

Master of science in Electrical Engineering

Focus electronics and information technologies

The Master is defined around 4 axes:

- > Electronics and microelectronics
- > Telecommunication
- > Multimedia
- > Automatic control

Bloc 1 | M-IRELE | MA-IREL

Compulsory courses

- ELEC-H401 **Modulation and coding** | Francois HORLIN (Coordinator)
 ⌚ 5 credits [lecture: 36h, practical work: 24h] 📅 second term 🗨 English
- ELEC-H409 **Digital architectures and design** | Dragomir MILOJEVIC (Coordinator)
 ⌚ 4 credits [lecture: 12h, practical work: 36h] 📅 first term 🗨 English
- ELEC-H415 **Communication channels** | Philippe DE DONCKER (Coordinator)
 ⌚ 5 credits [lecture: 24h, tutorial classes: 36h, project: 12h] 📅 second term 🗨 English
- ELEC-H417 **Communication networks : protocols and architectures** | Jean-Michel DRICOT (Coordinator)
 ⌚ 5 credits [lecture: 36h, practical work: 24h] 📅 first term 🗨 English
- ELEC-H473 **Microprocessor architecture** | Dragomir MILOJEVIC (Coordinator)
 ⌚ 5 credits [lecture: 24h, practical work: 36h] 📅 second term 🗨 English
- ELEC-Y400 **Analog electronics** | Piet WAMBACQ (Coordinator)
 ⌚ 5 credits [lecture: 36h, tutorial classes: 24h] 📅 first term 🗨 English
- ELEC-Y412 **Image processing** | Adrian MUNTEANU (Coordinator)
 ⌚ 5 credits [lecture: 24h, tutorial classes: 18h, practical work: 30h] 📅 second term 🗨 English
- ELEC-Y413 **Signal theory** | Gert VANDERSTEEN (Coordinator)
 ⌚ 4 credits [lecture: 36h] 📅 first term 🗨 English
- ELEC-Y418 **Sensors and Microsystem electronics** | Maarten Kuijk (Coordinator)
 ⌚ 5 credits [lecture: 30h, tutorial classes: 30h] 📅 second term 🗨 English
- ELEC-Y430 **Digital signal processing** | Nicolaos DELIGIANNIS (Coordinator)
 ⌚ 4 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨 English
- ELEC-Y503 **Measurement and Data Driven Modelling** | John LATAIRE (Coordinator)
 ⌚ 4 credits [lecture: 24h, practical work: 24h] 📅 second term 🗨 English
- MATH-H407 **Control system design** | Emanuele GARONE (Coordinator)
 ⌚ 5 credits [lecture: 24h, tutorial classes: 12h, practical work: 24h] 📅 first term 🗨 English

One course chosen from the following

- ELEC-Y404 (optional) **Operating systems and security** | Bruno Tiago DA SILVA GOMES (Coordinator)
 ⌚ 4 credits [lecture: 12h, project: 90h] 📅 first and second terms 🗨 English
- PROJ-H415 (optional) **Project Electronics and Telecommunication** | Francois HORLIN (Coordinator)
 ⌚ 4 credits [project: 96h] 📅 academic year 🗨 English
- A choisir parmi :
- > Projet scientifique
 - > Chef d'équipe
 - > CODEPO
 - > ECO Marathon
 - > Plydaire

Master of science in Electrical Engineering

Focus electronics and information technologies

MA-IREL | M-IRELE | 2024-2025

Bloc 2 | M-IRELE | MA-IREL

Master Thesis (compulsory)

Master thesis

MEMO-H503

Master thesis in Electrical Engineering | Philippe DE DONCKER (Coordinator), Maarten Kuijk and Roger VOUNCKX

🕒 24 credits [mfe/tfe: 600h] 📅 academic year 🗨 English

Options - Block 2

An alternative chosen from the three following

Option nano, opto-electronics and embedded systems

ELEC-H505
(optional)

Advanced digital architecture | Dragomir MILOJEVIC (Coordinator) and Jan Tobias Mühlberg

🕒 5 credits [lecture: 24h, practical work: 36h] 📅 second term 🗨 English

ELEC-Y411
(optional)

High-frequency Electronics and Antenna | Yves ROLAIN (Coordinator) and Gert VANDERSTEEN

🕒 5 credits [lecture: 24h, tutorial classes: 18h, project: 36h] 📅 first term 🗨 English

ELEC-Y415
(optional)

Software and engineering for embedded systems | Bruno Tiago DA SILVA GOMES (Coordinator)

