



Master of science in Electromechanical Engineering

Focus Operations engineering and management

The 2024-2025 programme is subject to change. It is provided for information purposes only.

Programme mnemonic

MA-IREM

> Focus *Operations engineering and management* : M-IREMI

Exists also in

> Focus *Professional* : M-IREMR

Studies level

Master 120 credits

Learning language

english

Schedule

office hours

Studies category / subcategory

Sciences and technics / Sciences and technics

Campus

Other campus and Solbosch

Programme objectives

Aeronautics, automation, mechanical engineering and design, vibrations, robotics, electrical motors, renewable energy, transportation, piston engines, CAD, management, logistics, quality, etc. These are all examples showing that the majority of companies, whatever the sector they belong to, have a growing demand for engineers skilled in electrical, mechanical or electromechanical engineering. And this is why this programme has so many different facets. Students opting for the electromechanical engineering specialisation in their third block of the Bachelor course (block 3 of BA) can carry on and take a Master degree in electromechanical engineering, specialising in either management and technology or electro-mechanics. The latter, organised together with the VUB since 2011-2012, is taught in English and is part of the BRUFACE initiative.

Graduates of this programme benefit from a compromise between, on the one hand, important base training preparing

students for work in design and management and, on the other hand, a specialisation in a particular discipline.

A wide-ranging base curriculum opening the door to various options

The technology specialisation offered by the electromechanical engineering department is based on wide-ranging training backed up by various options.

Block 3 of BA and the first half of block 1 of MA constitute a common base, ensuring that students gain a firm understanding of electricity, electronics, automation, fluid mechanics, electrical and thermal machines and their associated calculation methods. These lead to the following MA2 options: aeronautics, mechatronic construction, energy and, last but not least, transportation.

A special case: the "Management and Technology" specialisation Students heading straight for a management career can opt in block 1 of MA for the "Management and Technology" specialisation. This is held jointly with the Solvay Brussels School of Economics and Management (SBS-EM). This Masters course has no particular prerequisites and can be taken whatever the option taken in block 3 of BA.

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Programme's added value

The projects, end-of-course dissertations, work placements, international exchanges

Looking at the electromechanical engineering specialisation, the block 3 of BA project only accounts for 2 ECTS, thereby hardly encroaching on the wide-ranging base curriculum. This is a CAD project, with either an electrical or mechanical dimension. Block 1 of MA also contains an individual project worth 5 ECTS (with the exception of teamwork-based development cooperation, Eco-Marathon and Robotics Cup projects). Students indicate their preferences, choosing from a large range of subjects with a technological dimension (mechanical, electrical or combined), before the department optimises which students are assigned to which projects. Students can also elect to lead groups of BA1 students, should they want to develop their organisation and leadership capabilities.

In Block 2 of MA, the end-of-course dissertation (worth 20 ECTS) is done in one of the electromechanical departments or in another department providing appropriate subjects, possibly in conjunction with an industrial company or with a Belgian or foreign research centre. The subjects suggested by the departments are closely connected to their research activities, and dissertations are therefore supervised by people full of motivation and wanting to see successful research results. Departments very often suggest subjects where a student will be in contact with a company directly interested in the results.

All Masters programmes in the electromechanical engineering field offer the opportunity of doing a 12-week work placement (11 weeks in the aeronautics sector). Supervised jointly by a company supervisor and a Faculty supervisor, work placements may be linked with the end-of-course dissertation. Work placements are done between the beginning of July and the end of October, with the exception of aeronautics placements which end in mid/late September. Students taking the Management and Technology specialisation choose between a mandatory placement and an international exchange.

As with the Faculty's other Master courses, the electromechanical engineering department allows student to take part in an international exchange programme for a term or a year, either in block 1 or 2 of MA. The one exception here is the Management and Technology specialisation, where the exchange must take place in Block 2 of MA. A further option is to take a twin degree, such as that offered by Sup'Aéro in Toulouse.

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Succeed in your studies

Choose

The information and guidance counsellors at the InfOR-études [<https://www.ulb.be/en/studies-info-desk-1>] service will help you choose your studies throughout the year.

