



**ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ
ΤΜΗΜΑ ΠΛΗΡΟΦΟΡΙΚΗΣ
ΠΜΣ ΚΥΒΕΡΝΟΑΣΦΑΛΕΙΑ
ΚΑΙ ΕΠΙΣΤΗΜΗ ΔΕΔΟΜΕΝΩΝ**

**MSc CYBERSECURITY
AND DATA SCIENCE
DEPT OF INFORMATICS
UNIVERSITY OF PIRAEUS**

Track: Information and Communication Systems Security (ICSS)

2nd semester

<https://cybersecdatasci.cs.unipi.gr>

Courses



- **CDS201: Penetration Testing**
- **CDS202: Digital Forensics**
- **CDS203: Malware Analysis**
- **CDS204: Software Security**
- **CDS211: Advanced Cryptographic and Security Technologies (Blockchain technologies) (elective course)**
- **CDS212: Special Topic in Security and Privacy (elective course)**

CDS201: Penetration Testing (6 ECTS)

➤ **Syllabus:**

- Introduction to Penetration Test Methodology
- Reconnaissance Techniques
- Scanning Techniques
- Gaining Initial Access Techniques (Exploitation, Brute forcing, Client side attack)
- Maintain access (Trojans, rootkits, back doors)
- AV, EDR bypass Techniques
- Post exploitation Techniques
- Lateral Movement
- Network pivoting
- Covering tracks

➤ **Lab hours:**

- Various hands-on labs and step-by-step technical walkthroughs

➤ **Instructors:**

- Dr Spyridon Papageorgiou, Prof. Panayiotis Kotzanikolaou

CDS202: Digital Forensics (3 ECTS)

➤ **Syllabus:**

- Incident Handling Process
- Windows forensics (memory forensics, registry forensics, file system analysis, application forensics)
- Log file analysis
- Linux forensics
- Network forensics

➤ **Lab hours:**

- Various hands-on labs and step-by-step technical walkthroughs (memory/registry/file system analysis tools etc)

➤ **Instructors:**

- Dr Spyridon Papageorgiou, Prof. Kostas Patsakis

CDS203: Malware Analysis (3 ECTS)

➤ **Syllabus:**

- Categories and analysis of analysis of malware (trojans, rootkits, ransomware etc).
- C&C servers (protocols and methods)
- Obfuscation
- Static malware analysis
- Dynamic malware analysis
- Machine learning for malware detection

➤ **Lab hours:**

- Various labs for malware analysis and interaction via debuggers, sandboxes etc

➤ **Instructors:**

- Prof. Kostas Patsakis

CDS204: Software Security (6 ECTS)

► Syllabus:

- Best practices for secure software development
- Identification of security issues in open source and closed source software
- Vulnerability Identification, assessment and management
- Secure Software Development Lifecycle (at the design, implementation and maintenance phases of software projects).
- Techniques for the proactive mitigation of risks.

► Lab hours:

- Various tools for static and dynamic code analysis (like nm, file, objdump, strace, ltrace), debugging tools (gdb), protocol fuzzing (peach), file fuzzing (jonggfuzz) and web app security (bwapp)

► Instructors:

- Dr Spyridon Papageorgiou, Prof. Panayiotis Kotzanikolaou

CDS211: Advanced Cryptographic and Security Technologies (Blockchain technologies) (3 ECTS)

➤ **Syllabus:**

- Introduction to blockchain
- Consensus algorithms (Proof of work, Proof of stake, Byzantine fault tolerance)
- Traceability in blockchain (tracing transactions in the blockchain)
- Smart contract development in Ethereum/Hyperledger

➤ **Lab hours:**

- Labs on smart contract development and blockchain traceability

➤ **Instructors:**

- Prof. Kostas Patsakis, Prof. Thomas Dasaklis

CDS212: Special Topics in Security and Privacy (3 ECTS)

➤ **Syllabus:**

- Study of cross-discipline aspects related to cybersecurity and privacy
- Economics of Security
- Security in Education
- •Security Awareness
- •Legal and Regulatory Aspects of Security and Privacy

➤ **Lab hours:**

- Project-based exercises in one or more special topics

➤ **Instructors:**

- Prof. Christos Douligeris