Master of science in Electromechanical Engineering

Focus Operations engineering and management

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

polytech@ulb.be

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 and Alassane Ballé NDIAYE
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 | Péter BERKE (Coordinator) and Lincy PYL
5 credits [lecture: 36h, tutorial classes: 24h] first term English

MECA-H411 Mechanical Vibrations | Arnaud DERAEMAEKER (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) | Péter 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) and Dirk Roosendans
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] first 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 Julien VANDEBURIE
5 credits [lecture: 40h] second term French

ENVI-F452 (optional) Environmental impact analysis and management | Wouter ACHTEN (Coordinator) and Edgar Towa Kouokam
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: 24h, tutorial classes: 24h, practical work: 12h] 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 | Gilles GEVERS (Coordinator) and Laurent GHEERAERT
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 and second terms 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