



# Master in cybersecurity

## Programme mnemonic

MA-SECU

- > Focus *Cryptanalysis and Forensics*: M-SECUC
- > Focus *Corporate Strategies*: M-SECUS
- > Focus *Erasmus Mundus joint master in Cybersecurity (CYBERUS)*: M-SECUM

## Studies level

Master 120 credits

## Learning language

english

## Schedule

office hours

## Studies category / subcategory

Sciences and technics / Sciences and technics

## Campus

Other campus, Plaine and Solbosch

## Programme objectives

The Master in Cybersecurity trains students who will act as **researchers and / or professionals in information security**, security management, and security engineering in the many branches of the IT industry.

We want our graduates to have a **strong sense of ethics** and to be fully autonomous, able to self-teach, dedicated to their role in society, self-evolving throughout their careers, and to have a **high level of qualification in IT security**.

Courses in this Master are offered by **four academic partners** (Université Libre de Bruxelles, Université Catholique de Louvain, Université de Namur, and the Royal Military School) and **two higher education institutions** (Haute École Bruxelles-Brabant and Haute École Libre de Bruxelles), which jointly deliver a **single diploma**; classes are given in a rich and multidisciplinary environment.

## Teaching methods

Students attend **interactive theoretical classes** and take part in **projects and challenges** that further add to the expertise and practical know-how required in the IT industry.

These projects will give students (**alone or in groups**) the opportunity to apply the concepts covered during the lectures, and to learn new material by solving proposed challenges.

Along with the practical implementation of these learning activities, students develop their **abilities (soft skills)** to write solid, scientific, and structured reports and documentation. In addition, they look into cybersecurity from the perspective of management and ethics.

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.

## 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.

## International/Openness

Many opportunities for a work placement or a study programme abroad (Erasmus exchange programme).

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Collaborations with the industry and other European universities is a strong point of this cursus.

## Job opportunities

Our students are active in a wide variety of domains, ranging from telecommunications, software industry, public

administrations, military, law enforcement, and banks, to national and international institutions.

Typical positions for cybersecurity experts are:

- > Chief Security Officer (CSO)
- > Law enforcement officer
- > Computer emergency response team member
- > Security architect
- > Network architect
- > Security analyst, consultant, and auditor
- > Forensics expert
- > Researcher

### Contacts

 <https://www.masterincybersecurity.eu>

### Jury Presidents

Thibault Debatty and Jean-Michel DRICOT

### Jury Secretaries

Jérôme DOSSOGNE and Olivier MARKOWITCH



# 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.

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## 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
- INFO-F307 **Génie logiciel et gestion de projets** | Frédéric PLUQUET (Coordinator)  
 ⌚ 5 credits [lecture: 24h, practical work: 7h, project: 89h] 📅 second term 🗨 French
- INFO-F309 **Administration de systèmes** | Sébastien COLLETTE (Coordinator)  
 ⌚ 5 credits [lecture: 24h, practical work: 24h, project: 30h] 📅 second term 🗨 French
- INFO-F405 **Introduction to cryptography** | Christophe PETIT (Coordinator) and Gilles VAN ASSCHE  
 ⌚ 5 credits [lecture: 24h, tutorial classes: 24h, project: 30h] 📅 first term 🗨 English
- INFO-F514 **Protocols, cryptanalysis and mathematical cryptology** | Olivier MARKOWITCH (Coordinator), Liran LERMAN and Christophe PETIT  
 ⌚ 5 credits [lecture: 24h] 📅 second term 🗨 English
- INFO-Y111 **Computer system security** | Ramin SADRE  
 ⌚ 5 credits [lecture: 30h, tutorial classes: 15h] 📅 second term
- INFO-Y112 **Machine learning and data mining** | Benoit FRENAY  
 ⌚ 5 credits [lecture: 30h, practical work: 15h] 📅 first term
- INFO-Y113 **Management of security** | Thibault Debatty (Coordinator) and Wim Mees  
 ⌚ 5 credits [lecture: 24h, practical work: 24h] 📅 second term
- INFO-Y114 **Legal aspects of IT security** | Amélie LACHAPELLE  
 ⌚ 5 credits [lecture: 30h] 📅 first term
- INFO-Y115 **Secure software design and web security** | Romain ABSIL (Coordinator)  
 ⌚ 5 credits [lecture: 30h, practical work: 20h] 📅 first term