Succeed

Take part in preparatory courses [<https://www.ulb.be/en/studies-info-desk-1>] or get help to succeed [<https://www.ulb.be/en/studies-info-desk-1>], before or during your studies.

Get help

Apply for financial aid, look for accommodation or a student job, get support [<https://www.ulb.be/fr/aides-services-et-accompagnement/aid-services-and-support-1>] for your specific needs.

Job opportunities

The advantages of this programme result from the compromise between, on the one hand, important base skills preparing engineers for work in design and management and, on the other hand, a specialisation in a particular discipline.

Electromechanical engineers will also find wide-ranging career opportunities in engineering companies, industry, public authorities, research and higher education, and in the services sector.

Though there are a large number of openings in companies in the area of process automation, computerised management, electricity, electronics, etc., the majority of companies in other sectors (chemicals, petrochemicals, metallurgy, etc.) also have a growing need for skilled and versatile electromechanical engineers.



Contacts

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 <https://polytech.ulb.be/fr/les-etudes/masters/electromecanique>



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Bloc 1 | M-IREMI | MA-IREM

Common courses - Block 1

- ELEC-H406** | **Electrical drives** | Johan GYSELINCK (Coordinator) and Omar HEGAZY
 5 credits [lecture: 24h, practical work: 36h] | second term | English
- MATH-H407** | **Control system design** | Emanuele GARONE (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 12h, practical work: 24h] | first term | English
- MECA-H402** | **Turbomachinery** | Patrick HENDRICK (Coordinator)
 3 credits [lecture: 24h, tutorial classes: 12h] | second term | English
- MECA-H409** | **Design methodology** | Alain DELCHAMBRE (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 24h, personal assignments: 12h] | first term | English
- MECA-H419** | **Data-Driven Engineering** | Alessandro PARENTE (Coordinator), Axel Coussement, Emanuele GARONE, Omar HEGAZY, Alassane Ballé NDIAYE and Mehrdad TERATANI
 4 credits [lecture: 36h, tutorial classes: 12h] | second term | English

Partially common courses - Block 1

Courses to choose

- CNST-H421** | **Structural analysis and finite elements** | Peter BERKE (Coordinator) and Lincy Pyl
 5 credits [lecture: 36h, tutorial classes: 24h] | first term | English
- MECA-H411** | **Mechanical Vibrations** | Arnaud DERAEMAERKER (Coordinator) and Wout Weijtjens
 5 credits [lecture: 36h, tutorial classes: 24h] | first term | English
- MECA-H420** | **Piston Engines** | Axel Coussement (Coordinator)
 3 credits [lecture: 26h, practical work: 8h] | first term | English


Optional courses

One course chosen from the following



- PROJ-H405** (optional) | **Project in Electromechanical Engineering** | Emanuele GARONE (Coordinator), Aurélie Bellemans, Svend Bram, Alain DELCHAMBRE, Johan GYSELINCK, Patrick HENDRICK, Pierre HENNEAUX, Joeri VAN MIERLO and Bram VANDERBORGHT
 5 credits [personal assignments: 150h] | first and second terms | English
- PROJ-H417** (optional) | **Projet coopération au développement / Development cooperation project** | Antoine NONCLERCQ (Coordinator)
 5 credits [project: 150h] | first and second terms | French
 Only on selection : see the Development Unit of the Polytechnic School of Brussels (<http://polytech.ulb.be/en/international/development-cooperation>)
- PROJ-H418** (optional) | **Hands-on learning: project manager (chef de projet)** | Peter BERKE (Coordinator)
 5 credits [project: 150h] | first and second terms | French
- PROJ-H420** (optional) | **Eco-marathon project** | Patrick HENDRICK (Coordinator) and Johan GYSELINCK
 5 credits [project: 150h] | first and second terms | English

Specific courses - Block 1

- GEST-H501** | **Logistics Engineering and Management** | Alassane Ballé NDIAYE (Coordinator)
 5 credits [lecture: 12h, tutorial classes: 36h] | first term | English

