

# MASTER OF ENGINEERING MANAGEMENT (ONLINE)

## Overview

### Summary

- Degree offered: Master of Engineering Management (MEM)
- Registration status options: Part-time
- Language of instruction: English
- Program option (expected duration of the program):
  - within two years of full-time study
- Academic units: Faculty of Engineering (<https://engineering.uottawa.ca/>), Telfer School of Management (<http://www.telfer.uottawa.ca/en/>).

## Program Description

The Engineering Management Program offers an online Master of Engineering-Management and a Graduate Diploma online Engineering Management. The program is supervised by a committee composed of representatives from the Telfer School of Management and of the Faculty of Engineering.

## Main Areas of Research

- Data analytics
- Production innovation management
- Technology project management
- Operations management

## Learning Outcomes

The objective of the Master of Engineering Management program is to develop the knowledge and skills of engineers and scientists in the management of people, projects, resources and organizations in technical environments.

## Admission Requirement

For the most accurate and up to date information on application deadlines, language tests and other admission requirements, please visit the specific requirements (<https://www.uottawa.ca/graduate-studies/programs-admission/apply/specific-requirements/>) webpage.

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- Robotics and manufacturing

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## Other Programs Offered Within the Same Discipline or in a Related Area

- Graduate Diploma Online Engineering Management

## Fees and Funding

- Program fees:

The estimated amount for university fees (<https://www.uottawa.ca/university-fees/>) associated with this program are available under the section Finance your studies (<http://www.uottawa.ca/graduate-studies/programs-admission/finance-studies/>).

International students enrolled in a French-language program of study may be eligible for a differential tuition fee exemption (<https://www.uottawa.ca/university-fees/differential-tuition-fee-exemption/>).

- To learn about possibilities for financing your graduate studies, consult the Awards and financial support (<https://www.uottawa.ca/graduate-studies/students/awards/>) section.

## Notes

- Programs are governed by the academic regulations (<http://www.uottawa.ca/graduate-studies/students/general-regulations/>) in effect for graduate studies.
- In accordance with the University of Ottawa regulation, students have the right to complete their assignments, examinations, research papers, and theses in French or in English.

Graduate Studies Office, Faculty of Engineering (<https://engineering.uottawa.ca/graduate-studies-office/>)

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## Program Requirements

Requirements for this program have been modified. Please consult the 2022-2023 calendars (<https://catalogue.uottawa.ca/en/archives/>) for the previous requirements.

## Master's with Coursework

To receive the Master of Engineering Management, a student enrolled in the program must successfully complete 30 units of academic work: 12 units of compulsory courses and 18 units of optional courses.

Students must meet the following requirements:

### Compulsory Courses:

MEM 5100	Introduction to Engineering Management	3 Units
MEM 5241	Principles of Accounting and Finance for Engineers	3 Units
MEM 5231	Principles of Management and Leadership for Engineers	3 Units
MEM 6260	Project Management	3 Units
18 optional course units from the list of optional courses		18 Units

## List of optional courses

DTO 6106	User Research and User Experience Principles and Practice	3 Units
DTO 6107	Interaction Design and Design Thinking	3 Units
MEM 5111	Creativity and Innovation	3 Units
MEM 5119	Project Information Management	3 Units
MEM 5120	Product Development and Management	3 Units
MEM 5121	Taguchi Methods for Engineering R D	3 Units
MEM 5122	Operational Excellence and Lean Six Sigma	3 Units
MEM 5265	Business Intelligence and Performance Management	3 Units
MEM 5280	Principles of Operations Management	3 Units
MEM 5300	Principles of Data Analytics	3 Units
MEM 6100	Complex Project Management	3 Units
MEM 6281	Supply Chain Management	3 Units
MEM 6285	Project Risk Management	3 Units
MEM 6287	Advanced Data Analytics	3 Units
MIA 5130	System optimization and management	3 Units
MIA 6160	Cyber Security Systems and Strategies	3 Units

## Research

### Research at the University of Ottawa

Located in the heart of Canada's capital, a few steps away from Parliament Hill, the University of Ottawa ranks among Canada's top 10 research universities. Our research is founded on excellence, relevance and impact and is conducted in a spirit of equity, diversity and inclusion.

Our research community thrives in four strategic areas:

- Creating a sustainable environment
- Advancing just societies

- Shaping the digital world
- Enabling lifelong health and wellness

From advancing healthcare solutions to tackling global challenges like climate change, the University of Ottawa's researchers are at the forefront of innovation, making significant contributions to society and beyond.

## Research at the Faculty of Engineering

Areas of research:

- Chemical and Biological Engineering
- Civil Engineering
- Electrical Engineering and Computer Science
- Mechanical Engineering

For more information, refer to the list of faculty members and their research fields on **Uniweb**.

**IMPORTANT: Candidates and students looking for professors to supervise their thesis or research project can also consult the website of the faculty or department (<https://www.uottawa.ca/study/graduate-studies/academic-unit-contact-information/>) of their program of choice. Uniweb does not list all professors authorized to supervise research projects at the University of Ottawa.**

## Courses

### MEM 5100 Introduction to Engineering Management (3 units)

Introduction to management and engineering management. The structure of engineering organizations. The importance of accounting and finance, interpersonal skills, decision-making under conditions of uncertainty. The legal, ethical, technological and global context of management decision-making. Planning and control in engineering management.

**Course Component:** Lecture

### MEM 5111 Creativity and Innovation (3 units)

Factors which enhance individual and group creativity in organizations and its translation into successful technological innovations. The invention/innovation process. Creative problem-solving techniques. Entrepreneurship. Organizational climate for stimulating invention. Management of research and development. Project selection. Elements of financial decision-making. Organization design for innovation.

