



Department of Industrial Engineering and Engineering Management

Master of Science in Engineering Management

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Introduction

Individuals with combined technical expertise and business skills are increasingly in demand by organizations that seek 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 program in engineering management at the University of Sharjah is specifically designed for you.

As 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 degree (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 the 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 a bachelor degree in engineering from a recognized university with a minimum CGPA of 3 out of 4 or equivalent.
2. Students with CGPA between 2.50 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 maximum (6) credit hours in the first semester of their study and obtain a CPGA of 3 out of 4.
3. Applicants should satisfy the English Language proficiency requirement of 550 in TOEFL or 6.0 in IELTS if the medium of instruction in their Bachelor's degree was not English.
4. The department may offer a conditional admission. Conditions include, but are not limited to, registering in specific option or taking some additional bridging courses (i.e. qualifying non-credit courses).

Program Options

To accommodate students with different interests, the MScEM program is offered under two options:

1. MScEM with Courses and Project (Option 1)
2. MScEM with Courses and Thesis (Option 2)

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 determination 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 associated 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 projects, professional activities and operations effectively and efficiently.
2. Understand the concepts and application of good management practices to foster innovation and sustain global competitiveness.
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 strategic 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, a satisfactory completion of 33 credits is required for both MScEM options. The course work for Option 1 includes 12 credits of compulsory courses, 15 elective credits, and a six-credit project. In addition to 12 compulsory credits, Option 2 requires a satisfactory completion of six elective credits and a fifteen-credit thesis. Both options also require a satisfactory completion of a zero-credit seminar.

Table 1: MScEM Program Components for the Two Options

| Components | Credit Hours | |
|--------------------|--------------|-----------|
| | Option 1 | Option 2 |
| Compulsory Courses | 12 | 12 |
| Elective Courses | 15 | 6 |
| MSc Seminar | 0 | 0 |
| MSc Project | 6 | - |
| MSc Thesis | - | 15 |
| Total | 33 | 33 |

Upon admission, students should choose an option among the two options of the MScEM program based on their interests.

Study Option Change

Students are allowed to change their option only once subject to the following conditions:

1. If their current option is 1:
 - a. They should not have registered the course MSc Project (0405-595) yet.
 - b. They should have taken at most two elective courses.
2. If their current option is 2, they should not have registered the course MSc Thesis (0405-599) yet.
3. Other cases can be considered on a case-by-case basis. The student bears, in these cases, the responsibility of possibly not counting in his/her transcript some of the courses that he/she has taken.
4. Approval of the program MSc committee must be obtained in all cases and then the approval of the dean of the college of graduate studies.
5. The change becomes effective from the following semester.

Academic Courses

The program offers a wide range of courses to suit students' areas of interest. These courses are listed in Table 2.

Table 2: MScEM Academic Courses

| | Course Code | Course Name | Credit Hours | Pre-requisite |
|-----|-------------|--|--------------|----------------------------|
| 1. | 0405-501 | Legal Issues | 3 | |
| 2. | 0405-511 | Operations Management | 3 | |
| 3. | 0405-512 | Applied Engineering Optimization | 3 | |
| 4. | 0405-522 | Engineering Statistical Analysis | 3 | |
| 5. | 0405-532 | Engineering Asset Management | 3 | |
| 6. | 0405-541 | Safety Engineering Management | 3 | |
| 7. | 0405-560 | Management for Engineers | 3 | |
| 8. | 0405-561 | Engineering Project Management | 3 | |
| 9. | 0405-562 | Economic Analysis of Engineering Systems | 3 | |
| 10. | 0405-563 | Quality Engineering | 3 | 0405-522 |
| 11. | 0405-564 | Lean Six Sigma Systems | 3 | 0405-522 |
| 12. | 0405-566 | Accounting and Finance for Engineers | 3 | |
| 13. | 0405-567 | Supply Chain Management | 3 | |
| 14. | 0405-581 | Special Topics in Engineering Management | 3 | |
| 15. | 0405-591 | MSc Seminar | 0 | 9 CHs |
| 16. | 0405-595 | MSc Project | 6 | 18 CHs and 0405-591 |
| 17. | 0405-599 | MSc Thesis | 15 | 12 CHs and 0405-591 |

Study Plan

Option 1: MScEM with Courses and Project

The study plan for the MScEM with Courses and Project option is outlined in Table 3. Elective Courses are selected based on the following criteria:

1. At least four courses should be taken from MScEM elective courses (Table 4).
2. Subject to the approval of Project/Thesis supervisor and MSc committee, only one course may be taken from graduate (master) level courses offered within the College of Engineering or the College of Business Administration.

