جامعة الشارقة
UNIVERSITY OF SHARJAH

كلية الهندسة
COLLEGE OF ENGINEERING

Department of Industrial Engineering and Engineering Management

Master of Science in Engineering Management

June 2022

Introduction

Individuals with combined technical expertise and business skills are increasingly in demand by organizations that seek a sustainable competitive advantage. If you hold a bachelor's degree in engineering and your career goal is to be a manager or business leader, then the master's program in engineering management at the University of Sharjah is specially designed for you.

As a part of its commitment to providing high-quality education at both the undergraduate and graduate levels, the University of Sharjah launched a Master of Science in Engineering Management (MScEM) in Fall 2013-14. The strength of this program that distinguishes it from similar programs in the region is the wide range of elective courses available to students. Another strength is the distinguished world-class faculty members that teach in this program.

Admission Requirements

1. Admission to this program is open to students holding B.Sc. degree in engineering from a recognized university with a minimum CGPA of 3 out of 4, or equivalent.
2. Students with CGPA between 2.5 and 2.99 may apply for admission and the department may consider their application subject to availability. However, they will be admitted conditionally provided that they register a maximum of (6) credit hours in the first semester of their study and obtain a minimum CGPA of 3 out of 4.
3. Applicants should satisfy the English language proficiency requirements and the other conditions announced by the college of graduate studies (https://www.sharjah.ac.ae/en/Research/gs/master/Pages/ar.aspx).
4. Remedial courses are decided on a case-by-case basis upon the acceptance of students.

Program Goals

The main goals of the MScEM program are:

1. To prepare engineers from various specializations to address advanced and challenging engineering problems taking into account the technical and socio-economic factors and implications.
2. To prepare its graduates to assume leading roles in their organizations in the determinatiothen of best approaches to manage changes in the engineering processes and benefit from relevant technological innovations.
3. To equip its graduates with the knowledge and skills to interact and communicate effectively with professionals from other specializations within and outside their organizations.
4. To equip its graduates with the knowledge, skills, and awareness of long-term sustainability factors assocciated with the adoption of any engineering process or product.

Student Learning Outcomes

Student learning outcomes for the MScEM program are as follows:

1. Apply knowledge, skills and techniques of engineering and management to execute contemporary activities and operations effectively and efficiently.
2. Understand the concepts and application of good management practices to foster innovation and sustain global competitivness.
3. Identify, analyze, formulate, and solve advanced engineering problems and highly complex matters that involve constrained resources.
4. Collect, interpret, and use data effectively to make fair and valid decisions and assess their impacts taking into account socio-economic, ethical, environmental, health and safety issues.
5. Demonstrate leadership and effective communication and further learning skills while incorporating new startegic approaches or conceptual abstract solutions.
6. Demonstrate ability to take responsibility, conduct academic research and contribute to professional knowledge.

Program Components

As shown in Table 1, satisfactory completion of 33 Credit Hours (CHs) is required to obtain the M.Sc. degree. The M.Sc. program requires the completion of 15 CHs of compulsory courses, 9 CHs of elective courses, and 9 CHs of M.Sc. thesis. Satisfactory completion of a zero-CH seminar is also required to register for the M.Sc. thesis. The compulsory and electives courses are listed in Table 2.

A grade of Pass or Fail can be given upon the defense of the thesis. The grade of the M.Sc. thesis will not be included in the calculation of the student CGPA. The examination jury will follow the procedure specified in the M.Sc. thesis registration and defense sections of the M.Sc. executive regulations available on the College of Graduate Studies website.

Table 1. MScEM Program Components

Components	**Credit Hours**
Compulsory Courses	15
Elective Courses	9
0405-591 M.Sc. Seminar	0
0405-598 M.Sc. Thesis	9
Total	**33**

Completing 9 CHs is a prerequisite for the M.Sc. Seminar (0405-591), while the completion of 15 CHs and passing the M.Sc. Seminar are prerequisites for the M.Sc. Thesis (0405-598). The compulsory and elective courses are listed in Table 2.

Table 2. MScEM Academic Courses

No.	Course Code	Course Name	CHs	Type	Prerequisite
1	0405-511	Operations Management	3	Compulsory	
2	0405-522	Engineering Statistical Analysis	3		
3	0405-560	Management for Engineers	3		
4	0405-561	Engineering Project Management	3		
5	0405-590	Engineering Management Research Methodologies	3		
6	0405-501	Legal Issues	3	Elective	
7	0405-512	Applied Engineering Optimization	3		
8	0405-523	Experimental Design & Analysis	3		**0405-522**
9	0405-532	Engineering Asset Management	3		
10	0405-541	Safety Engineering Management	3		
11	0405-562	Economic Analysis of Engineering Systems	3		
12	0405-563	Quality Engineering	3		**0405-522**
13	0405-564	Lean Six Sigma Systems	3		**0405-522**
13	0405-565	Organizational Behavior for Engineers	3		**0405-560**
15	0405-566	Accounting and Finance for Engineers	3		
16	0405-567	Supply Chain Management	3		
17	0405-569	Technology & Innovation Management	3		
18	0405-581	Special Topics in Engineering Management	3		

Study Plan

The study plan for the MScEM is outlined in Table 3. It includes three elective courses that should be selected from the list of the MScEM elective courses indicated in Table 2.

