

Cybersecurity

This micro-credential is designed for: students

University: L'X
Prerequisites: The primary prerequisite is to be curious and motivated. Additionally, any “introduction to computer programming” course is strongly recommended.

Description

Societal developments and increased reliance on digital infrastructures bring evident, yet important, challenges, first among those is that: The infrastructure has to be reliably and securely available from everywhere and at any time. It is with this in mind that this micro-credential proposes students an initiation to the technical side of the field “Cybersecurity”, with a specific emphasis of “Network Security”.

Micro-credential elements

To obtain this micro-credential, you need to successfully complete the following elements:

- Element 1: Network Security
- Element 2: Cybersecurity — the Hacker eXperience
- Element 3: Computer Networking & Distributed Applications

For detailed information about the elements, please see the following page(s).

General information

Total workload: 124.5 + personal work (in hours for the whole course)
Total ECTS credits: 14

Registration

To register for this micro-credential, follow the registration requirements of the corresponding university as specified here (“How do I sign up”): www.euroteq.eu/microcredentials-registration.

Administration

Number of places: 24-30

Minimum participants:

Contact: Thomas.Clausen@polytechnique.edu

Information on micro-credential elements

Element 1: Network Security

Subject area: Computer Science/ICT

Teaching mode: completely online, no specific time (asynchronous)

Instructor(s): Thomas Heide Clausen

Description

Threats and attacks are like living organisms: some survive unaltered but remain deadly when conditions are “just right”; others emerge quickly then become extinct. A network professional cannot be limited to just static application of risk assessment methodology, nor to mechanical application intrusion tools but must also understand the whole processes, technologies and theories involved in attacks.

Full description

<https://synapses.polytechnique.fr/catalogue/2021-2022/ue/627/INF586-secureite-des-reseaux?from=P1272>

Learning outcomes

Through this course, the students will not just understand understand “This is an attack, and here is how to detect it”, but also to understand “What architectural choices have made this attack even possible?”. This, so as to ensure that graduates can:

Go beyond just mechanically replicating recipes from a catalogue for “evaluation-detection-countermeasures”

When developing a system, make appropriate, security-informed, architectural choices

Distinguish between “science-facts”and “science-fiction”, when listening to security solution vendors, reading popular press, etc.

Understand, analyse, and exercise critical appreciation of, the panorama of current known techniques for: Risk Evaluation; Systems and Network Protection; Intrusion Detection; Forensics and Recover;

Practice setting up secure networks, including the usage of techniques such as VLANs, VPNs, DMZs, IDSes (Snort, Suricata), Firewalls, etc.

General information

Contact hours per week: 2 hours

Total workload: 40 hours + personal work (in hours for the whole course)

ECTS credits: 5

Course start date: 01/09/2022

Course end date: 03/06/2023

Weekly teaching day/time: The course will be available asynchronously, fully on-line, or on-site, through learning flows with short videos, quizzes, homework, lab exercises / tutorials — as well as office-hours via Webex with professors and instructors. While being asynchronous, each student is expected to check in with an instructor over Webex, weekly, following the chosen start-date.

Time zone: CET (Denmark, Germany, France, Netherlands, Switzerland, Czech Republic)

Further information: Individualised starting date, it can be any date, between Sept. 1, 2022 and April 1, 2023. Please note that the intended start-date must be communicated to Ecole Polytechnique at the time of registration. The course end date should be exactly 10 weeks after the start-date.

Interested EuroTeQ students are welcome to, at any time, to come discuss their course choices in chat, or in visio, with the instructors from Ecole Polytechnique who will be teaching the classes. To this end, a dedicated WebEx space is permanently available here: <https://eurl.io/#fCk0f6iWF>.

Activities and methods: Lab work, Online videos, Self-study, Exercises

Presence on campus:

Final examination

Form: written

Date:

Location/format: online

Add. info/requirements: Final exam, weekly quizzes, graded assignments

Administration

Internal course code: INF586

Element 2: Cybersecurity — the Hacker eXperience

Subject area: Computer Science/ICT

Teaching mode: completely online, no specific time (asynchronous)

Instructor(s): Thomas Heide Clausen

Description

As anybody, familiar with 1970s sitcoms can confirm, Mel, the cook on Alice used to say: “the best defence is a good offence”. In cybersecurity, a similar saying would be that in order to know how to secure something, one needs first to know how to compromise & break it. This MODAL will exercise exactly that. Through a set of lessons, tutorials, and challenges, we will understand — and try out — how to “break things”.

