

MASTER OF ENGINEERING ENGINEERING MANAGEMENT

Summary

- Degree offered: Master of Engineering (MEng)
- Registration status options: Full-time; Part-time
- Language of instruction: English
- Program option (expected duration of the program):
 - within two years of full-time study
- For immigration purposes, the summer term (May to August) for this program is considered a regularly scheduled break approved by the University. Students should resume full-time studies in September.
- 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 a Master of Engineering in Engineering Management and a Graduate Diploma in 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

- Production and operations management
- Robotics and manufacturing management
- Reliability and maintainability engineering
- Human resource management, industrial and technology marketing
- Technical project management and control
- Research and development and innovation management
- Operation research
- Forecasting

Learning Outcomes

The objective of the Master of Engineering in 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.

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

- Graduate Diploma in 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 general 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.

Program Contact Information

Graduate Studies Office, Faculty of Engineering (<https://engineering.uottawa.ca/graduate-studies-office/>)
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Ottawa ON Canada
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Twitter | Faculty of Engineering (<https://twitter.com/uOttawaGenie/?lang=en>)

Facebook | Faculty of Engineer (<https://www.facebook.com/uottawa.engineering/>)

Admission Requirements

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.

To be eligible, candidates must:

- Have a Bachelor's degree with a specialization or a major (or equivalent) in a relevant discipline with a minimum admission average of 70% (B).

Note: International candidates must check the admission equivalencies (<https://www.uottawa.ca/graduate-studies/international/study-uottawa/admission-equivalencies/>) for the diploma they received in their country of origin.

- A minimum 2 years of experience and demonstrated proficiency in English are required.
- Students are responsible for having their own computers and a broadband connection to the Internet sufficient for videoconferencing

Language Requirements

Most courses are delivered in English as the international language for business and advanced technology. However, the program will provide an appropriately supportive environment for francophone students to develop professional competence in technical English at their own pace. Students have the right, as stipulated in the University's bilingualism regulations (Academic Regulations I-2), to complete all their work,

including their thesis, in the official language of their choice (French or English). There are fully bilingual professors and advisors who can support students in French.

Applicants whose first language is neither French nor English must provide proof of proficiency in the language of instruction through one of the following two requirements or one of the language tests below.

- Proof of completion within the last five years, of a previous degree program in an English language university.
- Proof of recent prolonged residence and exercise of a profession in an English speaking country (normally at least four years over the last six years).

Language tests recognized by the University of Ottawa:

- TOEFL minimum score of 600 (paper-based) with a minimum score of 50 on the written and 50 on the spoken or a minimum score of 100 (internet-based).
- IELTS minimum score of 7 for 3 of the 4 tests (Reading, Listening, Writing, Speaking) and a minimum score of 6 in the fourth test.
- A score of at least 14 on the CANTEST, with no individual test score below 4.0, along with a minimum score of 4.5 on the oral component of the test.

Note:

- Candidates are responsible for any fees associated with the language tests.
- Test scores cannot be more than two-years-old as of September 1 of the year of potential entry into the program.

Notes

- The admission requirements listed above are minimum requirements and do not guarantee admission to the program.
- Admissions are governed by the general regulations (<http://www.uottawa.ca/graduate-studies/students/general-regulations/>) in effect for graduate studies.
- Admission to the program is very competitive and preference will be given to candidates who have a few years of full-time work experience in engineering or a related field.

Transfer from the Diploma to the Master's Program

Students registered in the Graduate Diploma in Engineering Management may apply for transfer to the Master of Engineering degree in Engineering Management, obtain advanced standing for courses completed under the Graduate Diploma in Engineering Management, complete the remaining units, and finally obtain the Master of Engineering degree.

Students who have completed the Graduate Diploma in Engineering Management may apply for admission to the Master of Engineering in Engineering Management, obtain advanced standing for courses completed under the Graduate Diploma in Engineering Management, complete the remaining units, and obtain the Master of Engineering degree.

Advanced standing will not be granted for courses completed at other institutions under any circumstances.

Program Requirements Master's with Coursework

Requirements for this program have been modified. Please consult the 2023-2024 calendar (<https://catalogue.uottawa.ca/en/archives/>) for the previous requirements.

