

# CSE 316/426 - Cyber Physical Systems Security

## Syllabus

### Basic Information

Meeting time: Tue 5:45PM - 9:00PM in Dailey 503

Instructor: Filippo Sharevski [fsharevs@cdm.depaul.edu](mailto:fsharevs@cdm.depaul.edu)

Office: CDM 750, Phone: 312-362-1075; Hours: Tue/Wed 2:30PM - 5:00PM

### Course Description

Design for Cyber Physical Systems Security (CPSS), breaches and enforcement, standardization, best practices, policies, security threat and protection-in-depth modeling, vulnerability and risk assessment for CPSS, privacy and legal issues, CPSS and cyberwarfare, practical experimentation with industrial control systems, Internet-of-Things (IoT) for home, and IoT for healthcare.

### Textbook

No text book is required. All the articles are posted in D2L for the respective week.

### Agenda

W	Topic	Homework/Assignment	In-class Experimentation
1	CPSS: Concepts and Principles	<i>Monitoring Security of Networked Control Systems - It's the Physics</i>	n/a
2	Security Breaches and Defenses in CPS	<i>Robust Cyber-Physical Systems: Concept, models, and implementation</i>	n/a
3	ICS/SCADA Security [Part 1]	<i>An Internet-Wide View of ICS Devices</i>	PLC programming: Seal-in Circuit, Timer Counters, Traffic Light HMI development: Traffic light logic
4	ICS/SCADA Security [Part 2]	<i>Reading Between Fields - Practical, Effective, IDS for ICS</i>	Firewall Config: Inter-Level Protection Snort Configuration - SCADA IDS
5	ICS/SCADA Security [Part 3]	<i>Forensic Analysis of a Siemens PLC</i>	Exploiting a PLC with Metasploit Exploiting a HMI device with Armitage
6	IoT Security [Part 1]	Research on IoT Hacks	Exploiting Smart IoT Light bulbs
7	IoT Security [Part 2]	Draft Security Assessment Report	Project experimentation
8	CPSS: Legal and Privacy Aspects	<i>Designing Ethical Cyber-Physical Industrial Systems</i>	Project experimentation
9	CPSS: Risk Management	<i>Safety and Security in Cyber-Physical Systems and Internet-of-Things Systems</i>	Project experimentation
10	CPSS and Cyberwarfare	n/a	Project experimentation
11	Final Project Presentations		

## Grading

Grading is based on a percentage basis, which is then convert to a letter as:

Percentage Grade	Letter Grade	Manner of fulfillment
92-100	A	Excellent
90-91	A-	
88-89	B+	
82-87	B	Very Good
80-81	B-	
78-79	C+	
72-77	C	Satisfactory
70-71	C-	
68-69	D+	
62-67	D	Poor
60-61	D-	
0-59	F	

The weights of each assignment for contributing to the final average are as follows:

Assignment	Weight in final grade
Homework	35%
Labs	20%
Group Activity	10%
Discussion	10%
Project/Presentation	25%

## Assignments Delivery

Homeworks/Assignments are due a week after each is assigned at 11:59 PM.

## Homework

On weeks where there are articles assigned, you need to critically review them. What's an article? A journal/conference paper. What's critical review? It's not summarizing the article as in "Authors said...". Instead, you need to analyze the content of the article in the context of the class experimentation, lectures, and recent hacks and provide your opinion on it.

## Labs

All labs will be conducted as an in-class experimentation. You will need a laptop and a Kali Linux bootable USB (I will give you one, so you can make copies of it). If you already have Kali Linux on your computers, that will work too. I will also bring laptops if you need.

## Group Activity

In every class we will split in groups and work on an assignment to analyze security incidents or issues in CPSS. I expect your active participation in the group; no free riders.

## Discussion

In every class, we will discuss a lot of issues, challenges and interesting anecdotes about CPSS. I expect your active participation with your opinions.

## Project/Presentation

Mid quarter, you will be introduced to a practical CPPS system. The projects will allow for each of you to conduct a security analysis and assessment of these CPSS systems. This is your final assignment and shall result into a final report. In the finals week, you will present your findings (abridged version of the report) to the entire class.

## Other Important Information

Attendance: I expect you will attend every class.

Class Cancellation: Unless DePaul closes because of weather, we will have class.

Academic Integrity: I expect that you have read and understood DePaul's Academic Integrity policy: <http://academicintegrity.depaul.edu/>.

Changes to Syllabus: I reserve the right to change the syllabus and you will be timely informed of such changes. I don't expect significant deviations of the course agenda.

Academic Policies:

<http://www.cdm.depaul.edu/Current%20Students/Pages/PoliciesandProcedures.aspx>

Students with disabilities: Contact the instructor or the Center for Students with Disabilities (CSD) at: [csd@depaul.edu](mailto:csd@depaul.edu) prior to the class start.

Online Teaching Evaluation: Please evaluate the course in CampusConnect when you receive a notification towards the end of the quarter.

Preferred Name & Gender Pronouns: I will gladly honor your request to address you by an alternate name or gender pronoun: <http://policies.depaul.edu/policy/policy.aspx?pid=332>