

The Masters of Science in Engineering Management

College of Engineering and Computer Science

University of Michigan-Dearborn

A Rackham School of Graduate Studies Program

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Program

In a **36-credit hour program** of evening classes, students with an undergraduate degree in engineering (or a degree in math, computer science or a physical science *coupled with at least five years experience in engineering after the completion of their undergraduate degree*) can learn to manage the engineering function and the technology assets of their organizations by earning a master of science in Engineering Management. Students who already have a graduate degree in mechanical, electrical, industrial, manufacturing, or another branch of engineering can pursue the Engineering Management program for even greater mastery of both technology and the principles of management.

The Goals

The Master of Science in Engineering Management is designed to meet the following goals:

- Provide an understanding of core management areas vital for a technical manager, e.g., marketing, accounting, organizational behavior, business ethics/law, finance.
- Provide knowledge of topics inherent and common to all engineering disciplines, e.g., systems engineering, total quality management, production management, management of product/process design.
- Provide the requisite knowledge and skills to manage the engineering function at both lower and upper levels of management.
- Provide experience in integrating technical and management aspects in "real life" engineering project or problem.

Admission Requirements

Students must have an undergraduate degree in engineering (or a degree in math, computer science, or a physical science coupled with at least five years experience in engineering after the completion of the undergraduate degree) and must have completed one course in calculus based probability and statistics. This course requirement may be completed after admission into the program on a "conditional/lack of preparation" basis. Three letters of recommendation, with at least one from someone familiar with the candidate's academic performance, are also required.

The Courses

The M.S.-Engineering Management comprises 13 required courses for a total of 31 credit hours: the remaining 5 credit hours required for the degree may be completed with the election of a thesis option which integrates and applies the knowledge of technical management to an engineering project in the student's particular engineering discipline. If a student chooses not to elect the thesis option, he or she is required to take the Project Seminar (2 credit hours), and the remaining 3 credit hours may then be chosen with the approval of a graduate advisor.

Sample Program for Part-Time Students

Fall (Year I)	EM 500 Managing the Engineering Function EM 505 Systems Engineering	2 3
Winter (Year I)	EM 535 Marketing Management and Policy EM 520 Production Management	2 3
Summer I (Year I)	EM 541 Accounting Fundamentals for Decision Making	3
Summer II (Year I)	EM 510 Managerial Finance and Economics	2
Fall (Year II)	EM 530 Information Systems for Engineering Management EM 550 Business Ethics/Law	3 2
Winter (Year II)	EM 525 Total Quality Management EM 545 Organization Behavior & Human Resource Management	3 2
Summer I (Year II)	EM 580 Management of Product and Process Design	3
Summer II (Year II)	EM 515 Corporate Strategy EM 560 Engineering Management at Upper Levels	2 1
Fall (Year III)	EM 591 & Elective or EM 699 (Thesis)	5

Sample Program for Full-Time Students

Fall	EM 500 Managing the Engineering Function EM 505 Systems Engineering EM 530 Information Systems for Engineering Management EM 541 Accounting Fundamentals for Decision Making	2 3 3 3
Winter	EM 510 Managerial Finance and Economics EM 520 Production Management EM 525 Total Quality Management EM 535 Marketing Management and Policy	2 3 3 2
Summer I	EM 545 Organization Behavior & Human Resource Management EM 580 Management of Product and Process Design	2 3
Summer II	EM 515 Corporate Strategy EM 560 Engineering Management at Upper Levels	2 1
Fall	EM 550 Business Ethics/Law EM 591 & Elective Or EM 699 (Thesis)	2 5

For further information please call Dr. A. Zakarian at (313) 593-5361.

The course numbers, titles and brief descriptions of all required courses are given below

EM 500: Engineering Management: Managing the Engineering Function (2 credit hours)

Prerequisite: Graduate Standing

This course provides the knowledge and skills required to manage an efficient and productive engineering organization within the company. Topics include: starting a new department; missions; planning; organizing the department; integrating and coordinating functions and projects; measuring performance; components of the engineering operation; technical forecasts; state-of-the-art surveys; proposals; managing innovation; ethics and leadership. Two lecture hours. (College of Engineering and Computer Science)

EM 505: Systems Engineering (3 credit hours)