🕒 5 credits [lecture: 20h, tutorial classes: 10h, project: 60h] 📅 second term 🗨 English

ELEC-Y515
(optional)

Nano-Electronics Devices & Technologies | Bertrand Parvais (Coordinator) and Johan STIENS

🕒 5 credits [lecture: 30h, practical work: 30h] 📅 first term 🗨 English

ELEC-Y548
(optional)

Photonics | Francis BERGHMANS (Coordinator) and Hugo THIENPONT

🕒 4 credits [lecture: 36h] 📅 first term 🗨 English

or

Option information and communication technology systems

ELEC-H422
(optional)

Wireless communication channels | Philippe DE DONCKER (Coordinator)

🕒 4 credits [lecture: 24h, practical work: 24h] 📅 second term 🗨 English

ELEC-H423
(optional)

Mobile and wireless networks | Jean-Michel DRICOT (Coordinator)

🕒 4 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨 English

ELEC-H522
(optional)

Digital communications | Francois HORLIN (Coordinator)

🕒 4 credits [lecture: 24h, practical work: 24h] 📅 second term 🗨 English

ELEC-Y512
(optional)

Computer vision | David Blinder (Coordinator)

🕒 4 credits [lecture: 18h, tutorial classes: 12h, project: 36h] 📅 first term 🗨 English

ELEC-Y591
(optional)

Machine Learning and Big Data Processing | Nicolaos DELIGIANNIS (Coordinator) and Adrian MUNTEANU

🕒 5 credits [lecture: 24h, tutorial classes: 18h, project: 30h] 📅 second term 🗨 English

INFO-Y093
(optional)

Image and video technology | Peter SCHELKENS (Coordinator)

🕒 3 credits [lecture: 15h, tutorial classes: 30h] 📅 first term 🗨 English

or

Option measuring, modeling and control

- ELEC-H509
(optional) **Optimization-based Control Design** | Emanuele GARONE (Coordinator)
⌚ 4 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨 English
- ELEC-Y416
(optional) **Advanced Measurement and Data Driven Modeling** | John LATAIRE (Coordinator)
⌚ 4 credits [lecture: 24h, tutorial classes: 24h] 📅 first term 🗨 English
- ELEC-Y417
(optional) **Selected Topics in Nonlinear System Identification** | Yves ROLAIN (Coordinator) and Dries PEUMANS
⌚ 3 credits [lecture: 18h, project: 42h] 📅 first term 🗨 English
- ELEC-Y513
(optional) **Identification of dynamical systems** | John LATAIRE (Coordinator)
⌚ 5 credits [lecture: 18h, tutorial classes: 30h, project: 30h] 📅 first term 🗨 English
- ELEC-Y591
(optional) **Machine Learning and Big Data Processing** | Nicolaos DELIGIANNIS (Coordinator) and Adrian MUNTEANU
⌚ 5 credits [lecture: 24h, tutorial classes: 18h, project: 30h] 📅 second term 🗨 English
- MATH-H503
(optional) **Model-Based and Data-Driven Fault Detection and Isolation** | Michel KINNAERT (Coordinator)
⌚ 3 credits [lecture: 18h, practical work: 18h] 📅 second term 🗨 English