To receive the Master of Engineering in Engineering Management, a student enrolled in the program must successfully complete 30 units of academic work: 15 compulsory course units and 15 optional course units.

Students must meet the following requirements:

Compulsory Courses

15 compulsory course units from:	15 Units
EMP 5100 Introduction to Engineering Management	
EMP 5123 Business Case Development	
EMP 5235 Leadership Skills	
EMP 5241 Management Accounting	
EMP 5250 Introduction to Corporate Finance	
EMP 5320 Marketing	
EMP 6362 Project Management	

Optional Courses

9 optional course units from one primary Area of Expertise	9 Units
6 optional course units from the list of Industry Applications and/or from the other Area of Expertise that is not considered your primary Area	6 Units

List of Optional Courses - Area of Expertise

The 15 units of optional courses in the master's programs are chosen from four areas of expertise: data analysis, product innovation management, operations management, project management, as well as additional courses offered in areas of potential interest. Students are required to take 9 credits from one area of expertise and can choose 6 more credits from either other areas of expertise or from industry applications.

Graduate courses offered by the Faculty of Engineering and the Telfer School of Management (with the ADM designation) may be taken with the permission of the EMP program director and the academic units concerned. The description of each course is given in the section of the calendar of the academic unit offering them. Optional courses allow students to develop their knowledge in various fields.

It is the student's responsibility to verify that they satisfy the prerequisites and language requirements for the elective courses that they wish to take.

Data Analysis

ADM 6287	Business Intelligence Technologies and Big Data Analytics for DTI	1.5 Units
DTI 5126	Fundamentals for Applied Data Science	3 Units
DTI 5310	Ethics for Design, AI, and Robotics	3 Units
EMP 6277	E-Business Energy Management	1.5 Units
GNG 5125	Data Science Applications	3 Units
MBA 6300	Applied Data Science for Managers	3 Units

Product Innovation Management

DTI 5389	Electronic Commerce Technologies	3 Units
EMP 5111	Creativity and Innovation	3 Units
EMP 5120	Product Development and Management	3 Units
GNG 5140	Engineering Design	3 Units

Operations Management

EMP 5122	Operational Excellence and Lean Six Sigma	3 Units
EMP 5179	Manufacturing Systems Analysis	3 Units
EMP 5180	Operations Management	3 Units
EMP 5181	Supply Chain Management	3 Units

Project Management

EMP 5118	Technology Project Management Practice	3 Units
EMP 5119	Project Information Management	3 Units
EMP 5330	Managing Talent Organizations	3 Units
GNG 5131	Sales and Influence for Engineers	3 Units

List of Optional Courses - Industry Applications

Industry Applications

EMP 5101	Industrial Organization	3 Units
EMP 5117	Foundations of Software Engineering	3 Units
EMP 5124	Advanced Engineering Management Practicum	3 Units
EMP 5910	Directed Studies	3 Units
GNG 5301	Professional Skills and Responsibility	3 Units
GNG 5901	Industry Internship	
GNG 5902	Industry Project	6 Units

Minimum Requirements

Students who fail 6 units must withdraw from the program.

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

EMP 5100 Introduction to Engineering Management (3 units)

Introduction to management. The structure of engineering organizations. Planning and control in engineering management.

Course Component: Lecture

EMP 5101 Industrial Organization (3 units)

Principles of organization. Production process. Organization and planning of production. Planning and control in engineering management.

Course Component: Lecture

EMP 5102 Systems Engineering and Integration (3 units)

Introduction to modeling methods employed for the planning and design of subsystems and complex systems. System structure and modularity. System-human interfacing. System integration process. Configuration management. Reengineering. Reverse engineering. Concurrent engineering.

Course Component: Lecture

EMP 5103 Reliability, Quality and Safety Engineering (3 units)

Failure rate. Repair time. System reliability estimation. Maintainability. Statistical quality control. Statistical process control. Quality management. Life cycle management. Safety engineering issues.