Prerequisite: Graduate standing and a course in probability and statistics

Introduction to systems and systems engineering, tools in systems analysis, the system design process, design for operational feasibility and systems engineering management. Three lecture hours. (College of Engineering and Computer Science)

EM 510: Managerial Finance and Economics (2 credit hours)

Prerequisite: EM 540 or EM 541

This course covers foundation concepts in Financial Management, with emphasis on project evaluation. Topics include financial statement use and analysis, time value of money, valuation of stocks and bonds, capital budgeting and risk/return analysis. (College of Business)

EM 515: Corporate Strategy (2 credit hours)

Prerequisite: EM 510, EM 535, and (EM 540 or EM 541)

The central focus of this course is strategic analysis. Emphasis is on strategy formulation and implementation for organizations operating in global environment. Topics covered include the analysis of a company's external and internal environment; the development of a strategic vision and organizational objectives; the design of strategy at the functional, business, corporate, and international levels; and the creation of the organizational structure, operational policies and procedures, and reward system. Two lecture hours. (College of Business)

EM 520: Production Management (3 credit hours)

(Cross-listed with IMSE 580) Prerequisite: EM 505 or equivalent

Forecasting, inventory and scheduling activities in production systems are studied. Topics in forecasting include the regression method, exponential smoothing techniques, Winters seasonal model, and adaptive control models. Continuous and periodic review inventory models, deterministic and probabilistic cases are also included. Dynamic and static job shop and flow shop scheduling problems are investigated using heuristic and mathematical models. Planning and scheduling for large-scale projects is studied. Material Requirements and Resources Planning (MRP I and II), and Aggregate Planning techniques are evaluated. Students are asked to select problems of interest and to present final project reports. Three lecture hours. (College of Engineering and Computer Science)

EM 525: Total Quality Management (3 credit hours)

(Cross-listed with IMSE 561). Prerequisite: Knowledge of statistics and graduate standing

This course covers implementing Total Quality Management (TQM), undertaking Six Sigma Projects, and applying Baldrige National Quality Award criteria and ISE 9000 principles to improve quality performance in an organization. Topics include Definitions and Importance of Quality, Quality Costs, Quality Function Deployment (QFD), Product Specification and Critical-to-quality Measures (CQM), Statistical Quality Control (SQC), Robustness Concepts, Quality System Design and Evaluation. Six Sigma and DMAIC Methodologies, Design for Six Sigma (DFSS) Process, IDOV (Identify requirements, Design alternatives, Optimize the design and Verify process capability) Methodology, and several other concepts and tools related to quality are also covered. Three lecture hours. (College of Engineering and Computer Science)

EM 530: Information Systems for Engineering Management (3 credit hours)

(Cross-listed with IMSE 554). Prerequisite: knowledge of computer fundamentals and graduate standing

This course covers the organizational foundations of information systems, their emerging strategic role, and the technical foundation for understanding computers and information systems. Topics include: introduction to management information systems; decision support systems artificial intelligence and expert systems; end-user computing; data vs. information; data communication and connectivity; data management. Three lecture hours. (College of Engineering and Computer Science)

EM 535: Marketing Management and Policy. (2 credit hours)

Prerequisite: Graduate standing

This course studies the salient features of technology-driven marketing and distinguishes technology-push from market-pull marketing. Highlights the technology-marketing interface in the context of strategy planning, market segmentation, product innovation, channels of distribution, promotional and pricing decisions. Particular attention will be paid to technology inventory-user interactions, process of adoption, and technological innovation. Two lecture hours. (College of Business)

EM 541: Accounting Fundamentals for Decision Making (3 credit hours)

Prerequisite: Graduate Standing

This course introduces fundamental accounting concepts and applications that are useful in the evaluation of financial information and decision tools relevant to project planning. Students will achieve an understanding of basic accounting and cost management tools that are essential to decision making. Emphasis will be placed on assessing financial statement through an understanding of accounting practice, the relationship between business activities and an organization's cash flows. Three lecture hours. (College of Business)

EM 545: Organization Behavior & Human Resource Management (2 credit hours)

Prerequisite: EM 500

This course encompasses key areas of human resource management and organization behavior as they relate to technical work environments. Organization design and theory will be discussed, along with motivation, leadership, employee selection skills, group and team processes, and managing diversity. Techniques for devising a personal career development plan are covered. Two lecture hours. (College of Business)

EM 550: Business Ethics/Law (2 credit hours)

