

Cybersecurity — the Hacker eXperience

Subject area: Computer Science/ICT

University: L'X
Level: BA all years, MA1, MA2
Teaching mode: completely online, not time-specific
Instructor(s): Thomas Heide Clausen

Short 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

Through a set of video lessons, tutorials, and challenges, we will understand — and try out — how to “break things”. This may include topics such as:

- TCP Connection Hi-jacking & SYN flooding
- SQL Injection attacks on WWW servers
- Heartbleed - that SSL-bug that caused the whole Internet to flip out
- DNS Cache Poisoning

...

The practical part of this course consists of a set of tutorials and a set of challenges.

-Tutorials: serve to help students who need them acquire a certain set of skills. Each tutorial requires a submission of some code, which will be evaluated, and a grade (0-5) will be awarded.

-Challenges: each represent "a thing to hack", such as DNS, or TCP, or DHCP, or invoking a buffer overflow, or performing a man-in-the-middle attack, or ... Challenges will each have an explanation, and supporting material, for what is expected - but will require independent thinking. Each challenge requires a submission of some code, which will be evaluated, and a grade (0-10) will be awarded. Note that a code submission which "does the job, nothing more, nothing less" will be graded 5. Grades in the interval (5-10) reflect an additional effort, such as highly modular code, flexible, robust, or supporting different attack approaches.

The course will be available asynchronously, fully on-line, or on-site, through learning flows with short videos, quizzes, homework, lab exercises.

Learning outcomes

The course provides students with a solid understanding in C programming, and a first experience in how to seek out (and exploit) vulnerabilities in Internet protocols and applications.

General information

Contact hours per week:	6 hours
Total workload:	60 hours + personal work (in student hours for the whole course)
ECTS credits:	6
Language:	English
Course start date:	03 January 2023
Course end date:	03 June 2023
Add. info about start date:	Individualised, can be any date, between Jan 3 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.
Weekly teaching day/time:	Available fully asynchronous
Time zone:	CET (Denmark, Germany, France, Netherlands, Switzerland, Czech Republic)
Further information:	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 .
Prerequisites:	Any “introduction to computer programming” course
Activities and methods:	The course will be available asynchronously, fully on-line, or on-side, 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.
Presence on campus:	no

Final examination

Form:	Continuous assessment
Date:	
Location/format:	online

Re-sit possibility: no
Transcript available: end of the semester and generally 8 weeks after the exam.
Add. info/requirements:

Registration

To register for this course, follow the registration requirements of your **home university** as specified here: www.euroteq.eu/courses-registration.

Administration

Number of places: 24-30
Minimum participants:
Internal course code:
Contact: euroteq-mobility@polytechnique.fr

This course is part of the EuroTeQ Engineering University joint course catalogue 2023. This is a collaborative activity of the partner universities DTU, L'X, TU/e, TalTech, CTU, TUM as well as Technion. Students from these universities can participate in the offered courses. It is the responsibility of the student to check if you fulfil the requirements to participate in a specific course. Students are also advised to check with their home institution how to get recognition of the ECTS credits gained in courses of the EuroTeQ course catalogue. For further information about EuroTeQ Engineering University, visit www.euroteq.eu or get in touch with the above-mentioned point of contact.