Table 3. Study Plan for MScEM Program

Semester	Courses	CHs	Total CHs
1	0405-511 Operations Management	3	**12**
	0405-522 Engineering Statistical Analysis	3	
	0405-560 Management for Engineers	3	
	Elective Course 1	3	
2	0405-590 Engineering Management Research Methodologies	3	**12**
	0405-561 Engineering Project Management	0	
	0405-591 Seminar	3	
	Elective Course 2	3	
	Elective Course 3	3	
3	0405-598 M.Sc. Thesis	3	**3**
4	0405-598 M.Sc. Thesis	6	**6**
Total Credits			**33**

M.Sc. Thesis Registration Process

1. Upon the completion of at least 15 CHs & M.Sc. Seminar with a minimum CGPA of 3, the M.Sc. student is assigned to supervisor(s) based on the decision of the departmental MScEM committee and taking into consideration the preference of the students and the availability of the faculty members. The student will then prepare for the M.Sc. thesis proposal and present it to the discussion committee (through the M.Sc. committee) as required by the university bylaws.
2. Once the M.Sc. thesis proposal is approved by the departmental MScEM committee and the College of Graduate Studies, the M.Sc. student can immediately register the first 3 CHs in the M.Sc. Thesis (0405-598).
3. The due date (in every semester) for registering the first 3 CHs in the M.Sc. Thesis (0405-598) is announced by the college of graduate studies. If the student is not registering for any other course in that semester, he/she is recommended to apply for postponement.
4. In the semester(s) following the approval of the M.Sc. thesis proposal, the M.Sc. student can register part of/the totality of the remaining CHs of the M.Sc. Thesis (0405-598) during the normal registration period published on the university website (Academic Calendar) or during the add/drop period as per the university regulations. The number of CHs that the student can register depends on his/her status (part time/full time).
5. If the MSc student registered all the 9 CHs of the M.Sc. Thesis (0405-598) and did not defend his/her M.Sc. Thesis, he/she shall register the M.Sc. Thesis (0405-598) with zero CH until a grade of Pass is obtained (i.e., the defense is completed successfully).

University Graduate Studies Bylaws and Master's Executive Regulations

For more detailed information regarding the general admission requirements for the M.Sc. program at the University of Sharjah, as well as the graduation requirements, academic load, maximum and minimum duration of the Master's studies, conditional admission, academic probation, examination and grade system, as well as registration of thesis (for the MScEM program with Courses and Thesis option), you can consult the University of Sharjah Graduate Studies Bylaws and Master's Executive Regulations available in PDF format on the following link (College of Graduate Studies website):

https://www.sharjah.ac.ae/en/Research/gs/Documents/Master%20Excecutive%20Regulations%20En.pdf

Course Descriptions

0405-501 Legal Issues (3:3)

This course provides a comprehensive overview of the effects of important legal principles on decisions the engineering manager make. The course introduces engineering students to the basic fundamentals of laws, with a focus on the intersection of these legal principles with engineering decisions. The student will learn about legal concepts such as 'legal' and 'the laws'. Other legal concepts addressed in the course include the notion of 'The rule of law', 'justice' and 'legal systems'. Particular attention is paid to legal concepts which are of essence to the engineering manager. These concepts include 'Property', 'Legal entities', 'The agency challenge', 'The law of contract and obligations' and 'Performance and breach of contract'.

0405-511 Operations Management (3:3)

In operations management several processes and activities are integrated to make a product or a service available to the customer in the most effective and efficient way. This course presents issues related to the competitiveness of companies and gives a set of quantitative and qualitative tools to tackle these issues. Topics of the course include process design, layout design, facilities design, quality, capacities management, distribution systems, production systems, inventory management, lean operations and JIT, enterprise resource planning.

0405-512 Applied Engineering Optimization (3:3)

This course introduces the concepts of optimization by presenting different classes of problems. Topics include classical optimization theory and other optimization models and techniques such as linear programming, integer programming, dynamic programming, nonlinear programming, and modern heuristics and metaheuristics. Applications of these techniques in different engineering disciplines are also presented.

0405-522 Engineering Statistical Analysis (3:3)

Applied statistical methods for analyzing engineering and management systems including inferential statistics; nonparametric statistics; regression and correlation analysis; analysis of variance; time series analysis and forecasting models. The course is application oriented, and examples drawn from industrial applications will be used. Student will use statistics packages such as MINITAB or SPSS.

0405-523 Experimental Design and Analysis (3:3)

The objective of this course is to show students how to plan, design and conduct experiments efficiently and effectively, and analyze the resulting data to obtain objective conclusions. Opportunities to use the principles taught in the course arise in all phases of engineering work, including process management, decision making, process development, and process improvement. Computer software packages to implement the methods presented will be illustrated. Topics include analysis of variance, blocked designs, projection, single replicate experiments, factorial designs, fractional factorial designs, Taguchi approach to parameter optimization, and response surface method.

