

# SPECTRO - SPecialised Education programmes in CybersecuriTy and Robotics

Contact: Assoc. prof. Darius Bufnea, [cyber-master@cs.ubbcluj.ro](mailto:cyber-master@cs.ubbcluj.ro)

Web: <https://www.cs.ubbcluj.ro/cyber-master/>, <https://28digital.eu/eu-collaborations/spectro>

The technical developments in the field of communications, advances in IT, the increasing share of online activities in our personal and professional lives, as well as the recent progress in artificial intelligence, raise various questions about how these technological advances are being absorbed by society. All these factors, together with those related to software development processes and also the human nature, introduce various vulnerabilities into the applications and technologies we daily use. These vulnerabilities can be exploited by malicious actors, primarily motivated by financial gain, but also for purposes related to espionage and cyberwarfare.

Cybersecurity is essential because at both the individual and organizational level, it protects data, privacy and reputation, it prevents unauthorized access and financial loss, it maintains system reliability and trust, and, ultimately, it helps preserve national security.

Education in cybersecurity is more than a need, it is a necessity that must be implemented on a wide scale to address the growing demand for cybersecurity and to bridge the gap that exists within society.

The SPECTRO (SPecialised Education programmes in CybersecuriTy and Robotics) project aims to train specialists in the field of cybersecurity through the implementation of master's programmes and self-standing modules in this area, as well as in robotics. Led by 28Digital (formerly EIT Digital) and co-financed through the Digital Europe Programme, the project brings together several major European universities under the same umbrella, including: Eötvös Loránd University (ELTE, Hungary), University of Trento (UNITN, Italy), University of Twente (UT, Netherlands), University of Rennes (UR, France), University of Turku (UTU, Finland), EURECOM (France), Babeş-Bolyai University (UBB, Romania), KTH Royal Institute of Technology (Sweden), Aalto University (Finland), University of Bologna (UNIBO, Italy), University Côte d'Azur (UCA, France), Budapest University of Technology and Economics (BME, Hungary), University of the Aegean (Greece) and Politecnico di Bari (POLIBA, Italy).

An important feature of these master's programmes is that enrolled students are required to study for the two years at two different universities and they receive project-funded scholarships. This educational trajectory along a "European path," together with inter-university collaboration strengthens and enriches academic cooperation across Europe.

Within these cybersecurity master's programmes, students follow in their first year a common core curriculum covering fundamental cybersecurity knowledge. In the second year, they specialize in different areas such as: Advanced Cryptography, Quantum-Resistant Cryptography, Big Data Security, Software Security, System Security, Security Technologies and Intelligence or Circular Security.

A notable aspect of these master's programmes is that 30 ECTS credits within the curriculum are allocated to an Innovation and Entrepreneurship (I&E) minor. Moreover, some of the self-standing modules developed under SPECTRO also focus on this component. Among the I&E courses offered in this master's programme or developed by UBB are Introduction to Agile Project Management, Innovation Management & Digital Economy Principles and Academic Ethics and Integrity in Computer Science.

This project represents a significant step forward in strengthening Europe's capacity to educate and train the next generation of cybersecurity or robotics specialists. By combining academic excellence, cross border collaboration and practical innovation, the program not only enhances technical expertise but also fosters a culture of ethical awareness and entrepreneurship. Through its comprehensive and forward-looking approach, the SPECTRO projects contributes to building a more secure, resilient and digitally empowered Europe.