### Cours à option - Electives (10 crédits)

- TEMP-0000 **Cours extérieurs au programme**  
 ⌚ 10 credits 📅 academic year 🗨 French

# Master in cybersecurity

## Focus Cryptanalysis and Forensics

### Bloc 2 | M-SECUC | MA-SECU

## Cours obligatoires

- ELEC-H423 **Mobile and wireless networks** | Jean-Michel DRICOT (Coordinator)  
5 credits [lecture: 36h, practical work: 24h] first term English
- INFO-Y116 **Aspects éthiques de l'informatique et de la sécurité informatique** | Marie-des-Neiges Ruffo (Coordinator)  
5 credits [lecture: 30h] second term
- MEMO-Y117 **Master thesis** | Thibault Debatty (Coordinator)  
20 credits [mfe/tfe: 240h] academic year

## Cours spécifiques

- INFO-Y118 **Mobile and embedded computing** | Ramin SADRE  
5 credits [lecture: 30h, tutorial classes: 30h] second term
- INFO-Y119 **Forensics and reverse engineering** | Thibault Debatty (Coordinator)  
5 credits [lecture: 24h, practical work: 24h] first term English
- INFO-Y120 **Data analysis for cybersecurity** | Bruno Dumas, Benoit FRENAY, Renaud Lambiotte and Florentin ROCHET  
5 credits [lecture: 30h, practical work: 15h] first term English
- INFO-Y121 **Privacy enhancing technologies** | Olivier POREIRA and François-Xavier STANDAERT  
5 credits [lecture: 30h, tutorial classes: 30h] first term
- STAG-F009 **Security analysis internship** | Jean-Michel DRICOT (Coordinator) and Olivier MARKOWITCH  
10 credits [work placement: 120h] first and second terms French

# Master in cybersecurity

## Focus Corporate Strategies

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.

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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-SECUS | MA-SECU

### Cours obligatoires

- ELEC-H504 **Network Security** | Jean-Michel DRICOT (Coordinator)  
 ⌚ 5 credits [lecture: 24h, practical work: 12h] 📅 second term 🗨 English
- INFO-F307 **Génie logiciel et gestion de projets** | Frédéric PLUQUET (Coordinator)  
 ⌚ 5 credits [lecture: 24h, practical work: 7h, project: 89h] 📅 second term 🗨 French
- INFO-F309 **Administration de systèmes** | Sébastien COLLETTE (Coordinator)  
 ⌚ 5 credits [lecture: 24h, practical work: 24h, project: 30h] 📅 second term 🗨 French
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 ⌚ 5 credits [lecture: 24h, practical work: 24h] 📅 second term
- INFO-Y114 **Legal aspects of IT security** | Amélie LACHAPELLE  
 ⌚ 5 credits [lecture: 30h] 📅 first term
- INFO-Y115 **Secure software design and web security** | Romain ABSIL (Coordinator)  
 ⌚ 5 credits [lecture: 30h, practical work: 20h] 📅 first term

### Cours à option - Electives (10 crédits)

- TEMP-0000 **Cours extérieurs au programme**  
 ⌚ 10 credits 📅 academic year 🗨 French

# Master in cybersecurity

## Focus Corporate Strategies

### Bloc 2 | M-SECUS | MA-SECU

## Cours obligatoires

- ELEC-H423 **Mobile and wireless networks** | Jean-Michel DRICOT (Coordinator)  
⌚ 5 credits [lecture: 36h, practical work: 24h] 📅 first term 🗨 English
- INFO-Y116 **Aspects éthiques de l'informatique et de la sécurité informatique** | Marie-des-Neiges Ruffo (Coordinator)  
⌚ 5 credits [lecture: 30h] 📅 second term
- MEMO-Y117 **Master thesis** | Thibault Debatty (Coordinator)  
⌚ 20 credits [mfe/tfe: 240h] 📅 academic year

## Cours spécifiques

- INFO-Y122 **Security Analysis: from audits to red teaming** | Jérôme DOSSOGNE (Coordinator)  
⌚ 5 credits [lecture: 30h, practical work: 30h] 📅 first term
- INFO-Y123 **Human factors in information security** | Jérôme DOSSOGNE (Coordinator)  
⌚ 10 credits [lecture: 60h, practical work: 60h] 📅 first term 🗨 English
- INFO-Y124 **Corporate information security** | Charles CUVELLIEZ (Coordinator)  
⌚ 5 credits [lecture: 30h, practical work: 30h] 📅 second term
- STAG-F010 **Internship in Cybersecurity** | Yasser El Jasouli (Coordinator)  
⌚ 10 credits [work placement: 120h] 📅 first and second terms 🗨 French

# Master in cybersecurity

## Focus Erasmus Mundus joint master in Cybersecurity (CYBERUS)

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.