Table 3: Study Plan for MSCEM with Courses and Project (Option 1)

| Year | Courses/Project | Credits | Total Credits |
|----------------------|---|---------|---------------|
| 1 | 0405-511 Operations Management | 3 | 18 |
| | 0405-522 Engineering Statistical Analysis | 3 | |
| | 0405-560 Management for Engineers | 3 | |
| | 0405-561 Engineering Project Management | 3 | |
| | 0405-591 Seminar | 0 | |
| | Elective Course 1 | 3 | |
| | Elective Course 2 | 3 | |
| 2 | Elective Course 3 | 3 | 15 |
| | Elective Course 4 | 3 | |
| | Elective Course 5 | 3 | |
| | 0405-595 MSc Project | 6 | |
| Total Credits | | | 33 |

It is worth noting that the MSc Project (0405-595) should be registered over two semesters with a load of 3 credit hours for the first semester and 3 credit hours for the second semester. A grade of Pass or Fail is given upon the presentation of the project at the end of the second semester. The examination committee can decide that the student has to add one (or more) semester to complete the work. In this case the student has to register the course (0405-595) with zero credit hours. The grade of the MSc Project will not be included in the calculation of the student CGPA. The procedure is similar to that of the MSc Thesis registration and defense available in the MSc Executive Regulations on the College of Graduate Studies website.

Table 4: MScEM Elective Courses

| Elective Courses | | | |
|------------------|-------------|--|--------------|
| | Course Code | Course Name | Credit Hours |
| 1. | 0405-501 | Legal Issues | 3 |
| 2. | 0405-512 | Applied Engineering Optimization | 3 |
| 3. | 0405-532 | Engineering Asset Management | 3 |
| 4. | 0405-541 | Safety Engineering Management | 3 |
| 5. | 0405-562 | Economic Analysis of Engineering Systems | 3 |
| 6. | 0405-563 | Quality Engineering | 3 |
| 7. | 0405-564 | Lean Six Sigma Systems | 3 |
| 8. | 0405-566 | Accounting and Finance for Engineers | 3 |
| 9. | 0405-567 | Supply Chain Management | 3 |
| 10. | 0405-581 | Special Topics in Engineering Management | 3 |

Option 2: MScEM with Courses and Thesis

The study plan for the MScEM with Thesis and Courses is outlined in Table 5. Elective Courses are selected based on the following criteria:

1. At least one course should be taken from MScEM Elective Courses (Table 4)
2. Subject to the approval of the Project/Thesis supervisor and MSc committee, only one course may be taken from graduate (master) level courses offered within the College of Engineering or the College of Business Administration.

MSc Thesis (0405-599) registration process

1. Upon the completion of at least 12 CHs & MSc Seminar with a minimum CGPA of 3, the MSc student shall search for supervisor(s), have the supervisor(s) approved by the departmental MScEM committee (through the MSc Program Coordinator), prepare the MSc Thesis proposal and present it to the discussion committee (through the MSc Program Coordinator) as required by the University bylaws.
2. Once the MSc Thesis proposal is approved by the departmental MScEM committee and the College of Graduate Studies, the MSc student can immediately register the first 3 CHs in the MSc Thesis (0405-599).
3. The due date (in every semester) for registering the first 3 CHs in the MSc Thesis (0405-599) is:
 - The last date for withdrawal from that semester which is set every semester by the College of Graduate Studies and published on its website, if the student is not registering for any other course in that semester.
 - The last week of the semester (before the final exams), if the student is registering for at least one course (other than the thesis) in that semester.
4. In the semester(s) following the approval of the MSc Thesis proposal, the MSc student can register part of/the totality of the remaining CHs of the MSc Thesis (0405-599) 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 15 CHs of the MSc Thesis (0405-599) and did not defend his/her MSc Thesis, he/she shall register the MSc Thesis (0405-599) with zero CH until a grade of pass is obtained (i.e., the defense is completed successfully).