Course Component: Lecture

EMP 5109 Topics in Engineering Management (3 units)

Current topics in industrial practice

Course Component: Lecture

EMP 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

EMP 5112 Tech. Policy and R. and D. Management (3 units)

Relationship between R & D and economic progress. Elements of the Canadian policy on technology; R & D activities in the private and public sectors; government incentives and support programs; comparison with the policies of other industrial countries. Technology planning and R & D management in a Canadian setting; technology forecasting, staffing, structure, strategy and support for R and D.

Course Component: Lecture

Prerequisite: MBA 5330. Courses EMP 5112, ADM 6263 or ADM 6264 cannot be combined for units.

EMP 5116 Issues in Management and Operation of Communication Networks (3 units)

Selected topics and emerging issues in management and operation of public and corporate communication networks: real-time and distributed systems; multimedia communications; integrated services network.

Course Component: Lecture

EMP 5117 Foundations of Software Engineering (3 units)

Foundations of software engineering for nonsoftware engineers; basic principles of software engineering; practical laboratories and programming examples using modern programming languages.

Course Component: Lecture

EMP 5118 Technology Project Management Practice (3 units)

Technological project management process. Project team management involving multiple technological and engineering experts. Configuration management during project development. Coordination of outsourcing in large multinational projects. Management of in-process change of technology.

Course Component: Lecture

EMP 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

EMP 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

EMP 5121 Taguchi methods for efficient Engineering R&D (3 units)

Two-level statistical experimental methods as applied to engineering design; analysis of means, analysis of variance, contrasts, multifactorial analysis of variance, fractional factorial design, screening designs, product variation and an introduction to the Taguchi approach.

Course Component: Lecture

EMP 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

The courses EMP 5122, GNG 5122 cannot be combined for credits.

EMP 5123 Business Case Development (1.5 unit)

This course on Business Case Development equips Master's students with essential skills for crafting compelling business cases, with a specific focus on leveraging core technology to strengthen proposals. A business case serves as a crucial tool for influencing stakeholders, selling ideas, and aligning organizational objectives. Understanding how to develop, write, and present a business case is essential for business professionals aiming to secure funding or gain management approval. Successful business cases must meet specific requirements, including solving business problems, making financial sense, outlining human resources, and fitting within the organizational context. Additionally, integrating core technology and addressing its protection and integration play pivotal roles in strengthening the case and gaining competitive advantage. Throughout the course, students will learn to identify stakeholders, conduct market and financial analyses, assess risks, and present persuasive arguments. They will also explore how integrating core technology can enhance the business case and align with organizational goals. By the course's conclusion, students will possess the expertise to develop well-structured business cases that drive informed decision-making within organizations, leveraging core technology to achieve strategic objectives.

Course Component: Lecture

EMP 5124 Advanced Engineering Management Practicum (3 units)

The Advanced Engineering Management Practicum draws from everything that you have learned in your program courses. It focuses on integrating different types of strategy – corporate, competitive, and functional – to create a coherent plan for organizational success. You will participate in the Green Business Lab simulation - a team-based simulation - where you will apply a variety of analytical approaches to formulate a strategy for a large global company in a complex environment and then align operations to effectively deliver on your intentions. In dynamic conditions, you will then react to different competitive moves and changing customer requirements under tight time constraints and in keeping with the program's focus on responsible management for sustainability. This will be a concentrated interactive laboratory designed to regularly assess the effectiveness of our planning, monitoring and adjusting of strategic direction and operational alignment to achieve responsible results (triple bottom line balancing financial, social and environmental outcomes). By the end of the seminar, students will be able to establish overall direction of an enterprise, line up operations to effectively realize intentions in a sustainable way and adjust in response to changes in the external environment.

Course Component: Lecture

EMP 5169 Advanced Topics in Reliability Engineering (3 units)

Overview of classical reliability concepts. Fault tree construction and evaluation. Common cause failure analysis of engineering systems. Human reliability modelling in engineering systems. Human unreliability data banks. Reliability of information and communication systems.

