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

- Design for the Circular Economy (https://catalog.colorado.edu/graduate/colleges-schools/engineering-applied-science/programs-study/engineering-management/design-circular-economy-graduate-certificate/)
- Design for the Circular Economy (Online) (https://catalog.colorado.edu/graduate/colleges-schools/engineering-applied-science/programs-study/engineering-management/engineering-management-master-engineering-me-online/design-circular-economy-graduate-certificate-online/)
- 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

Bouvier, Claudia
Lecturer; ME, University of Colorado Boulder

Bozic, Christy L. (https://experts.colorado.edu/display/fisid_155482/)
Instructor Adjunct; PhD, Purdue University

Crofton, Karen (https://experts.colorado.edu/display/fisid_164479/)
Scholar in Residence; MBA, Rice University

Dietrich, Alex
Lecturer; MBA, George Washington University

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

Egan, Kristen
Lecturer; ME, University of Colorado Boulder

Gazarik, Michael
Scholar in Residence, Director; PhD, Georgia Institute of Technology

Katz, Tami
Lecturer; PhD, Colorado State University

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

Kramer, Amy
Lecturer; JD, University of Colorado Boulder

Leeker, Eric
Lecturer; MBA, Purdue University

Leeker, Jessica Rush (https://experts.colorado.edu/display/fisid_167166/)
Instructor Adjunct; PhD, Purdue University

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

McCluskey, Alyssa
Lecturer; PhD, 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/)
Instructor Adjunct; PhD, Case Western Reserve University

Songer, Anthony
Lecturer; PhD, University of California Berkeley

Svoboda, John D. (https://experts.colorado.edu/display/fisid_154884/)
Lecturer; MBA, 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 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, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

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, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

EMEN 5020 (3) Finance for Engineering Managers
This course empowers technical managers to make better financial management decisions about issues like capital budgeting, project selection, financial planning, and working capital management.
The course also covers topics essential to engineering managers communicating outside of engineering, including interpreting financial statements, the time value of money, and determining financial metrics of NPV and IRR in project valuation. Special topics covered include triple bottom line accounting and sustainability reporting as part of corporate risk management initiatives.
Requisites: Restricted to College of Engineering graduate students, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.
Recommended: Prerequisites beginning algebra and familiarity working with Excel spreadsheets.

EMEN 5030 (3) Fundamentals of Project Management
Project managers work cross-functionally to plan, monitor, and manage projects to successful completion. This course provides an introduction to the project management discipline, including the processes, tools, and techniques used in the management and leadership of projects. Key topics covered include the role of the project manager; the project team; stakeholder communications and management; cost, schedule, and risk management; quality in projects; and the project lifecycle.
Requisites: Restricted to College of Engineering graduate students, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

EMEN 5032 (3) Advanced Project Management
Advance and elevate your skills to lead technical teams in pursuit of challenging projects and programs. You will investigate real-world, judgment-intensive decision-making via case studies drawn from famous and infamous engineering projects across a range of industries. You will acquire knowledge and abilities to employ throughout your career as a technical leader. Sophisticated tools such as Monte Carlo Analysis are investigated and assessed for real-world utility.
Requisites: Requires prereq courses of EMEN 5030 or MBAX 6440 (all min grade B). Restricted to Coll of Engineering grad students, Grad Certificate Engineering (CRTGE), Engr EMEN BAM students students w/ subplans C-ASENEMEN, C-ECENEMEN, C-EEEN-EME or C-MCENEMEN.

EMEN 5033 (3) Aerospace Program Management
Focuses on how program/project management fundamentals are adapted and extended within the specific needs and frameworks of aerospace programs, which are typically complex, multi-year, and high-stakes, with stringent safety, performance, and reliability requirements. Students learn to balance sponsor/customer objectives with business goals across U.S. Government (DoD, NASA), commercial, and international contexts, emphasizing lifecycle management, best practices, and integration across program disciplines. Case studies develop practical skills for managing diverse aerospace programs.
Requisites: Restricted to College of Engineering graduate students, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.
Recommended: Prerequisite EMEN 5030 Fundamentals of Project Management.
Grading Basis: Letter Grade

EMEN 5042 (3) Quality Management
Focuses on the principles and practices of quality management in modern organizations. Students will develop an understanding of theories, methodologies, and tools used to achieve and maintain high levels of quality in products and services. Topics covered include Total Quality Management, Six Sigma, Lean Management, ISO 9001, and Continuous Improvement. Students will learn how to design and implement quality management systems, conduct process improvement initiatives, measure / analyze performance data, lead organizational change.
Requisites: Restricted to graduate students and Engineering Management BAM students only.