0405-532 Engineering Asset Management (3:3)

This course focuses on asset reliability, safety and performance with financial and managerial constraints; economic and financial decision making for the construction and maintenance of infrastructure assets; managing assets throughout the lifecycle, starting with the identification of the need for a physical asset through defining the requirements, the acquisition and system implementation processes, in-service operation and maintenance management, and asset decommissioning and disposal; asset replacement, rehabilitation or upgrading; emerging technologies in asset management.

0405-541 Safety Engineering Management (3:3)

This course comprises an Introduction to safety management systems and regulations; types of human behavior and error, occupational hazards; risk management; workplace and process safety assessment tools; heat stress; management of hazardous substances and hazardous waste; occupational diseases; emergency and evacuation plans; fire safety; environmental safety; safety culture.

0405-560 Management for Engineers (3:3)

Topics include the four management functions (planning, organizing, leading, and controlling); strategic planning; communication; employee selection and development; teamwork; employee motivation and evaluation; diversity; performance measurement; globalization; ethics; negotiation and conflict resolution; and managerial challenges.

0405-561 Engineering Project Management (3:3)

This course provides a comprehensive overview of the main principles and practices of project management. It covers projects in contemporary organizations; project initiation, organizational structures, the project manager; project planning, risk management, cost estimation, scheduling, resource allocation; monitoring and controlling projects; project contracts; ethical issues; project termination; practice using project management software packages.

405-562 Economic Analysis of Engineering Systems (3:3)

Course topics include financial planning, including cash-flow analysis models; engineering economic analysis, including discounted cash flows and taxation effects; application of optimization techniques, as in equipment replacement or capacity expansion models.

0405-563 Quality Engineering (3:3)

Introduction to principles and philosophies of total quality management, concepts of variation, SPC for process control and monitoring, traditional control charts, advanced control charts, process and gage capability analysis, single factor, two factor and factorial and fractional factorial design, Taguchi approach to quality and parameter optimization.

0405-564 Lean Six-Sigma Systems (3:3)

Concepts and principles of lean and six-sigma systems are introduced. Quality improvement tools and waste elimination methods are discussed. Rapid product development strategy is stressed via the VOC and QFD. The main process improvement tools will be applied through DMAIC and DFSS.

0405-565 Organizational Behaviour for Engineers (3:3)

This course introduces the principles of individual and group attributes and behavior and their applications within organizations. Topics covered include job design, perceptions, job satisfaction, learning, communication, decision-making, motivation, group dynamics, conflict management, organizational structure, power and politics, leadership and organizational change, case studies within engineering management context.

0405-566 Accounting and Finance for Engineers (3:3)

Introduction to financial accounting and financial management of organizations; Financial statements, financial ratios, and how to interpret them; sources of finance, cash flows, time value of money, long and short-term financial decisions, and use accounting information for decision making and financial control.

0405-581 Special Topics in Engineering Management (3:3)

This course is a study of engineering management from a viewpoint of construction safety and health with an Ergonomics methodology. Students will be expected to conduct extensive research into safety and health in the construction industry and develop tools to aid in both compliance and reduction of construction-related injuries/illnesses. This course involves undertaking a group project, which is intended to help students integrate knowledge, methodology, and practical skills in an area that reflects their interests.

0405-590 Engineering Management Research Methodologies (3:3)

This course covers the fundamentals and the advanced aspects of research in the field of engineering management including conducting literature reviews, quantitative and qualitative research methods, engineering management problem solving and critical thinking, design of experiments, research communications (writing research papers, presentations, etc.), ethics in research, initiating and managing research proposals, publication process, using research databases, and related issues. The writing and communication skills will be developed throughout the lectures, assignments, presentations, and term papers.

0405-569 Technology & Innovation Management (3:3)

This course acknowledges that all technology-based organizations need to continually innovate in order to remain competitive. It explores the principles, tools and challenges involved in managing innovation and technology. Course topics include introduction to technology and innovation, theories of technology acceptance, technology intelligence, technology acquisition, models of innovation, innovation processes, tools, and techniques, strategic technology management, road-mapping, new product introduction (NPI), innovative project selection, macro and micro influencing factors on innovation, strategic alliances, and intellectual property management. The course provides appropriate case studies to link theory and practical aspects of topics under study.

0405-591 M.Sc. Seminar (1:0)

Students are required to attend seminars given by faculty members, visitors, and other graduate students. Students are required to submit reports on the seminars they attend when asked. Each student is also required to give a seminar on a timely research topic.

0405-598 M.Sc. Thesis (0:9)

Students have to conduct research, prepare a written thesis, and defend it at a final oral examination before a committee. The thesis should exhibit a competence in the research process by applying an existing body of knowledge in the critical analysis of a new question or of a specific problem or issue in a new setting. Students are expected to submit for publication at least one refereed article before passing the defense.

Contacts

For more information about the program, you may contact:

Department of Industrial Engineering and Engineering Management, College of Engineering
University of Sharjah
PO Box 27272, Sharjah, UAE
Phone: +971-(0)6-505 3965
Fax: +971-(0)6-5053963