Full description

<https://synapses.polytechnique.fr/catalogue/2021-2022/ue/2263/INF473X-computer-science-modal-cybersecurity-the-hacking-xperience?from=D1>

Learning outcomes

The course will provide students with an abstract "programmers overview of computer network principles and architectures", and will cover topics such as:

How does the Net Work?

Network Programming

Network Configuration

Components of a Computer Network

The Domain Name System

NAT, NAPT, ...

The lab exercises will, additionally, give students practical experiences in computer networking - in particular, but not exclusively, in how to write programs that communicate over the network.

General information

Contact hours per week: 4 hours

Total workload: 60 hours + personal work (in hours for the whole course)

ECTS credits: 6

Course start date:	01/09/2022
Course end date:	03/06/2023
Weekly teaching day/time:	While being asynchronous, each student is expected to check in with an instructor over Webex, weekly, following the chosen start-date.
Time zone:	CET (Denmark, Germany, France, Netherlands, Switzerland, Czech Republic)
Further information:	Individualised starting date, it can be any date, between Sept. 1, 2022 and April 1, 2023. Please note that the intended start-date must be communicated to Ecole Polytechnique at the time of registration. The course end date should be exactly 10 weeks after the start-date. Interested EuroTeQ students are welcome to, at any time, to come discuss their course choices in chat, or in visio, with the instructors from Ecole Polytechnique who will be teaching the classes. To this end, a dedicated WebEx space is permanently available here: https://eurl.io/#fCk0f6iWF .

Activities and methods: Lab work, Online videos, Self-study, Exercises

Presence on campus:

Final examination

Form: continuous assessment

Date:

Location/format: online

Add. info/requirements: The course will be available asynchronously, fully on-line, or on-site, through learning flows with short videos, quizzes, homework, lab exercises / tutorials — as well as office-hours via Webex with professors and instructors.

Administration

Internal course code: INF473X

Element 3: Computer Networking & Distributed Applications

Subject area: Computer Science/ICT

Teaching mode: completely online, no specific time (asynchronous)

Instructor(s): Thomas Heide Clausen

Description

This course will introduce students to the architectures, theory, and practice required for implementing communicating, Internet-connected, systems — as well as provide students with the necessary understanding of “how the Internet Works”. The course will be available asynchronously, fully on-line, or on-site, through learning flows with short videos, quizzes, homework, lab exercises.

Full description

<https://synapses.polytechnique.fr/catalogue/2020-2021/ue/50/CSE207-introduction-to-networks?from=D12>

Learning outcomes

The course will provide students with an abstract "programmers overview of computer network principles and architectures", and will cover topics such as:

How does the Net Work?

Network Programming

Network Configuration

Components of a Computer Network

The Domain Name System

NAT, NAPT, ...

The lab exercises will, additionally, give students practical experiences in computer networking - in particular, but not exclusively, in how to write programs that communicate over the network.

General information

Contact hours per week: 2 hours

Total workload: 24,5 hours + personal work (in hours for the whole course)

ECTS credits: 3

Course start date: 01/09/2022

Course end date: 03/06/2023

Weekly teaching day/time: The course will be available asynchronously, fully on-line, or on-site, through learning flows with short videos, quizzes, homework, lab exercises / tutorials — as well as office-hours via Webex with professors

and instructors. While being asynchronous, each student is expected to check in with an instructor over Webex, weekly, following the chosen start-date.

Time zone: CET (Denmark, Germany, France, Netherlands, Switzerland, Czech Republic)

Further information: Individualised starting date, it can be any date, between Sept. 1, 2022 and April 1, 2023. Please note that the intended start-date must be communicated to Ecole Polytechnique at the time of registration. The course end date should be exactly 10 weeks after the start-date. Interested EuroTeQ students are welcome to, at any time, to come discuss their course choices in chat, or in visio, with the instructors from Ecole Polytechnique who will be teaching the classes. To this end, a dedicated WebEx space is permanently available here: <https://eurl.io/#fCk0f6iWF>.

Activities and methods: Online videos

Presence on campus:

Final examination

Form: written

Date:

Location/format: online

Add. info/requirements: Final exam, weekly quizzes, graded assignments.

Administration

Internal course code: CSE207

This course is a micro-credential developed by EuroTeQ Engineering University, a collaborative activity of the partner universities DTU, L'X, TU/e, TalTech, CTU and TUM. It is the responsibility of the participant to check if you fulfil the requirements to participate in a specific course, as specified in the description. When the course is completed successfully, participants will be awarded the EuroTeQ micro-credential, evidencing the learning outcomes. For further information about EuroTeQ Engineering University, visit www.euroteq.eu or get in touch with the above-mentioned point of contact.