

# ENGINEERING MANAGEMENT (EMP)

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## Courses in engineering management (EMP) are offered by the Faculty of Engineering

### 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 units)**

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 units)**

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 units)**

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 units)**

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 and 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 Energy Sustainability in Business (1.5 units)**

This comprehensive course provides insights into how organizations can profile and manage their energy profile. In particular, there is a focus on integrating renewable energy, energy efficiency, conservation and the path to Net Zero Carbon and applying it to corporate strategy. Students will become familiar with the use of common energy-management frameworks and how to set goals, measure progress and write compelling energy business cases. Through real-world examples and interactive discussions, participants will gain an understanding of global energy challenges as defined by the United Nations Sustainable Development Goals (SDG) initiative.

**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.