

ENGINEERING MANAGEMENT

<http://www.pacific.edu/Academics/Schools-and-Colleges/School-of-Engineering-and-Computer-Science/Academics-/Majors/Engineering-Management-.html>

Phone: (209) 946-2575

Location: Baun Hall

Degrees Offered

Bachelor of Science in Engineering Management

The Bachelor of Science in Engineering Management provides academic preparation for individuals who plan a systems engineering, project management or management career in a technically related field.

Pacific graduates from this program have done well in fields such as manufacturing plant engineering, applications engineering, technical sales, construction management, project engineering and cost engineering.

The Engineering Management core consists of courses that cover key topics within engineering management and business administration. In addition, the curriculum includes a large number of engineering electives that provide students with the flexibility to custom design a curriculum to fit their career objectives.

Educational Objectives

The Engineering Management Program at the University of the Pacific seeks to graduate engineers ready to enter professional practice or pursue graduate level studies. The educational objectives of the Engineering Management Program are to graduate engineers that:

1. Are ready to enter professional practice or pursue graduate level studies;
2. Use engineering knowledge as a base for solving problems requiring business and analytical skills;
3. Are able to work in a wide array of different industries, positions and projects; and,
4. Seek continual professional development and lifelong learning.

Students graduating with a BS in Engineering Management will have:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Bachelor of Science in Engineering Management

Students must complete a minimum of 120 units of academic work and a minimum of 32 units of Cooperative Education in order to earn the bachelor of science in engineering management.

I. General Education Requirements

For more details, see General Education (<http://catalog.pacific.edu/stocktongeneral/generaleducationprogram/>)

Minimum 28 units and 9 courses that include:

A. CORE Seminars (2 courses)

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|----------|-------------------------------|---|
| CORE 001 | Problem Solving & Oral Comm | 3 |
| CORE 002 | Writing and Critical Thinking | 4 |

Note: 1) CORE Seminars cannot be taken for Pass/No Credit. **2)** Transfer students with 28 or more transfer credits taken after high school are exempt from both CORE seminars. Students participating in the First Year Honors Program should complete an honors section of CORE 001 regardless of the number of college transfer units completed.

B. Breadth Requirement (7 courses, at least 3 units each)

At least one course from each of the following areas:

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|-------------------------------|
| Artistic Process & Creation |
| Civic & Global Responsibility |
| Language & Narratives |
| Quantitative Reasoning |
| Scientific Inquiry |
| Social Inquiry |
| World Perspectives & Ethics |

Note: 1) No more than 2 courses from a single discipline can be used to meet the Breadth Requirement.

C. Diversity and Inclusion Requirement

All students must complete Diversity and Inclusion coursework (at least 3 units)

Note: 1) Diversity and Inclusion courses can also be used to meet the breadth category requirements, or major or minor requirements.

D. Fundamental Skills

Students must demonstrate competence in:

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| Writing |
| Quantitative Analysis (Math) |

Note: 1) Failure to satisfy the fundamental skills requirements by the end of four semesters of full-time study at the University is grounds for academic disqualification.

II. Major Requirements

Mathematics and Science (32 units minimum)

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|----------|---|---|
| MATH 039 | Probability with Applications to Statistics | 4 |
| MATH 051 | Calculus I | 4 |
| MATH 053 | Calculus II | 4 |
| MATH 055 | Calculus III | 4 |

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|---|--|---|
| MATH 057 | Applied Differential Equations I: ODEs | 4 |
| PHYS 053 | Principles of Physics I | 5 |
| Two math/science electives (above MATH 057) | | 8 |
| Engineering (45 units minimum) | | |
| Engineering Science | | |
| ENGR 010 | Dean's Seminar | 1 |
| ENGR 019 | Computer Applications in Engineering | 3 |
| ENGR 020 | Engineering Mechanics I (Statics) | 3 |
| Two Engineering Science electives | | 6 |
| Engineering Management Core | | |
| BUSI 031 | Principles of Financial Accounting | 4 |
| EMGT 142 | Design and Innovation | 3 |
| EMGT 142L | Design and Innovation Lab | 1 |
| EMGT 162 | Introduction to Data Analytics for Engineers and Computer Scientists | 3 |
| EMGT 170 | Project Decision Making | 4 |
| EMGT 174 | Engineering Project Management | 3 |
| EMGT 176 | Systems Engineering Management | 4 |
| Two BUSI/EMGT electives | | 8 |
| ENGR 025 | Professional Practice Seminar | 1 |
| Engineering Discipline Electives | | |
| EMGT 195 | Engineering Management Synthesis | 4 |
| Engineering Discipline Electives * | | |
| Cooperative Education (minimum 32 units) | | |
| ENGR 181 | Professional Practice | |
| ENGR 182 | Professional Practice | |
| ENGR 183 | Professional Practice | |
| ENGR 030 | Engineering and Computing Ethics in Society | 3 |

* Each student works with their advisor to develop a customized set of Engineering Discipline electives to meet student specific goals and objectives. The Engineering Management website describes potential sets of electives for different career paths.

