INTERNATIONAL THEMATIC CLUSTERS IN ENGINEERING

2026-2027

Add an expertise to your engineering training. Join us for our speciality courses taught in English, that build on Canadian and Polytechnique Montréal strengths in training and research. Become part of vibrant student community. Engage with local and other international students for an unforgettable experience in one of the best student cities in the world!

- **SOFTWARE & COMPUTING**
  Offered in both Fall and Winter terms
- **INDUSTRIAL & SYSTEMS ENGINEERING**
- **ENGINEERING PHYSICS & MATERIALS ENGINEERING**
- **ENERGY SYSTEMS**
- **SUSTAINABLE DEVELOPMENT**
- **SUSTAINABLE TRANSPORT**
- **EMERGING BIOMEDICAL TECHNOLOGIES**

FOR MORE INFORMATION
Internationaly Mobility Program:
etudiant.echange@polymtl.ca
Partnerships and quotas: point@polymtl.ca

POLYTECHNIQUE MONTREAL

Update | September 2025

SOFTWARE & COMPUTING

Offered in both Fall and Winter terms

Software and computer systems are ubiquitous in today's world, found in smartphones, vehicles, home devices, and every aspect of entertainment. This thematic cluster offers students the opportunity to advance their knowledge in many key areas of modern technology design, including AI and machine learning, software design and maintenance, software quality engineering, cloud computing and Internet of Things (IoT), cybersecurity, human-computer interaction, and more. Through a blend of coursework and hands-on practices, students will gain valuable skills relevant to today's evolving tech landscape, prepared for addressing the engineering, development, and research challenges of software and computer systems. Note that the following courses are advanced specialized courses destined for students in their final year of an engineering degree program or pursuing graduate studies in various fields.

Students must take 12 to 15 credits among the following :

FALL TERM

Human Centered Inquiry for Software and Computer Engineering
LOG6406E - 3 credits
DETAILS →

Release Engineering - Applications of Mining Software Repositories
LOG6307E - 3 credits
DETAILS →

Software Quality Engineering
LOG8371E - 3 credits
DETAILS →

Advanced Concepts of Cloud Computing
LOG8415E - 3 credits
DETAILS →

Software Architecture and Advanced Design
LOG8430E - 3 credits
DETAILS →

Model-Driven Software Engineering
LOG8505E - 3 credits
DETAILS →

Intelligent DevOps of Large-Scale Software Systems
LOG6309E - 3 credits
DETAILS →

Machine learning
INF8245AE- 4 credits
DETAILS →

Reinforcement Learning
INF8250AE - 4 credits
DETAILS →

Internet of Things Security
INF6953QE - 3 credits
DETAILS →

Directed Readings in Computer and Software
INF8900E - 3 credits
DETAILS →

Students must take 12 to 15 credits among the following :

WINTER TERM

Vehicular Networks
INF6400E - 3 credits
DETAILS →

Directed Readings in Computer and Software
INF8900E - 3 credits
DETAILS →

Advanced Concepts in Computer Security
INF6422E - 3 credits
DETAILS →

Swarm intelligence
INF6805E - 3 credits
DETAILS →

Digital Twin Engineering
LOG6310E - 3 credits
DETAILS →

FRENCH LANGUAGE COURSE - 3 credits
Exchange students have access to the Université de Montréal credited French language course offer. Detailed application procedure will be sent by email before the beginning of classes.
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INDUSTRIAL & SYSTEMS ENGINEERING

This cluster will appeal to students interested in industrial and systems engineering as well as Industry 4.0. The Department of Mathematics and Industrial Engineering houses Polytechnique Montréal's Industry 4.0 laboratory, and the faculty members teaching the five courses are members of this laboratory. Industrial engineering research at Polytechnique aims to provide training to address the full complexity of technological, economical, social, organizational and environmental issues by offering the opportunity to study in multidisciplinary fields. Note that the following courses are advanced specialized courses destined for students in their final years of an engineering degree program or who are currently pursuing graduate studies in various fields.

Students must take 12 to 15 credits among the following :

FALL TERM

Distributed Production and Logistics
IND6215E - 3 credits
DETAILS →

Industry 4.0: Concepts and Applications
IND6240E - 3 credits
DETAILS →

Techno-entrepreneurship
IND8137AE - 3 credits
DETAILS →

Analytics of Faults and Maintenance
IND8217E - 3 credits
DETAILS →

Industrial Safety
IND8841E - 3 credits
DETAILS →

Operations Research Tools for Engineering
MTH8414E - 3 credits
DETAILS →

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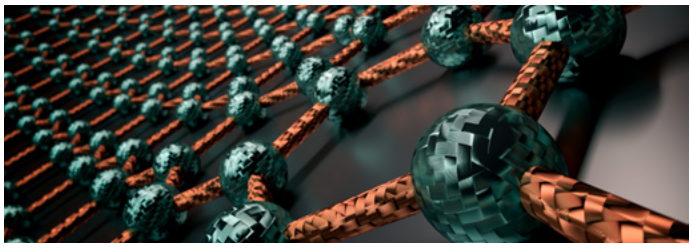
ENGINEERING PHYSICS & MATERIALS ENGINEERING



Engineering physics bridges the gap between physics and engineering by utilizing fundamental principles and phenomena for the development of radically new technologies solving outstanding challenges in the fields of energy, communications and processing, and biomedicine.