GEST-H502 [Supply Chain Performance Analytics](#) | Alassane Ballé NDIAYE (Coordinator)
5 credits [lecture: 12h, tutorial classes: 36h, personal assignments: 12h]  second term  English

INFO-H420 [Management of Data Science and Business Workflows](#) | Dimitrios SACHARIDIS (Coordinator)
5 credits [lecture: 24h, tutorial classes: 36h]  first term  English

STAT-S406 [Data management and business analytics](#) | Martine GEORGE (Coordinator)
5 credits [lecture: 36h, tutorial classes: 24h]  second term  English



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Bloc 2 | M-IREMI | MA-IREM

Partially common courses - Block 2

Courses to choose

- MATH-H503 **Model-Based and Data-Driven Fault Detection and Isolation** | Michel KINNAERT (Coordinator)
 4 credits [lecture: 24h, practical work: 24h] second term English
- MECA-H406 **Composite structures** | Patrick HENDRICK (Coordinator)
 3 credits [lecture: 18h, tutorial classes: 18h] second term English
- PHYS-H524 **Reliability and risk analysis of industrial installations** | Pierre-Etienne LABEAU (Coordinator)
 4 credits [lecture: 24h, tutorial classes: 18h, practical work: 6h] first term English

Master Thesis

- MEMO-H502 **Master thesis in Electromechanical Engineering** | Patrick HENDRICK (Coordinator), Aurélie Bellemans, Svend Bram, Alain DELCHAMBRE, Emanuele GARONE, Johan GYSELINCK, Pierre HENNEAUX, Joeri VAN MIERLO and Bram VANDERBORGHT
 24 credits [mfe/tfe: 600h] academic year English

Specific courses - Block 2

10 ECTS

A total of ten credits chosen from the following

- GEST-S421 (optional) **Entrepreneurial ecosystems** | Judith BEHRENS (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 24h] second term English
- GEST-S564 (optional) **Project management** | FREDERIC HOFFMANN (Coordinator)
 5 credits [seminars: 24h] second term English

Elective courses - Block 2

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A total of 15 credits chosen from the following

- GEST-H506 (optional) **Energy policy and management** | Pierre HENNEAUX (Coordinator), Adel EL Gammal and Benjamin GENET
 5 credits [lecture: 42h, practical work: 18h] first and second terms English
- GEST-S440 (optional) **Applied marketing analytics** | Sandra ROTHENBERGER (Coordinator) and Philippe MAUCHARD
 5 credits [lecture: 48h] second term English
- GEST-S448 (optional) **Organizational behaviour and leadership** | Claudia TOMA (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 24h] first term English

GEST-S471 (optional)	Management and sustainable development : constraints and opportunities Eric MONAMI (Coordinator) ⌚ 5 credits [lecture: 36h, seminars: 36h] 📅 second term 🗨 English
INFO-F422 (optional)	Statistical foundations of machine learning Gianluca BONTEMPI (Coordinator) ⌚ 5 credits [lecture: 24h, tutorial classes: 12h, project: 60h] 📅 second term 🗨 English
MATH-H510 (optional)	Risk-based methodologies for energy systems Pierre-Etienne LABEAU (Coordinator) and Pierre HENNEAUX ⌚ 4 credits [lecture: 24h, personal assignments: 24h] 📅 second term 🗨 English
STAG-H501 (optional)	Internship (60 days) Frédéric ROBERT (Coordinator) ⌚ 10 credits [personal assignments: 300h] 📅 first term 🗨 English

Free elective courses

Students have also the opportunity to choose courses among the courses of the 'transversal modules' of the School.

