

Master in cybersecurity

Focus Cryptanalysis and Forensics

The programme is organised around **five specific and complementary key disciplines**: (1) Cryptography, (2) Systems and Networks, (3) Legal, ethical, and human aspects, (3) Security management, and (5) Secure software engineering.

The **first year** of the Master is dedicated to a **common set of courses**. Several seminars and elective courses ensure the **curriculum is dynamic and remains up to date**. For instance, 10 credits can be chosen as **elective courses**, selected from courses already taught in the participating academic institutions.

In the second year, half of the programme's credits are for courses in one of **two focuses**: 'system design and analysis', which is dedicated to the design and thorough analysis of secure systems, and 'corporate strategies', which is dedicated to more concrete applications. Both focuses are built on the **students' personal involvement and self-learning, through several projects**. A significant part of the skills involved is acquired during the **mandatory long-term work placement in a professional environment** (typically 12 weeks).

Students take part in **projects and challenges** that further add to the expertise and practical know-how required in the IT industry. They apply the concepts covered in lectures, and learn new material by solving proposed challenges.

At the end of the programme, students prepare a **Master's dissertation** under the supervision of a professor who is an active researcher in the field.

Bloc 1 | M-SECUC | MA-SECU

Cours obligatoires

ELEC-H504	Network Security Jean-Michel DRICOT (Coordinator) ⌚ 5 credits [lecture: 24h, practical work: 12h] 📅 second term 🗨 English
ELEC-H550	Embedded System Security Jan Tobias Mühlberg (Coordinator) ⌚ 5 credits [lecture: 24h, practical work: 36h] 📅 first term 🗨 English
INFO-F514	Protocols, cryptanalysis and mathematical cryptology Christophe PETIT (Coordinator) ⌚ 5 credits [lecture: 24h] 📅 second term 🗨 English
INFO-Y023	Cryptography ⌚ 5 credits [lecture: 30h, tutorial classes: 15h] 📅 first term 🗨 English
INFO-Y024	Cloud computing ⌚ 5 credits [lecture: 30h, practical work: 15h] 📅 first term 🗨 English
INFO-Y025	Cybersecurity challenge ⌚ 5 credits 📅 academic year 🗨 English
INFO-Y111	Computer system security ⌚ 5 credits [lecture: 30h, tutorial classes: 15h] 📅 second term 🗨 English
INFO-Y112	Machine learning and data mining Katrien BEULS ⌚ 5 credits [lecture: 30h, practical work: 15h] 📅 first term 🗨 English
INFO-Y113	Management of security Thibault Debatty (Coordinator) and Wim Mees ⌚ 5 credits [lecture: 24h, practical work: 24h] 📅 second term 🗨 English
INFO-Y114	Legal aspects of IT security ⌚ 5 credits [lecture: 30h] 📅 first term 🗨 English
INFO-Y115	Secure software design and web security Romain ABSIL (Coordinator) ⌚ 5 credits [lecture: 30h, practical work: 20h] 📅 first term 🗨 English
INFO-Y124	Corporate information security Charles CUVELLIEZ (Coordinator) ⌚ 5 credits [lecture: 30h, practical work: 30h] 📅 second term 🗨 English

Master in cybersecurity

Focus Cryptanalysis and Forensics

Bloc 2 | M-SECUC | MA-SECU

Cours obligatoires

Module 1 - ULB

- ELEC-H423 **Mobile and wireless networks** | Jean-Michel DRICOT (Coordinator)
 5 credits [lecture: 36h, practical work: 24h] 📅 first term 🗨 English
- ELEC-H473 **Microprocessor architecture** | Dragomir MILOJEVIC (Coordinator) and Jan Tobias Mühlberg
 5 credits [lecture: 24h, practical work: 36h] 📅 second term 🗨 English
- INFO-Y119 **Forensics and reverse engineering** | Thibault Debatty (Coordinator)
 5 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨 English
- INFO-Y122 **Security Analysis: from audits to red teaming** | Jérôme DOSSOGNE (Coordinator)
 5 credits [lecture: 30h, practical work: 30h] 📅 first term 🗨 English
- MEMO-F001 **Master Thesis** | Jean-Michel DRICOT (Coordinator) and Olivier MARKOWITCH
 20 credits [mfe/tfe: 240h] 📅 academic year 🗨 French
- STAG-F009 **Security analysis internship** | Jean-Michel DRICOT (Coordinator) and Olivier MARKOWITCH
 10 credits [work placement: 120h] 📅 academic year 🗨 French

A total of ten credits chosen from the following

- GEST-S482 (optional) **The digital firm** | Nicolas VAN ZEEBROECK (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 24h] 📅 first term 🗨 English
- GEST-S706 (optional) **Entrepreneurship** | Olivier WITMEUR (Coordinator) and Ant BOZKAYA
 5 credits [lecture: 24h] 📅 second term 🗨 English
- INFO-F404 (optional) **Real-Time Operating Systems** | Joël GOOSSENS (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 12h, project: 30h] 📅 first term 🗨 English
- INFO-F409 (optional) **Learning dynamics** | Tom LENAERTS (Coordinator) and Ann NOWE
 5 credits [lecture: 24h, practical work: 24h, project: 60h] 📅 first term 🗨 English
- INFO-H415 (optional) **Advanced databases** | Esteban ZIMANYI (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 12h, practical work: 30h] 📅 first term 🗨 English
- INFO-H420 (optional) **Management of Data Science and Business Workflows** | Dimitrios SACHARIDIS (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 36h] 📅 first term 🗨 English
- INFO-H514 (optional) **Quantum information and computation I** | Ognyan Oreshkov (Coordinator)
 5 credits [lecture: 24h, tutorial classes: 24h] 📅 second term 🗨 English
- TEMP-0000 (optional) **Cours extérieurs au programme**
 5 credits 📅 academic year 🗨 French