**Course Component:** Lecture

### MEM 5119 Project Information Management (3 units)

Topics relating to the contractual relationship within the project team, including the different types of contracts and their application, the preparation of project documents, the evaluation of different types of project organization structures and associated project delivery systems, bidding strategies, network analysis using deterministic and stochastic methods for time and cost management.

**Course Component:** Lecture

### MEM 5120 Product Development and Management (3 units)

Product development and management, including engineering aspects of the process. The latest trends and practices, insight into processes which facilitate product management and development, understanding of product management and development practices via case studies, development of the leadership and management skills required to create, initiate, develop, bring to market and implement new technological products and services.

**Course Component:** Lecture

**MEM 5121 Taguchi Methods for Engineering R & D (3 units)**

The role of experiments in product innovation. Taguchi/Plackett-Burman methods for design of experiments. Analysis of means. Analysis of variance. Contrasts and multifactorial ANOVAs. Fractional factorial designs. A-priori and post hoc pooling, scree plots. Numerous application examples focused on engineering design.

**Course Component:** Lecture

**MEM 5122 Operational Excellence and Lean Six Sigma (3 units)**

Lean Six Sigma Green Belt tools and techniques, operational efficiency, waste and variability reduction, continuous improvement, the pursuit of perfection. DMAIC (define, measure, analyze, improve and control), process mapping, data collection and analysis, root cause problem solving, the cost of quality, mistake proofing, change management.

**Course Component:** Lecture

**MEM 5231 Principles of Management and Leadership for Engineers (3 units)**

The difference between management and leadership. Development of increased skills and understanding of participant preferences for the management of interpersonal and team-based issues and processes in a work environment. Special focus on diversity and ethics in a team environment. Effective business communications, including skills for delivery of high quality business presentations; exposure to common business software for inclusion in the student's professional toolbox.

**Course Component:** Lecture

**MEM 5241 Principles of Accounting and Finance for Engineers (3 units)**

The difference between accounting and finance. The role of the accounting function internal to the organization. A broad view of managerial accounting, introducing various costing systems, cost behaviour patterns, cost structures, budgeting and variances. The use of accounting for the evaluation of product, managerial and divisional performance thus helping students to understand what accounting can do for decision makers and how accounting choices affect decisions. Emphasis on the strategic importance of aligning accounting systems with firm technologies and goals. Financial management and the financial environment. Risk and rates of return. Discounted cash flow analysis and profitability indicators of potential capital investments.

**Course Component:** Lecture

**MEM 5265 Business Intelligence and Performance Management (3 units)**

Role of information in organizations. Overview of systems used to capture, transform and disseminate information to managers. Linkages between information and knowledge management. The process of knowledge creation and application within and among organizations. Business Intelligence (BI) as a concept. Business intelligence and performance management approaches at operational levels in the organization. Frameworks such as the Balanced Score Card and Quality Management will be covered. Review of major BI tools and methods. Identification of the right types of BI for different types of decision making environments.

**Course Component:** Lecture

**MEM 5280 Principles of Operations Management (3 units)**

Introductory course providing a broad knowledge in the field of operations in a realistic, meaningful and practical manner while explaining the different value-creation resources to any organization and how they form a solid operations framework. Operations Management (OM) is a subject that includes accounting, industrial engineering, management, supply chain management, purchasing, logistics, process engineering, manufacturing, product and service quality, and customer relationship management.

**Course Component:** Lecture

**MEM 5300 Principles of Data Analytics (3 units)**

Descriptive models, predictive models, evaluating and deploying models, and applications of such models in engineering such as smart manufacturing, intelligent transportation, intrusion/anomaly detection, heuristic optimization. Hands on experience with tools.

**Course Component:** Lecture

**MEM 6100 Complex Project Management (3 units)**

Complex projects such as major infrastructure projects, radical product innovations (e.g., autonomous vehicles), and radical operations and systems overhauls, tend to be large, tend to involve a great number of organizations, and tend to have very serious negative consequences if the project fails. As such, managing these kinds of projects requires elevated skill in systems thinking, partnership building, risk management, and information management. This course, with the aid of several case studies, demonstrates how recognition and management of these extra layers of complexity will contribute to project success.

**Course Component:** Lecture

**MEM 6260 Project Management (3 units)**

Project management methods based on standards, including the Guide to Project Management Body of Knowledge (PMBOK) of the Project Management Institute (PMI); project success and stakeholders; project charter and project plan; managing a project throughout its life cycle (identification, design, planning, realization and close-out). Projects that have incomplete and/or unstable requirements such as IT projects or software development projects. Topics covered include: portfolio management; risk management; determining requirements and solutions; quality management; communication management; design methods (Quality Function Deployment, Value Analysis); iterative and adaptive project management; fast tracking and concurrent methods of project management.

**Course Component:** Lecture

**MEM 6281 Supply Chain Management (3 units)**

Overview of supply chain management as a framework for analyzing operations management situations and as a basis for general management situations. Major elements of the supply chain. Leading edge thinking on supply chain strategy and practical tools and methods for its implementation.

**Course Component:** Lecture

**MEM 6285 Project Risk Management (3 units)**

The execution of complex projects in the context of a complex and changing environment demands expertise in risk management. This course is a comprehensive introduction to risk management definitions, concepts and principles, and their practical applications. Using real-life examples and case studies this course examines project risk management processes including risk identification, assessment, prioritization, risk management planning and auditing, and contingency plans.

**Course Component:** Lecture

**MEM 6287 Advanced Data Analytics (3 units)**

Fundamentals of Big Data as well as big database management (NoSQL) with applications in engineering and management. Review of the supporting technologies. AI concepts for advanced analytics with applications in engineering and management.

**Course Component:** Lecture