Electives MA2 including optional internships

A total of 12 credits chosen from the following

- ELEC-H503
(optional) **Artificial organs** | Antoine NONCLERCQ (Coordinator)
⌚ 5 credits [lecture: 24h, practical work: 36h] 📅 second term 🗨 English
- ELEC-H504
(optional) **Network Security** | Jean-Michel DRICOT (Coordinator)
⌚ 3 credits [lecture: 24h, practical work: 12h] 📅 second term 🗨 English
- ELEC-H507
(optional) **Photonic communication systems** | Simon-Pierre GORZA (Coordinator)
⌚ 5 credits [lecture: 36h, tutorial classes: 24h] 📅 first term 🗨 English
- ELEC-H550
(optional) **Embedded System Security** | Jan Tobias Mühlberg (Coordinator)
⌚ 5 credits [lecture: 24h, practical work: 36h] 📅 second term 🗨 English
- ELEC-Y516
(optional) **Lasers** | Guy VERSCHAFFELT (Coordinator) and Nathalie VERMEULEN
⌚ 4 credits [lecture: 36h, tutorial classes: 12h] 📅 first term 🗨 English
- ELEC-Y521
(optional) **Laboratories in Photonics Research** | Heidi OTTEVAERE (Coordinator), Nicolas Le Thomas and Wendy Meulebrouck
⌚ 6 credits [lecture: 8h, tutorial classes: 88h] 📅 second term 🗨 English
- ELEC-Y531
(optional) **Physical Communication** | Dries PEUMANS (Coordinator)
⌚ 6 credits [lecture: 30h, practical work: 60h] 📅 first term 🗨 English
- ELEC-Y532
(optional) **Telecommunication Networks** | Marnix GOOSSENS (Coordinator)
⌚ 3 credits [lecture: 24h] 📅 first term 🗨 English
- ELEC-Y535
(optional) **Capita Selecta Telecom** | Gert VANDERSTEEN (Coordinator) and Dries PEUMANS
⌚ 3 credits [lecture: 12h, practical work: 24h] 📅 second term 🗨 English
- ELEC-Y540
(optional) **Project Computer Engineering** | Bart JANSEN (Coordinator)
⌚ 3 credits [practical work: 36h] 📅 second term 🗨 English
- ELEC-Y541
(optional) **Multiprocessors and Reconfigurable Architectures** | Abdellah TOUHAFI (Coordinator) and Bruno Tiago DA SILVA GOMES
⌚ 3 credits [lecture: 18h, practical work: 18h] 📅 academic year 🗨 English
- ELEC-Y542
(optional) **CAE-tools for the Design of Analog Electronic Circuits** | Gert VANDERSTEEN (Coordinator)
⌚ 3 credits [lecture: 12h, practical work: 30h] 📅 first term 🗨 English



ELEC-Y543 (optional)	Industrial Measurement Environments Yves ROLAIN (Coordinator) ⌚ 4 credits [lecture: 30h, practical work: 12h] 📅 second term 🗨 English
ELEC-Y546 (optional)	Cryptography Ann DOOMS (Coordinator) ⌚ 3 credits [lecture: 18h, 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-Y500 (optional)	Entrepreneurship Nikolay DENTCHEV (Coordinator) ⌚ 3 credits [lecture: 15h, tutorial classes: 9h, personal assignments: 62h] 📅 first term 🗨 English
INFO-H422 (optional)	Theory of information coding computing and complexity Nicolas CERF (Coordinator) and Jérémie ROLAND ⌚ 5 credits [lecture: 48h, tutorial classes: 12h] 📅 second term 🗨 English
INFO-H501 (optional)	Pattern recognition and image analysis Olivier DEBEIR (Coordinator) and Christine DECAESTECKER ⌚ 5 credits [lecture: 36h, practical work: 24h] 📅 second term 🗨 English
INFO-H502 (optional)	Virtual Reality Gauthier LAFRUIT (Coordinator) ⌚ 5 credits [lecture: 24h, practical work: 24h, project: 12h] 📅 first term 🗨 English
INFO-Y095 (optional)	Voice, image coding, media and systems Gert VANDERSTEEN (Coordinator) and Leo VAN BIESEN ⌚ 6 credits [lecture: 42h, tutorial classes: 18h] 📅 first term 🗨 English
INFO-Y098 (optional)	Capita selecta multimedia Colas SCHRETTTER (Coordinator) ⌚ 3 credits [lecture: 24h] 📅 second term 🗨 English
INFO-Y575 (optional)	Cloud Artificial Intelligence Services Gert VANDERSTEEN (Coordinator) and Lesley De Cruz ⌚ 3 credits [lecture: 8h, tutorial classes: 20h, project: 30h] 📅 first and second terms 🗨 English
INFO-Y576 (optional)	Cloud Machine Learning Gert VANDERSTEEN (Coordinator) and Lesley De Cruz ⌚ 3 credits [lecture: 8h, tutorial classes: 30h, project: 30h] 📅 first and second terms 🗨 English
MECA-Y502 (optional)	Theory and Practice of Advanced Control Emanuele GARONE (Coordinator) and Michel KINNAERT ⌚ 4 credits [lecture: 24h, practical work: 24h] 📅 second term 🗨 English
PHYS-Y016 (optional)	Optical materials Jan DANCKAERT (Coordinator), Kristiaan Neyts and Guy VERSCHAFFELT ⌚ 6 credits [lecture: 30h, tutorial classes: 30h] 📅 first term 🗨 English
STAG-H501 (optional)	Internship (60 days) Frédéric ROBERT (Coordinator) ⌚ 10 credits [personal assignments: 300h] 📅 first term 🗨 English
STAG-H502 (optional)	Internship (40 days) Lincy Pyl (Coordinator) ⌚ 6 credits [personal assignments: 180h] 📅 first term 🗨 English

Modules transversaux

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

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) ⌚ 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

