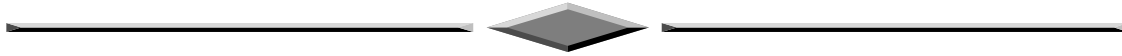


**THE MASTER OF SCIENCE  
IN  
ENGINEERING MANAGEMENT**

**The College of Engineering & Computer Science  
&  
School of Management  
at  
The University of Michigan-Dearborn**

**A RACKHAM SCHOOL OF GRADUATE STUDIES PROGRAM**  
Department web page: [www.engin.umd.umich.edu/IMSE/grad](http://www.engin.umd.umich.edu/IMSE/grad)



**The 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**

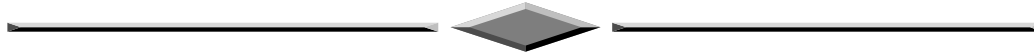
The master of science in Engineering Management is designed to meet the following goals:

- 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 from a set of approved courses.

### Sample Program for Part-Time Students

#### Fall (Year I)

EM 500	Managing the Engineering Function		2
EM 505	Systems Engineering	<u>3</u>	
		5	

#### Winter (Year I)

EM 535	Marketing Management and Policy	2	
EM 520	Production Management	<u>3</u>	
		5	

#### Summer Half Session I (Year I)

EM 541	Accounting Fundamentals for Decision Making	3	
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#### Summer Half Session II (Year I)

EM 510	Managerial Finance and Economics	2	
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#### Fall (Year II)

EM 530	Information Systems for Engineering Management	3	
EM 550	Business Ethics/Law	<u>2</u>	
		5	

#### Winter (Year II)

EM 525	Total Quality Management		3
EM 545	Organization Behavior & Human Resource Management	<u>2</u>	
		5	

#### Summer Half Session I (Year II)

EM 580	Management of Product and Process Design	3	
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#### Summer Half Session II (Year II)

EM 515	Corporate Strategy	2	
EM 560	Engineering Management at Upper Levels	<u>1</u>	
		3	

#### Fall (Year III)

EM 591 & Elective

or

EM 699 (Thesis)			5
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### Sample Program for Full-Time Student

Fall

EM 500	Managing the Engineering Function	2	
EM 505	Systems Engineering	3	
EM 530	Information Systems for Engineering Management	3	
EM 541	Accounting Fundamentals for Decision Making	<u>3</u>	
		11	

Winter

EM 510	Managerial Finance and Economics	2	
EM 520	Production Management	3	
EM 525	Total Quality Management		3
EM 535	Marketing Management and Policy	<u>2</u>	
		10	

Summer I

EM 545	Organization Behavior & Human Resource Management	2	
EM 580	Management of Product and Process Design	<u>3</u>	
		5	

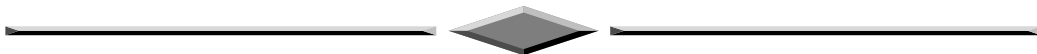
Summer II

EM 515	Corporate Strategy	2	
EM 560	Engineering Management at Upper Levels	<u>1</u>	
		3	

Fall

EM 550	Business Ethics/Law	2	
<i>EM 591 &amp; Elective</i>			
<i>Or EM 699 ( Thesis)</i>		<u>5</u>	
		7	

For further information please call Dr. S. K. Kachhal 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**

Focus is on two related topics; first, the course covers concepts and techniques of financial management in acquiring and allocating financial resources from a strategic perspective. In addition, contents include consideration of business development in the European Economic Community, Latin America, Eastern Europe and the Pacific Rim. Two lecture hours. (School of Management)

**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. (School of Management)

**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

The concepts of total quality control (TQC) for planning in production and service are introduced within a framework of quality, cost and delivery (QCD). Various interpretations and practices of TQC are discussed. Quality function deployment (QFD) is treated as a system tool for quality development, maintenance, and improvement over the life cycle of a product. The roles and functions of statistical quality control (SQC) and QC Circles are defined and studied. A graduate level research paper is required. 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. (School of Management)

**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. (School of Management)

**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. (School of Management).

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

**Prerequisite: Graduate Standing**

This seminar exposes the student to concepts related to ethics and integrity from the standpoints of personal, professional and organizational decision making. Prominent authorities in the fields of business ethics, technology management, law, social science, education, government and action groups will serve as visiting lecturers. Two lecture hours (School of Management).

**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)

