

# ENGINEERING MANAGEMENT (EMP)

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## **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, Lecture

EMP 5100, EMP 5111, MBA 5241, MBA 5250, MBA 5235, ADM 6260 are corequisite to EMP 5101.

## **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, Lecture

EMP 5100, EMP 5111, MBA 5241, MBA 5250, MBA 5235, ADM 6260 are corequisite to EMP 5102.

## **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, Lecture

EMP 5100, EMP 5111, MBA 5241, MBA 5250, MBA 5235, ADM 6260 are corequisite to EMP 5103.

## **EMP 5109 Topics in Engineering Management (3 units)**

Current topics in industrial practice

**Course Component:** Lecture, Lecture

Corequisite: EMP 5100, EMP 5111, MBA 5241, MBA 5250, MBA 5235, ADM 6260

## **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, Lecture

EMP 5100, EMP 5111, MBA 5241, MBA 5250, MBA 5235, ADM 6260 are corequisite to EMP 5116.

## **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, Lecture

EMP 5100, EMP 5111, MBA 5241, MBA 5250, MBA 5235, ADM 6260 are corequisite to EMP 5117. Experience with programming in at least one common language over the last decade. Cannot count for units in CEG, CSI and SEG programs.

## **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 inprocess change of technology.

**Course Component:** Lecture, Lecture

EMP 5100, EMP 5111, MBA 5241, MBA 5250, MBA 5235, ADM 6260 are corequisite to EMP 5118.

## **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, Lecture

EMP 5100, EMP 5111, MBA 5241, MBA 5250, MBA 5235, ADM 6260 are corequisite to EMP 5119.

## **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, Lecture

EMP 5100, EMP 5111, MBA 5241, MBA 5250, MBA 5235, ADM 6260 are corequisite to EMP 5120.

## **EMP 5121 Planning of Experiments in Engineering Design (3 units)**

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

**Course Component:** Lecture, Lecture

EMP 5100, EMP 5111, MBA 5241, MBA 5250, MBA 5235, ADM 6260 are corequisite to EMP 5121.

**EMP 5169 Advanced Topics in Reliability Engineering (3 units)**

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

**Course Component:** Lecture, Lecture

EMP 5100, EMP 5111, MBA 5241, MBA 5250, MBA 5235, ADM 6260 are corequisite to EMP 5169.

**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, Lecture

EMP 5100, EMP 5111, MBA 5241, MBA 5250, MBA 5235, ADM 6260 are corequisite to EMP 5179.

**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, Recherche / Research  
Permission du Département est requise. / Permission of the Department is required.

**EMP 6997 Projet majeur en consultation / Major Consulting Project (6 crédits / 6 units)**

Projet obligatoire de 6 unités réalisé par équipes. Projet majeur de recherche appliquée visant à apporter une solution à un problème de gestion de l'ingénierie proposé par une organisation (compagnie privée, université ou entreprise en démarrage). Supervisé par un professeur, approuvé par le directeur de programme, requiert une proposition de projet, un rapport d'étape de recherche et d'analyse, une présentation finale et un rapport final incluant des recommandations. Noté S (satisfaisant) ou NS (non satisfaisant) par le superviseur et le représentant du client. / Compulsory 6 units team-based major applied research project to address a specific engineering management challenge posed by an organizational client (e.g., private company, university or incubator start-up). Supervised by a professor, approved by the program director, requiring a project proposal, an interim research and analysis report, a final presentation and a final report with recommendations. Graded S (satisfactory) or NS (not satisfactory) by both the supervisor and the client's representative.

**Volet / Course Component:** Recherche / Research

Prerequisite: EMP 5100, EMP 5111, MBA 5241, MBA 5250, MBA 5235, ADM 6260, and a further 6 units of program courses. Permission of the Department is required.