ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΕΙΡΑΙΩΣ
ΤΜΗΜΑ ΠΛΗΡΟΦΟΡΙΚΗΣ

ΠΜΣ ΚΥΒΕΡΝΟΑΣΦΑΛΕΙΑ
ΚΑΙ ΕΠΙΣΤΗΜΗ ΔΕΔΟΜΕΝΩΝ

MSc CYBERSECURITY
AND DATA SCIENCE

DEPT OF INFORMATICS
UNIVERSITY OF PIRAEUS

Track: Infrastructure and Systems Security and Reliability (ISSR)

1st semester

https://cybersecdatasci.cs.unipi.gr

Courses

- CDS103: **Security Architecture Design**
- CDS107: **Data Analytics and Machine Learning**
- CDS106: **Dependable Systems and Critical Infrastructures Design**
- CDS104: **Secure Applications for the Internet of Things**
- CDS105: **Embedded Systems**

CDS106: **Dependable Systems and Critical Infrastructures Design**
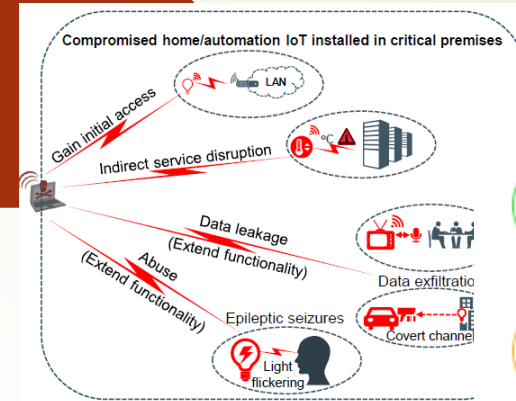

- ▶ **Syllabus**:
  - ▶ Fundamentals concepts of dependability (reliability, availability, safety, security)
  - ▶ Dependability standards
  - ▶ Fault models, security threats and system failures
  - ▶ Introduction to Critical Systems and Infrastructures (Standards, Methods, Regulation)
  - ▶ Dependency analysis for Critical Infrastructures (risk/threat propagation, cascading attacks)
  - ▶ Resilience in Critical Infrastructures (resilience-by-design, redundancy, restoration)
  - ▶ Hardware and Software fault tolerance (basic concepts)
  - ▶ Reliability evaluation (FMEA, radiation experiments, fault injection)

- ▶ **Lab hours**:
  - ▶ Case studies and real-world examples
    - ▶ Critical Infrastructures attacks and defenses, risk assessment tools
    - ▶ FMEA on a critical system

- ▶ **Instructors**:
  - ▶ Prof. Panagiotis Kotzanikolaou, Dr. Dimitrios Agiakatsikas, Prof. Mihalis Psarakis

CDS104: **Secure Applications for the Internet of Things**

- **Syllabus**:
  - Introduction to the Internet of Things (IoT)
  - Microcontroller architectures for IoT
  - IoT connectivity aspects
  - Design approaches for secure IoT
  - Hardware support for IoT security
  - Hardware Security Modules
  - Secure and cryptographic implementations for IoT
- **Lab hours**:
  - STM32, ST IoT node (B-L475E-IOT01A), STM CUBE IDE
- **Instructors**:
  - Prof. Athanasios Papadimitriou

CDS105: **Embedded Systems**

- **Syllabus**:
  - Introduction to Embedded Systems.
  - Embedded applications, specifications and requirements.
  - Embedded computing platforms (CPUs, ASIC, FPGA).
  - Design methodology with FPGAs. Introduction to hardware description languages (HDL) and high-level synthesis (HLS)
  - Case study: Xilinx Zynq-7000 System-on-Chip
- **Lab hours**:
  - Design, simulation and verification of embedded systems in FPGAs.
    - Use of automated design tools (Vivado) and Xilinx FPGA development boards (Zybo)
  - Project: Embedded application (software + hardware) on Zybo board.
- **Instructor**:
  - Prof. Mihalis Psarakis
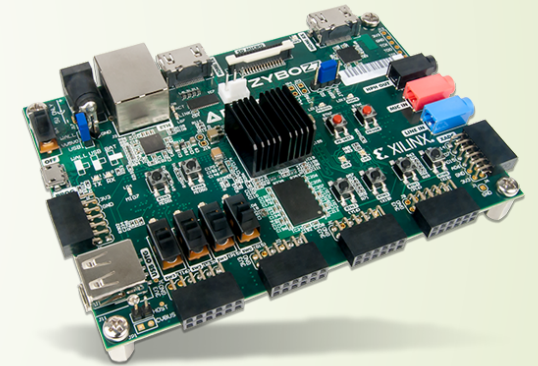
Weekly Planner

week 3: Oct. 11-15, 2021

	Monday	Tuesday	Wednesday	Thursday	Friday
Weeks 3 to 7	CDS106: **Dependable Systems and Critical Infrastructures Design**		CDS103: **Data Analytics and Machine Learning**	CDS109: **Security Architecture Design**	CDS104: **Secure Applications for the Internet of Things**
Weeks 8 to 12					CDS105: **Embedded Systems**