Course Component: Lecture

EMP 5179 Manufacturing Systems Analysis (3 units)

Introduction to manufacturing systems. Manufacturing system selection and cost justification. Analysis of manufacturing operations. Flexible and agile manufacturing. Group technology and cellular manufacturing. Transfer line and assembly line systems. Analysis of material transport and storage systems. Manufacturing Process Planning. Tolerance analysis and Taguchi methods. Design for manufacturing and assembly. Just-in-time production. Quality function deployment.

Course Component: Lecture

EMP 5180 Operations Management (3 units)

This introductory OM course provides broad knowledge in the operations field in a realistic, meaningful and practical way. Learn the different value-creation resources to any organization and how they form a solid operations framework. OM includes accounting, industrial engineering, management, supply chain management, purchasing, logistics, process engineering, manufacturing, product and service quality, and customer relationship management.

Course Component: Lecture

EMP 5181 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

EMP 5235 Leadership Skills (1.5 unit)

Power of self-awareness. Exercises for self-exploration. Interpersonal skills. Communication as essential to leadership. Strategies for leadership development. High performing teams and facilitating team process. Course delivery involves class discussions, experiential exercises, guest speakers and case studies.

Course Component: Lecture

The courses EMP 5235, MBA 5235 cannot be combined for units.

EMP 5241 Management Accounting (1.5 unit)

This course focuses on the role of the accounting function internal to the organization. It takes a broad view of managerial accounting, introducing students to various costing systems, cost behaviour patterns and cost structures. It demonstrates 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. Current issues in management accounting and internal reporting are discussed.

Course Component: Lecture

The courses EMP 5241, MBA 5241 cannot be combined for units.

EMP 5250 Introduction to Corporate Finance (1.5 unit)

Financial management and the financial environment. Risk and rates of return. Discounted cash flow analysis. Bond valuation, preferred share, common share and corporate valuation models.

Course Component: Lecture

The courses EMP 5250, MBA 5250 cannot be combined for units.

EMP 5320 Marketing (3 units)

Principles of market-driven managerial decision making: consumer, competitor, and company analysis, market segmentation, definition of target markets, and product positioning. Management of marketing function: product and pricing decisions, channels of distribution, marketing communications. Marketing as creating customer value and benefits to the organization and its stakeholders.

Course Component: Lecture

The courses EMP 5320, MBA 5320 cannot be combined for units.

EMP 5330 Managing Talent & Organizations (3 units)

The strategic advantage of designing effective organizations and talent management systems to achieve organizational outcomes. Topics include: job performance, organizational commitment, thriving workplaces, motivation, and team dynamics. Talent management processes to acquire, develop, and engage employees. Equity, diversity, and inclusion. Organizational culture, power and politics, and current topics related to talent management.

Course Component: Lecture

The courses EMP 5330, MBA 5330 cannot be combined for units.

EMP 5910 Études dirigées / Directed Studies (3 crédits / 3 units)

Étude approfondie dans un domaine de la gestion en ingénierie sous la supervision d'un professeur et donnant lieu à un rapport écrit. / Advanced study in an area of engineering management under the supervision of a professor and leading to a written report.

Volet / Course Component: Recherche / Research

Permission du Département est requise. / Permission of the Department is required.

EMP 6277 E-Business Energy Management (1.5 unit)

Reduction of e-business power requirements by locating data centres in areas with low cost electricity and where cold outside air can be used for cooling, e.g. British Columbia, Québec, Finland, Iceland and Sweden. Reduction of power requirements in other industries, e.g. using smart grid, smart buildings and smart cities. Calculation of energy requirements for specific e-business services, e.g. e-banking, e-newspapers, media download, media streaming and web-based advertising. Review of current international standardization work on sustainability for and by IT.

Course Component: Lecture

The courses ADM 6277, EMP 6277 cannot be combined for units.

EMP 6362 Project Management (3 units)

Introduction to project management. Project life cycle management overview (initiation, planning, execution, monitoring and control, and closure). Basic project management concepts, approaches, methods, tools and techniques. Topics covered include: identifying project needs and objectives; aligning projects with organizational strategy; managing stakeholder expectations; writing the project charter and the project plan; delivering projects; monitoring and control; understanding and measuring project success, delivering long-term and sustainable impacts.

Course Component: Lecture

The courses MBA 6362, EMP 6362 cannot be combined for units.