Engineering Management Courses

EMGT 115. Building Information Modeling. 4 Units.

This course provides the basics of design, modeling, scheduling, resource allocation, time/cost tradeoffs, task coordination, team-building, progress monitoring, and post project assessment while using the latest BIM technologies. Students study the lean construction and how to integrate BIM into the project delivery processes. Prerequisite: Completion of all fundamental skills.

EMGT 142. Design and Innovation. 3 Units.

This course brings buyers, sellers and end-users of design, prototyping and testing together in an educational and real problem environment. Students will learn how to identify innovation, and develop, design and market new product or service. Students will also learn the nature and importance of technological innovation in commercial organizations with particular reference to bringing a new product or service off the drawing board, through virtual development, and into a modern pre-sales promotional environment in weekly project deliverables. Prerequisite: Upper division standing in engineering.

EMGT 142L. Design and Innovation Lab. 1 Unit.

The laboratory component of EMGT 142, course provides the basics of Industrial Design techniques including drawing, graphical, presentation and design communication skills. Students learn how to design functional objects, sculpture and use a variety of 2D and 3D applications to produce those models as physical objects. A variety of rapid prototyping methods include: 3D Printing, Vacuum Forming, and Laser Cutting is used in weekly project deliverables. Prerequisite: Upper division. Corequisite: EMGT 142.

EMGT 155. Computer Simulation. 4 Units.

This course explores digital simulation in which a model of a system is implemented and executed on a computer. The course focuses on modeling methodologies, mathematical techniques for implementing models, and statistical techniques for analyzing the results of simulations. Students develop simulations that use both simulation development toolkits and general-purpose programming languages. Also listed as COMP 155. Prerequisites: Completion of all Fundamental Skills; MATH 037 or MATH 039; MATH 045 or MATH 051, COMP 051 or COMP 061 or ENGR 019 with a "C-" or better.

EMGT 162. Introduction to Data Analytics for Engineers and Computer Scientists. 3 Units.

This course introduces students to state-of-the-art topics involving large collection of data. Particular emphasis is made on data collection, data storage and processing, extracting structured data from unstructured data, analytics, visualization, and a number of specific applications. Students explore large amounts of complex, digital data and learn about the tools and skills they need to solve knowledge from voluminous data sets. Prerequisites: ENGR 019 or COMP 051; upper division standing.

EMGT 170. Project Decision Making. 4 Units.

Project decision-making based upon engineering economy studies. This area covers techniques for economic evaluation of alternatives including time value of money, risk costs, effects of inflation, compound interest calculation, minimum attractive rate of return, capital budgeting, break-even analysis, sensitivity analysis, and risk analysis. A second facet of the course covers the fundamental aspects of project management within an engineering context. This area covers the project procurement process, project management and project scheduling. (Summer, Fall).

EMGT 172. Engineering Economy. 3 Units.

This course examines decision-making based upon engineering economy studies. This course covers techniques for economic evaluation of alternatives that includes time, value of money, risk cost, effects of taxation, monetary inflation, compound interest calculations, minimum attractive rate of return, capitol budgeting, break-even analysis, sensitivity analysis and risk analysis. Prerequisite: Completion of all Fundamental Skills.

EMGT 174. Engineering Project Management. 3 Units.

Students study the fundamentals of project management that are used in estimating, planning, coordinating and controlling engineering projects. Topics include fundamentals of specifications and contracts, and the scheduling of projects. Prerequisites: Completion of all Fundamental Skills.

EMGT 176. Systems Engineering Management. 4 Units.

This course provides an introduction to the concepts and process of systems engineering. It uses interactive lectures, participatory class exercises and case studies to illustrate the framing and solution of problems through a systems engineering approach. The course stresses an understanding of the interdisciplinary aspects of systems development, operations and support. Prerequisites: Completion of all Fundamental Skills; MATH 055 with a "C-" or better, or permission of instructor.

EMGT 191. Independent Study. 1-4 Units.

Special individual projects are undertaken under the direction of one or more faculty members knowledgeable in the particular field of study. Permission of faculty member involved. The student must be in good academic standing.

EMGT 195. Engineering Management Synthesis. 4 Units.

The capstone course is for Engineering Management majors. Emphasis on integration and application of management concepts, including project proposal and design, with periodic reviews and written and oral reports. Prerequisites: Completion of all Fundamental Skills.

EMGT 197. Undergraduate Research. 1-4 Units.

This course offers applied or basic research in focused topics within Engineering Management under faculty supervision. Permission of faculty supervisor and department chair.