EMEN 5050 (3) Leading Oneself
The "Leading Oneself" course offers a comprehensive blueprint for professional's keen on honing their leadership capabilities, starting with the cornerstone of personal excellence. The curriculum delves into essential areas such as personal accountability, genuine leadership traits, individual brand development, enhanced self-awareness, fostering a growth mindset, mastering emotional intelligence, and achieving personal mastery. This content lays the foundation for all leadership to follow.
Requisites: Restricted to College of Engineering graduate students, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

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, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

EMEN 5053 (3) Leading Technical Organizations
Leadership of technical, complex organizations is challenged by the pace of technology development, innovation, hyper competition by new entrants and a workforce that demands to be engaged and recognized. 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, develop an accountable team, build enduring relationships, exhibit leadership presence, and create executable strategies.
Requisites: Restricted to College of Engineering graduate students, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

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, resililence, 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, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

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, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

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, human exploration strategies, the future of space exploration, and recent developments in the commercial space sector will be analyzed. The course exposes students to the current context of the industry to prepare them for a career in the space economy.
Requisites: Restricted to College of Engineering graduate students, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

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, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

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, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

EMEN 5094 (3) Technology Entrepreneurship
This course is designed for engineers, project managers, and technical leaders interested in learning how to leverage technology to solve problems and meet emerging market demands. Students learn how to apply a holistic approach that engages an entrepreneurial mindset with methods like entrepreneurial systems thinking and opportunity pattern recognition to identify and address target customer needs. The course empowers students with the knowledge, skills, and methods needed to create and launch a new technology company.
Requisites: Restricted to College of Engineering graduate students, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

EMEN 5215 (3) Applied Sustainability for Engineering Managers
Provides students the tools to integrate sustainability into business. The course explores why social and environmental sustainability are important, and how successful companies are incorporating sustainability as a core strategy. It then addresses the engineer¿s role in developing sustainable products through principles of the circular economy and life cycle assessment. The course culminates with a discussion of triple bottom line accounting, and how companies use the sustainability report to demonstrate progress toward their sustainability goals.
Repeatable: Repeatable for up to 6.00 total credit hours.
Requisites: Restricted to graduate students and Engineering Management BAM 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 ¿R¿, 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 5230 (3) Resilience Engineering and Leadership in Crisis
This course examines the qualities, concepts, and methodologies of resilience leadership amid conditions of chaos, uncertainty, and catastrophic breakdowns of complex social, ecological, and technological systems. The curriculum draws on topics from resilience policy, resilience engineering, crisis leadership, contemporary literature, and current events. These components collectively build a comprehensive understanding of resilience as a dynamic blend of processes embedded within and across complex systems like critical infrastructure essential to public health, safety, security, and well-being.
Requisites: Restricted to graduate students and Engineering Management BAM students only.
Grading Basis: Letter Grade

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, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

EMEN 5400 (3) Technical Product Development
Product Development introduces contemporary methods like design thinking and sustainability for the circular economy to identify and create products and services that address verified customer needs and problems. By focusing on solutions and benefits offered, the course takes a project-based approach from ideation, concept development, and prototyping to customer validation, pricing, and productization. Students learn how to present their product concepts to senior management or potential investors and showcase their prototypes in a tradeshow-like setting.
Requisites: Restricted to College of Engineering graduate students, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

EMEN 5405 (3) Fundamentals of Systems Engineering
Examines the disciplined process of designing a complex system to meet a specified customer need. We begin with identifying the needed capability through operational and functional analysis, then progress through defining requirements that articulate operational and environmental capabilities that address reliability, maintainability, and producibility considerations across the system lifecycle. The course also introduces technical management tasks to include risk management, technology readiness assessment, and program controls using real-world, current aerospace industry examples.
Requisites: Restricted to College of Engineering graduate students, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

EMEN 5415 (3) Introduction to Requirements, Verification and Validation
This course introduces the concepts of Requirements, Verification and Validation as applied during system development. Students completing this course will understand the terminology, usage, planning, organization roles, as well as how these methods are used during the system development lifecycle and how to determine what methods are appropriate for the type of project they may be working.
Requisites: Restricted to College of Engineering graduate students, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.
Grading Basis: Letter Grade

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, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.

EMEN 5830 (3) Special Topics
Repeatable: Repeatable for up to 9.00 total credit hours. Allows multiple enrollment in term.
Requisites: Restricted to graduate students and Engineering Management BAM 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 College of Engineering graduate students, Graduate Certificate Engineering (CRTGE) students and Engineering Management BAM students.