

ENGINEERING MANAGEMENT

The Lockheed Martin Engineering Management Program (EMP) is a management and leadership program that prepares students in the engineering and technical fields for early to mid-career positions. It is designed for students who are looking to advance in management, successfully contribute to the overall business or venture, and develop leadership skills.

The program offers a Master of Engineering, four engineering dual degrees and graduate certificates. Courses are offered both on campus and online (available in real-time distance class participation, as well as recorded videos for later viewing) to meet the needs of busy professionals. Courses are taught by faculty whose expertise in the engineering and technical industry and business leadership bring real-world experiences to the classroom.

For more information, visit the Lockheed Martin Engineering Management Program (EMP) (<http://www.colorado.edu/emp/>) website.

Course code for this program is EMEN.

Master's Degree

- Engineering Management - Master of Engineering (ME) (<https://catalog.colorado.edu/graduate/colleges-schools/engineering-applied-science/programs-study/engineering-management/engineering-management-master-engineering-me/>)

Certificates

- Engineering Management in the Aerospace Industry (<https://catalog.colorado.edu/graduate/colleges-schools/engineering-applied-science/programs-study/engineering-management/engineering-management-aerospace-industry-graduate-certificate/>)
- Innovation and Entrepreneurship in Engineering (<https://catalog.colorado.edu/graduate/colleges-schools/engineering-applied-science/programs-study/engineering-management/innovation-entrepreneurship-engineering-graduate-certificate/>)
- Leadership and Management (<https://catalog.colorado.edu/graduate/colleges-schools/engineering-applied-science/programs-study/engineering-management/leadership-management-graduate-certificate/>)
- Project Management (<https://catalog.colorado.edu/graduate/colleges-schools/engineering-applied-science/programs-study/engineering-management/project-management-graduate-certificate/>)

Partnership Certificate

- Water Engineering and Management (<https://catalog.colorado.edu/graduate/colleges-schools/interdisciplinary-programs/water-engineering-management-graduate-certificate/>)

Faculty

While many faculty teach both undergraduate and graduate students, some instruct students at the undergraduate level only. For more information, contact the faculty member's home department.

Angel, George
Lecturer; BS, University of Albuquerque

Bozic, Christy L. (https://experts.colorado.edu/display/fisid_155482/)
Scholar in Residence, Endowed/Named Professor, Faculty Director; PhD, Purdue University

Stephen, M. Dunn
Scholar in Residence, Director; M.B.A., Rice University

Duren, Ron G. Jr. (https://experts.colorado.edu/display/fisid_157263/)
Teaching Assistant Professor; M.S., University of Colorado Boulder

Egan, Kristen
Lecturer; M.E., University of Colorado Boulder

Kirschling, Wayne (https://experts.colorado.edu/display/fisid_123149/)
Professor Emeritus; DBA, University of Colorado Boulder

Leeker, Jessica Rush (https://experts.colorado.edu/display/fisid_167166/)
Endowed/Named Professor, Faculty Director, Scholar in Residence; MS, Purdue University

Martin, Wendy Lynn (https://experts.colorado.edu/display/fisid_154942/)
Teaching Assistant Professor; ME, University of Colorado Boulder

McCluskey, Alyssa (https://experts.colorado.edu/display/fisid_142958/)
Lecturer; Ph.D., University of Colorado Boulder

Moorer, Daniel F. Jr. (https://experts.colorado.edu/display/fisid_151590/)
Scholar in Residence; PhD, University of Colorado Boulder

Murray, Seth (https://experts.colorado.edu/display/fisid_148038/)
Teaching Assistant Professor; ME, University of Colorado Boulder

Readey, Michael J. (https://experts.colorado.edu/display/fisid_157363/)
Scholar in Residence, Endowed/Named Professor, Associate Faculty Director; PhD, Case Western Reserve University

Svoboda, John D. (https://experts.colorado.edu/display/fisid_154884/)
Teaching Assistant Professor; Ph.D., University of California-Los Angeles

Thomas, John (https://experts.colorado.edu/display/fisid_167167/)
Scholar in Residence; PhD, Arizona State University

Tobey, Kathryn
Scholar in Residence; ME, University of Colorado Boulder

Van Atten, Bill
Lecturer; MS, Johns Hopkins University

Courses

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 project 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, techniques 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 5065 (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 5080 (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.

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.

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 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 2R, 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.

Repeatable: Repeatable for up to 6.00 total credit hours.

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 5710 (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 5825 (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.