Students must take 12 to 15 credits among the following :

FALL TERM

Guided Waves in Photonics
PHS8205E - 3 credits
DETAILS →

Microfabrication
PHS8310E - 3 credits
DETAILS→

Direct Energy Conversion
PHS8604E - 3 credits
DETAILS →

Lasers
PHS8280E - 3 credits
DETAILS →

Quantum Optics
PHS8230E - 3 credits
DETAILS →

Polymer Processing Fundamentals
GCH8102E - 3 credits
DETAILS →

Physics of Biomedical Nanotechnology
PHS8810E - 3 credits
DETAILS →

FRENCH LANGUAGE COURSE - 3 credits
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ENERGY SYSTEMS

The Energy Systems Cluster at Polytechnique Montréal offers one of Canada's premier specializations in power and energy systems engineering, delivering a unique blend of academic excellence and industrial relevance. Our program benefits from internationally recognized faculty members specializing in power systems, smart grids, and renewable energy integration, supported by strong partnerships with major utilities and leading equipment manufacturers. The cluster leverages Polytechnique's research excellence in simulation technologies and grid modernization, while fostering international collaborations with renowned institutions worldwide.

The Energy Systems Cluster provides a solid foundation for both industry careers and advanced research opportunities in the rapidly evolving field of electrical power engineering. This program is particularly well-suited for final-year electrical or mechanical engineering students with a strong background in circuit theory and control systems.

Students must take 12 to 15 credits among the following :

FALL TERM

Microgrid Control
ELE6427E - 3 credits
DETAILS →

Power Electronics Systems
ELE8451E - 3 credits
DETAILS →

Electrical Networks
ELE8452E- 3 credits
DETAILS →

Electromechanical Systems
ELE8455E - 3 credits
DETAILS →

Modern Protection Methods
ELE8462E - 3 credits
DETAILS →

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SUSTAINABLE DEVELOPMENT

The Sustainable Development thematic cluster deals with the broad cross-disciplinary issues related to sustainability, with a particular emphasis on the social responsibility of engineers and working in a multidisciplinary environment. Concepts studied include lifecycle analysis, energy conversion, and circular flow, all of which are essential components of sustainable engineering. Note that the following courses are advanced specialized courses destined for students in their final years of an engineering degree program or who are currently pursuing graduate studies, all disciplines.

Students must take 12 to 15 credits among the following :

FALL TERM

Climate Change and Water Resources
CIV8330E - 3 credits
DETAILS →

Sustainable Development for Engineers
DDI8001E - 3 credits
DETAILS→

Life Cycle Analysis
DDI8003E - 3 credits
DETAILS →

Circular Economics
IND8111E - 3 credits
DETAILS →

Direct Energy Conversion
PHS8604E - 3 credits
DETAILS →

FRENCH LANGUAGE COURSE - 3 credits
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SUSTAINABLE TRANSPORT

Transport continues to be a major source of climate change emissions, health and wellbeing problems, as well as a large financial burden on individuals and society. At Polytechnique Montreal, we are dedicated to researching and teaching ways to address these issues through better planning, infrastructure and soft interventions such as improved information communication. The five dedicated professors internationally recognized for their work, including the Canada Research Chair on personal mobility, have a range of expertise including: travel behaviour, transport modeling, public transport planning, road safety, accessibility, future modes, health and wellbeing, and behaviour change. The courses offered here will give the student a range of tools to address sustainable transport problems. Note that the following courses are advanced specialized courses destined for students in their final years of an engineering degree program or who are currently pursuing graduate studies, all fields.

Students must take 12 to 15 credits among the following :

FALL TERM

Transport Systems
CIV2710E - 3 credits
DETAILS →

Transport, Society and Behaviour Change
CIV8710E - 3 credits
DETAILS →

Traffic Engineering
CIV8740E- 3 credits
DETAILS →

Sustainable Transport Planning
CIV8750E - 3 credits
DETAILS →

Transport Data Management
CIV8760E - 3 credits
DETAILS →

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EMERGING BIOMEDICAL TECHNOLOGIES

Polytechnique has become a hub of biomedical engineering activity, supported by an internationally recognized translational institute, TransMedTech, established academic programs at the undergraduate and graduate levels, a research alliance with Montréal hospital networks, and a critical mass of researchers. This cluster targets students looking to learn about and take part in emerging-technology development in the field of biomedical engineering. Note that the following courses are advanced specialized courses destined for students enrolled in their final years of a biomedical, computer, electrical, mechanical or physics engineering program.

Students must take 12 to 15 credits among the following :

FALL TERM

Neurotechnology and Neuroscience
GBM8321E - 3 credits
DETAILS →

Neuroprosthetics
GBM8322E - 3 credits
DETAILS→

Physical Principles of Advanced MRI Techniques
GBM8360E - 3 credits
DETAILS →

Biomedical Nanotechnologies
GBM8810E - 3 credits
DETAILS →

Physics of Biomedical nanotechnology
PHS8810E - 3 credits
DETAILS →

FRENCH LANGUAGE COURSE - 3 credits
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