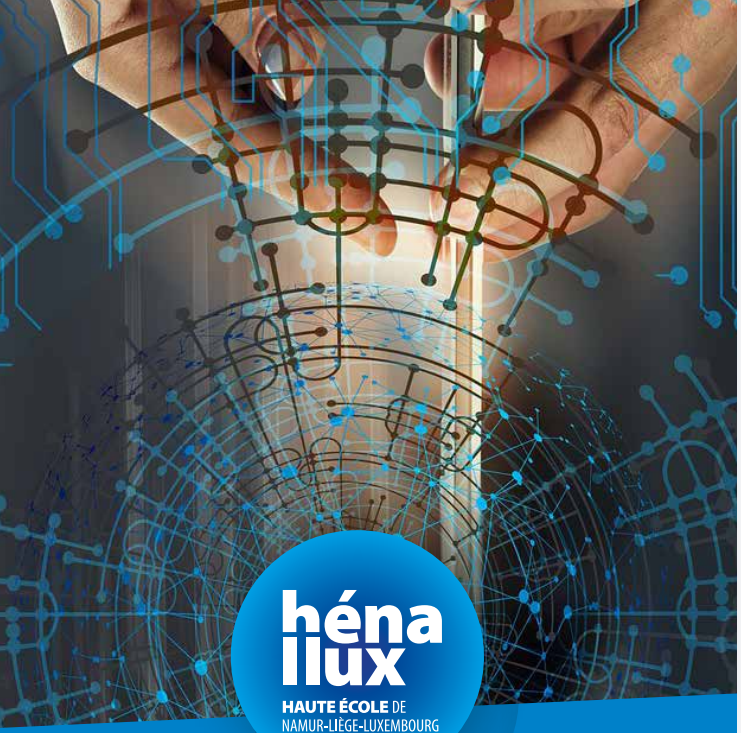

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HAUTE ÉCOLE DE NAMUR-LIÈGE-LUXEMBOURG

Exchange programme in Cybersecurity

Fall semester programme taught in English

at University College of Namur-Liège-Luxembourg (Namur, Belgium)

1e édition – Nov 2024 – Graphisme : N. da Costa Maya

General description of the programme

In response to a growing market demand for cyber security specialists, this 30-ECTS program provides a training in assessing and securing critical IT infrastructures for students with a background in computer sciences. After having assimilated the basic principles of computer security, the student will be able to learn how to defend and attack IT systems through practical and gamification activities. The course also includes the analysis and response to computer malware based on a forensic approach as well as the use of reverse engineering techniques. The main objective of this program is to train «security-minded» IT specialists capable of directly thinking or evaluating the IT security level of a company in order to reconcile business needs with business continuity.

Title	ECTS
Ethical Hacking and Pentesting	5
Digital Forensics	5
Software Security	5
Network Infrastructure Security	5
Cryptography	4
Seminar, Challenge and serious games	4
French	2

Description of each course

Digital Forensics

After a cyberattack, companies or public institutions need to recover. To do this, they first need to understand what happened: who attacked them and why? What technical or human vulnerabilities were exploited to take control of their infrastructure? What data was exfiltrated? Etc. This course takes an innovative approach, requiring students to conduct their own investigation through a realistic cyberattack scenario. Using cutting-edge techniques and tools, the learners will identify clues that will enable them to understand the nature and scale of the attack, while helping the victims to make their IT infrastructure work again.

Keywords: Imaging, Autopsy, Volatility, Metadata, OSINT, threat intelligence

Pentesting & Ethical Hacking

Modern cyberattacks are becoming increasingly sophisticated, and very difficult to predict. It's impossible to anticipate every danger. However, one tried-and-tested method is to put yourself in the shoes of a hacker in order to assess the security level of a computer system. This practice is known as «pentesting» or «ethical hacking». This course uses a dedicated infrastructure to simulate a real case of a vulnerable system. Students will have to apply their knowledge and creativity to identify and exploit system vulnerabilities, all in a fun learning environment.

Keywords: Nmap, reverse shell, metasploit, privilege escalation, exploit, brute force, CVE

Software Security

In today's digital landscape, safeguarding software against vulnerabilities is more critical than ever. This course will provide the students with a comprehensive understanding of software security principles, best practices, and techniques to identify and mitigate risks. Through a combination of lectures, hands-on labs, and real-world case studies, they will learn to recognize common threats, apply secure coding practices, and implement robust security measures.

Keywords: Vulnerabilities, reverse engineering, buffer overflow, security by design

Network and Infrastructure Security

This course provides a comprehensive overview of network and infrastructure security principles, equipping students with the skills to protect critical systems from evolving cyber threats. Topics include firewall configurations, intrusion detection/prevention systems and secure network architecture. Through hands-on labs, students will learn to identify vulnerabilities and implement security measures.
By the end of the course, students will be prepared to configure security devices that safeguard organizational assets against a variety of threats.

Keywords: Firewalls, network access control, VPN, security policies

Log management and security event analysis

This course on log management and security event analysis provides a comprehensive blend of theory and practical skills for managing logs and detecting security incidents. Through a combination of lectures and hands-on lab sessions, participants will learn to collect, centralize, and analyze log data from various systems and devices to identify security threats and respond to incidents effectively.
By the end of the course, students will be equipped to manage log data, detect security incidents, and implement effective incident response processes based on log analysis.

Keywords: Log management, Security Incident, Centralized Analysis, Incident Response

Cryptography

This course introduces the fundamental concepts and principles of cryptography, providing students with solid theoretical principles and hands-on applications of modern cryptographic techniques. Students will explore historical ciphers and progress through the development of more advanced cryptographic methods used today. Through a mix of theoretical lectures and practical labs, learners will gain a deep understanding of how to implement and analyse cryptographic algorithms, secure communication channels, and protect data integrity.

Keywords: Encryption, decryption, symmetric cryptography, asymmetric cryptography, public key infrastructure (PKI), digital signatures, cryptanalysis, quantum key distribution.

Seminars, Challenges, Serious Games and Casus

This course is designed to provide students with hands-on experience in evaluating and addressing complex security issues through a variety of practical activities. It is divided into four distinct sections: external seminars, Capture The Flag (CTF) challenges, Red Team vs Blue Team wargames, and real-world case studies. When participating in these activities, students will learn to apply security concepts, to work collaboratively, and to develop strategic thinking in real-world scenarios.

Keywords: Seminars, Capture The Flag, Red Team vs Blue Team, security strategy, event organization, collaborative work, problem-solving.

Your studies at the University College of Namur-Liège-Luxembourg

The University College of Namur-Liège-Luxembourg counts more than 6500 students spread on ten campuses, in the Provinces of Namur, Liège and Luxembourg. We propose a very wide range of trainings in higher education, Bachelor and Master levels, several one-year programmes of specialisation and a large number of in-service training sessions.
At the University College of Namur-Liège-Luxembourg, the largest campus is the so called IESN campus, located in Namur, the capital city of Wallonia – in the Southern part of Belgium.
Many higher education institutions, near to our Walloon Government & Parliament are also situated in the centre, making the city vivid and attractive to local and international students.

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Contact

- **adrien.voisin@henallux.be**
  Program director
- **international.iesn@henallux.be**
  Henallux international service (Namur)
- **https://services.henallux.be/international/fr/englishcourses/**