3) Enterprise Strategic Management
Student Teams launch a virtual company in a simulated tech-driven manufacturing industry. Plot your strategic direction and make tactical choices in product development, marketing, manufacturing, operations and finance. Present a business pitch and executive summary to secure venture capital or angel funding. The course focuses on the interplay among organizational functions. Targeted towards future general management and entrepreneurial roles.
Requisites: Requires prerequisite course of EMEN 5610 (minimum grade B). Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.

EMEN 5525 (3) Intrapreneurship & Innovation
Learn a comprehensive set of business concepts, skills and tools to launch and manage intrapreneurial ventures. Engage with faculty, classmates, guest speakers, industry professionals, potential customers and one’s leadership team to help you launch your venture. Develop the necessary skills, tools and awareness to be successful colleagues, managers and leaders in scientific and engineering industries. Gain valuable business acumen using a hands-on and learning environment.

EMEN 5830 (1-3) Special Topics
Repeatable: Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.
Requisites: Restricted to College of Engineering graduate students or Graduate Certificate Engineering (CRTGE) students only.
EMEN 5840 (1-3) Independent Study Project
Available only through approval of graduate advisor. Subjects arranged to fit the needs of the particular student. Non-EMP students require instructor permission.
**Repeatable:** Repeatable for up to 6.00 total credit hours. Allows multiple enrollment in term.
**Requisites:** Restricted to graduate students in Engineering Management Program (EMEN) only.

EMEN 6805 (1) Capstone Preparation
Students determine capstone research question, conduct literature review, develop research methodology and project plan, write a proposal, and select capstone committee.
**Requisites:** Requires prerequisite course of EMEN 5825 or EMEN 5900 (minimum grade C+). Restricted to graduate students in Engineering Management Program (EMEN) only.

EMEN 6810 (3) Capstone
Students conduct agreed-upon research, critical review, business proposal, or project and present their work to the capstone committee for evaluation.
**Repeatable:** Repeatable for up to 6.00 total credit hours.
**Requisites:** Restricted to graduate students in Engineering Management Program (EMEN) only.
**Grading Basis:** Letter Grade

EMEN 6940 (1) Master's Candidate for Degree
Registration intended for students preparing for a thesis defense, final examination, culminating activity, or completion of degree.
**Requisites:** Restricted to graduate students in Engineering Management Program (EMEN) only.