Prerequisite: Graduate Standing

This course provides student with an overview of the legal environment of business. Concepts including product liability, intellectual property, and contracts are introduced within the context of the legal system. Ethical consideration in personal, professional, and organization decision making are integrated throughout this course. (College of Business)

EM 560: Engineering Management at Upper levels (1 credit hour)

Prerequisite: EM 520, EM 530 and EM 545

This course provides the knowledge and skills in leadership and management required to build and manage the company's technical resources toward the attainment of corporate objectives. Topics covered include: technological forecasts; corporate strategic planning; corporate portfolios of technical programs; group and strategic planning; project collection; management of institutional time; corporate computer facilities; proposals; introducing new products and processes; inventorying and upgrading; engineering audits; and the role of engineering in joint ventures. One lecture hour. (College of Engineering and Computer Science)

EM 580: Management of Product and Process Design (3 credit hours)

Prerequisite: EM 510, EM 520 and EM 525

This course provides the knowledge and skills needed to manage the design of a product or process. Topics covered include: creativity, types of products, types of processes, generalized design process, identification and translation of customer needs into engineering specifications, designing for function and quality factors, design for manufacturability, life-testing, cost estimating, reporting on design projects, and concurrent engineering. Three lecture hours. (College of Engineering and Computer Science)

Those students who do not elect the thesis option will be required to take the following course and one other elective course with the permission of the program director.

EM 591: Capstone Project (2 credit hours)

Prerequisite: EM 515, EM 560 and EM 580

Students will receive the opportunity and training to integrate and apply both technical and managerial aspects acquired in various courses to an engineering project or problem. (College of Engineering and Computer Science)

Application Instructions

For Domestic Students

We do not have a deadline date, but we strongly recommend that you apply at least one month before the semester start.

Semester	Classes Begin
Fall	September
Winter	January
Summer	May, July

We *recommend* that you apply as early as possible before the semester begins for registration purposes and the best course availability.

Please follow the instructions below for submitting your application

DO NOT SEND APPLICATION TO RACKHAM

Please send the following materials directly to the IMSE Department:

- **All pages of the application** (both copies)
- **\$60 application fee** (This fee is per application, for each department applied.) Payable by check, credit cards are not accepted at this time.
- **3 Letters of Recommendation** (one letter of recommendation must be from someone familiar with your academic background: a Professor or an advisor)
- **Statement of Purpose**
- **1 Official Transcript** -from each institution you have attended (transcripts must be sent directly to the IMSE department)

NOTE: The above materials can be mailed separately

Mail All Application Materials To:

University of Michigan-Dearborn
IMSE Department (2340 EC)
4901 Evergreen Road
Dearborn, MI 48128-1491

If you have any questions regarding the application process, please call (313) 593-5361, or email imsedep@engin.umd.umich.edu

NOTE: Application can be obtained on line at www.engin.umd.umich.edu/IMSE/grad_prog/appforms.php (you will need to print out application and all necessary forms). You will need to print out the application and mail to the Department at the Dearborn Campus. We do not accept on-line graduate applications at this time.

Application Instructions For International Students

When to Apply?

Please Apply by the Required Date. If application is not submitted or completed before the deadline, it will be considered for the next term.

Semester	Deadline to Apply	Registration	Classes Begin
Fall	March 25	June	September
Winter	July 25	November	January
Summer (includes Spring-half & Summer-half, Spring/Summer -full)	November 25	April	May, July

Please follow the instructions below for submitting your application

DO NOT SEND APPLICATION TO RACKHAM

Please send the following materials directly to the IMSE Department:

- **All pages of the application** (both copies)
- **\$75.00 application fee** (your application will not be evaluated unless the fee has been paid). This fee is per application, for each department applied. Payable by check, credit cards are not accepted at this time.
- **2 Official Transcripts** (Official not notarized transcripts in native language and official English translation.)
- **Financial Certification** – original affidavit of support, with original bank statements, showing the minimum amount needed for certification (must include dependent if there are any).
- **TOEFL, ME Lab, or IELTS Score** – an English proficiency score that meets the minimum requirement for admission.
- **3 Letters of Recommendation** (one must be from someone familiar with your academic background: a Professor or an advisor)
- **Statement of Purpose**

NOTE: Evaluation can not be done until application fee, application, transcripts, financial certification, and English proficiency score has been received.

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