Module 2 - UCLouvain

- MEMO-Y004 **Master thesis**
 20 credits [mfe/tfe: 240h] 📅 academic year 🗨 English

A total of 40 credits chosen from the following

- INFO-Y026 (optional) **Secure Electronic Circuits and Systems**
⌚ 5 credits [lecture: 30h, tutorial classes: 30h, work placement: 120h] 📅 second term 🗨 English
- INFO-Y027 (optional) **Privacy enhancing technologies**
⌚ 5 credits [lecture: 30h, tutorial classes: 30h] 📅 first term 🗨 English
- INFO-Y028 (optional) **Secured Systems Engineering**
⌚ 5 credits [lecture: 30h, tutorial classes: 15h] 📅 second term 🗨 English
- INFO-Y029 (optional) **Mining patterns in data**
⌚ 5 credits [lecture: 30h, tutorial classes: 15h] 📅 second term 🗨 English
- INFO-Y031 (optional) **Algorithms in data science**
⌚ 5 credits [lecture: 30h, tutorial classes: 22,5h] 📅 first term 🗨 English
- INFO-Y032 (optional) **Mobile and embedded computing**
⌚ 5 credits [lecture: 30h, tutorial classes: 15h] 📅 second term 🗨 English
- INFO-Y034 (optional) **Design of embedded and real time systems**
⌚ 5 credits [lecture: 30h, tutorial classes: 30h] 📅 second term 🗨 English
- INFO-Y035 (optional) **Architecture and performance of computer systems**
⌚ 5 credits [lecture: 30h, tutorial classes: 30h] 📅 first term 🗨 English
- INFO-Y042 (optional) **Information theory and coding**
⌚ 5 credits [lecture: 30h, tutorial classes: 15h] 📅 second term 🗨 English
- INFO-Y043 (optional) **Théorie des nombres**
⌚ 5 credits [lecture: 30h, tutorial classes: 15h] 📅 first term 🗨 French
- INFO-Y044 (optional) **Machine learning : regression, deep networks and dimensionality reduction**
⌚ 5 credits [lecture: 30h, tutorial classes: 30h] 📅 first term 🗨 English
- STAG-Y004 (optional) **Internship**
⌚ 10 credits [work placement: 120h] 📅 academic year 🗨 English
- TEMP-0000 (optional) **Cours extérieurs au programme**
⌚ 5 credits 📅 academic year 🗨 French

Module 3 - UNamur

- INFO-Y054 **Ethical aspects of IT and IT security**
⌚ 5 credits [lecture: 30h] 📅 second term 🗨 English
- INFO-Y056 **Data Analysis for cybersecurity**
⌚ 5 credits [lecture: 30h, tutorial classes: 15h] 📅 first term 🗨 English
- INFO-Y057 **Program Analysis for Cybersecurity**
⌚ 5 credits [lecture: 30h, tutorial classes: 15h] 📅 first term 🗨 English
- INFO-Y058 **Security of Applications | Romain ABSIL (Coordinator)**
⌚ 5 credits [lecture: 30h, tutorial classes: 30h] 📅 second term 🗨 English
- INFO-Y059 **Software Verification and validation**
⌚ 5 credits [lecture: 30h, tutorial classes: 15h] 📅 second term 🗨 English
- INFO-Y062 **Automated Software Engineering | Fanny Boraita Amador, Xavier DEVROEY, Amélie Notaro, Florentin ROCHET, Benoit Vanderose and Wim Vanhoof**
⌚ 5 credits [lecture: 30h, tutorial classes: 15h] 📅 second term 🗨 English
- MEMO-Y006 **Master Thesis**
⌚ 20 credits [mfe/tfe: 240h] 📅 academic year 🗨 English



STAG-Y005 **Internship**
🕒 10 credits [work placement: 120h] 📅 academic year 🗨 English

Module 4 - HE2B-HELB

INFO-Y063 **Organisation of Corporate Security**
🕒 5 credits [lecture: 30h, practical work: 30h] 📅 second term 🗨 English

INFO-Y119 **Forensics and reverse engineering** | Thibault Debatty (Coordinator)
🕒 5 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨 English

INFO-Y122 **Security Analysis: from audits to red teaming** | Jérôme DOSSOGNE (Coordinator)
🕒 10 credits [lecture: 60h, practical work: 60h] 📅 first term 🗨 English

INFO-Y123 **Human factors in information security** | Jérôme DOSSOGNE (Coordinator)
🕒 10 credits [lecture: 60h, practical work: 60h] 📅 first term 🗨 English

MEMO-Y007 **Master Thesis**
🕒 20 credits [mfe/tfe: 240h] 📅 academic year 🗨 English

STAG-Y006 **Internship** | Yasser El Jasouli (Coordinator)
🕒 10 credits [work placement: 120h] 📅 academic year 🗨 French