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### Bloc 1 | M-SECUM | MA-SECU

The first year is to be followed at Université de Bretagne Sud (UBS).

HULB-0000

[Cours externe à l'Université](#)

🕒 60 credits 📅 academic year

# Master in cybersecurity

## Focus Erasmus Mundus joint master in Cybersecurity (CYBERUS)

### Bloc 2 | M-SECUM | MA-SECU

## Cours obligatoires

- ELEC-H423 **Mobile and wireless networks** | Jean-Michel DRICOT (Coordinator)  
 ⌚ 5 credits [lecture: 36h, practical work: 24h] 📅 first term 🗨 English
- ELEC-H550 **Embedded System Security** | Jan Tobias Mühlberg (Coordinator)  
 ⌚ 5 credits [lecture: 24h, practical work: 36h] 📅 first term 🗨 English
- INFO-F536 **Current issues in European digital security** | Olivier MARKOWITCH (Coordinator) and Jean-Michel DRICOT  
 ⌚ 5 credits [seminars: 12h] 📅 first term 🗨 English
- INFO-F537 **Cryptanalysis** | Gilles VAN ASSCHE (Coordinator)  
 ⌚ 5 credits [lecture: 36h] 📅 first term 🗨 English
- INFO-Y119 **Forensics and reverse engineering** | Thibault Debatty (Coordinator)  
 ⌚ 5 credits [lecture: 24h, practical work: 24h] 📅 first term 🗨 English
- MEMO-F543 **Master thesis and internship in cybersecurity** | Olivier MARKOWITCH (Coordinator) and Jean-Michel DRICOT  
 ⌚ 30 credits [work placement: 120h, mfe/tfe: 240h] 📅 second term 🗨 English

## Cours à options

Ou tout autre cours de MASTER avec l'accord du titulaire et du président de jury

*One course chosen from the following*

- GEST-S482 **The digital firm** | Nicolas VAN ZEEBROECK (Coordinator) and Vincent LION  
 (optional) ⌚ 5 credits [lecture: 36h, tutorial classes: 24h] 📅 first term 🗨 English
- GEST-S706 **Entrepreneurship** | Olivier WITMEUR (Coordinator) and Ant BOZKAYA  
 (optional) ⌚ 5 credits [lecture: 24h] 📅 second term 🗨 English
- INFO-F409 **Learning dynamics** | Tom LENAERTS (Coordinator)  
 (optional) ⌚ 5 credits [lecture: 24h, project: 60h] 📅 first term 🗨 English
- INFO-H415 **Advanced databases** | Esteban ZIMANYI (Coordinator)  
 (optional) ⌚ 5 credits [lecture: 24h, tutorial classes: 24h, practical work: 12h] 📅 first term 🗨 English
- INFO-H420 **Management of Data Science and Business Workflows** | Dimitrios SACHARIDIS (Coordinator)  
 (optional) ⌚ 5 credits [lecture: 24h, tutorial classes: 36h] 📅 first term 🗨 English
- INFO-Y082 **Distributed and mobile programming paradigms** | Elisa GONZALEZ BOIX  
 (optional) ⌚ 6 credits [lecture: 26h, tutorial classes: 26h, project: 30h] 📅 first term 🗨 English
- INFO-Y115 **Secure software design and web security** | Romain ABSIL (Coordinator)  
 (optional) ⌚ 5 credits [lecture: 30h, practical work: 20h] 📅 first term

*One course chosen from the following*



TEMP-0000  
(optional)

**Cours extérieurs au programme**

🕒 5 credits 📅 academic year 🗨️ French

TEMP-0000  
(optional)

**Cours extérieurs au programme**

🕒 10 credits 📅 academic year 🗨️ French

TEMP-0000  
(optional)

**Cours extérieurs au programme**

🕒 15 credits 📅 academic year 🗨️ French