English : LANG-H500

Engineering and society : PROJ-H421 - GEST-H509 - BIME-G5505 - PHYS-F517

Sustainability : GEST-S492 - ENVI-F405 - CHIM-H504 - ENVI-F452 - ENVI-F454 - ELEC-Y514

Finance, accounting, management, marketing, logistics and quality : GEST-S101 - GEST-S318 - GEST-S421 - GEST-Y501 GEST-H501 - GEST-H502





Participation to a summer school : EDUC-H601

Free elective courses

Up to six credits chosen from the following

BIME-G5505 (optional)	Interfaculty and interdisciplinary program in Healthcare Innovation Hilde STEVENS (Coordinator) ⌚ 5 credits [lecture: 40h, tutorial classes: 20h] 📅 second term 🗨 English
CHIM-H504 (optional)	Engineering aspects of circular economy Prakash VENKATESAN (Coordinator) ⌚ 5 credits [lecture: 24h, practical work: 36h] 📅 second term 🗨 English
DROI-C5174 (optional)	Approche interdisciplinaire du droit de la propriété intellectuelle/Interdisciplinary Approach to In Julien CABAY (Coordinator) ⌚ 5 credits [lecture: 24h] 📅 first term 🗨 English/French
EDUC-H601 (optional)	Summer School Johan GYSELINCK (Coordinator) ⌚ 5 credits [personal assignments: 5h] 📅 academic year 🗨 English
ELEC-Y514 (optional)	Sustainability : an interdisciplinary Approach Cathy MACHARIS (Coordinator) and Waldo Galle ⌚ 6 credits [lecture: 36h, practical work: 24h, personal assignments: 100h] 📅 academic year 🗨 English
ENVI-F405 (optional)	Climat: sciences et politiques Frank PATTYN (Coordinator) and Louise Knops ⌚ 5 credits [lecture: 40h] 📅 second term 🗨 French
ENVI-F452 (optional)	Environmental impact analysis and management Wouter ACHTEN (Coordinator) ⌚ 5 credits [lecture: 24h, practical work: 12h, project: 24h] 📅 first term 🗨 English/French
ENVI-F454 (optional)	Energie: Société et environnement Michel HUART (Coordinator) and Nadine MATTIELLI ⌚ 5 credits [lecture: 30h, practical work: 12h, project: 24h] 📅 first term 🗨 French
GEST-H501 (optional)	Logistics Engineering and Management Alassane Ballé NDIAYE (Coordinator) ⌚ 5 credits [lecture: 12h, tutorial classes: 36h] 📅 first term 🗨 English
GEST-H502 (optional)	Supply Chain Performance Analytics Alassane Ballé NDIAYE (Coordinator) ⌚ 5 credits [lecture: 12h, tutorial classes: 36h, personal assignments: 12h] 📅 second term 🗨 English
GEST-H509 (optional)	Ethique de l'ingénieur ⌚ 3 credits [lecture: 12h, tutorial classes: 12h, practical work: 12h] 📅 second term 🗨 French
GEST-S101 (optional)	Comptabilité financière Laurent GHEERAERT (Coordinator) and Gilles GEVERS ⌚ 5 credits [lecture: 36h, tutorial classes: 8h] 📅 second term 🗨 French



- GEST-S318
(optional) **Introduction to theoretical finance** | Laurent GHEERAERT (Coordinator)
5 credits [lecture: 24h, tutorial classes: 24h]  second term  English
- GEST-S421
(optional) **Entrepreneurial ecosystems** | Judith BEHRENS (Coordinator)
5 credits [lecture: 24h, tutorial classes: 24h]  second term  English
- GEST-S492
(optional) **Energy policy, sustainability & management** | Adel EL Gammal (Coordinator), Julien BLONDEAU and Michel HUART
5 credits [lecture: 36h, seminars: 24h]  first term  English
- GEST-Y501
(optional) **Business Management and Entrepreneurship** | Marc GOLDCHSTEIN (Coordinator)
3 credits [lecture: 33h]  first term  English
- LANG-H500
(optional) **English for professional purposes** | Alexander CORNFORD (Coordinator)
5 credits [tutorial classes: 48h, personal assignments: 12h]  first and second terms  English
- PROJ-H421
(optional) **Projet polydaire: expériences didactiques innovantes pour le secondaire** | Simon-Pierre GORZA (Coordinator)
5 credits [project: 150h]  academic year  French