Table 5: Study Plan for MSCEM with Courses and Thesis (Option 2)

| Year | Courses/Thesis | Credits | Total Credits |
|----------------------|---|---------|---------------|
| 1 | 0405-511 Operations Management | 3 | 18 |
| | 0405-522 Engineering Statistical Analysis | 3 | |
| | 0405-560 Management for Engineers | 3 | |
| | 0405-561 Engineering Project Management | 3 | |
| | 0405-591 Seminar | 0 | |
| | Elective Course 1 | 3 | |
| | Elective Course 2 | 3 | |
| 2 | 0405-599 MSc Thesis | 15 | 15 |
| Total Credits | | | 33 |

A grade of Pass or Fail can be given upon the defense of the Thesis. The grade of the MSc Thesis will not be included in the calculation of the student CGPA. The examination jury will follow the procedure specified in the MSc Thesis registration and defense sections of the MSc Executive Regulations available on the College of Graduate Studies website.

University of Sharjah Graduate Studies Bylaws and Master's Executive Regulations

For more detailed information regarding the general admission requirements for the Master's programs at 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 grades 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%20Executive%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 makes, with a focus on the intersection of these legal principles with business ethics and international trends. The student will learn legal concepts and processes consistent with ethical norms, and how to analyze business risks to arrive at a range of correct decisions concerning projects, contracts and operations. International and national environmental laws will be covered. Case studies will be given.

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.

0405-532 Engineering Asset Management (3:3)

Asset reliability, safety and performance with financial and managerial constraints; economical 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)

Introduction to safety management systems and regulations; types of 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); leadership; strategic planning; communication; employee selection and development; team work; employee motivation and evaluation; diversity; performance measurement; globalization; ethics; negotiation and conflict resolution; and managerial challenges.

0405-561 Engineering Project Management (3:3)

Topics include introduction to 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. The course will be taught using the generally accepted Project Management Institution (PMI) standards.

0405-562 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 quality control and improvement, concepts of variation, TQM tools such as Pareto charts, Cause and effect diagrams, Control charts for variables and attributes, multivariate control charts, Process and gauge capability analysis, Sampling plans, quality optimization using Taguchi method and quality loss function are covered. **Prerequisite: 0405-522 Engineering Statistical Analysis**

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

Concepts and principles of lean and six-sigma systems are introduced. Value stream mapping and waste elimination tools 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. **Prerequisite: 0405-522 Engineering Statistical Analysis**

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.

0405-567 Supply Chain Management (3:3)

The supply chain of any service or manufacturing firm involves processes that include the design, manufacturing, storage and delivery of products or services to the customers. The supply chain also involves processes from suppliers and customers of the firm. Supply Chain Management topics provide the right tools to gain synergy and efficiency in the management of the previous processes. This course adopts a modeling approach to supply chains that is designed to study trade-offs between system costs and customer service level. Topics covered include supply chain design, multi-location inventory-distribution models, delayed differentiation, supply chain integration. E-commerce and the role of information technology in supporting supply chain operations.

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

This course includes contemporary topics in engineering management.

0405-591 MSc Seminar (1:0)

Students are required to attend seminars given by faculty members, visitors, and graduate students. Students must submit reports of the seminars they attended. Each student is also required to present one seminar on a research topic. **Prerequisite: Completion of at least 9 credits.**

0405-595 MSc Project (0:6)

Students have to carry out an independent project work that involves formulating and solving an engineering problem under the direct supervision of a faculty member. The project has to be carried out over two semesters, typically during the final two semesters. Students are required to submit a written report and make an oral presentation of the project. **Prerequisite: Completion of at least 18 credits and 0405-591 Seminar.**

0405-599 MSc Thesis (0:15)

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. **Prerequisite: Completion of at least 12 credits and 0405-591 MSc Seminar.**

Contacts

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