Security in Advanced Networking Technologies

(CPSC 8570)

Spring 2019 Syllabus

Instructor: Dr. Hongxin Hu

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Office hours: MW 9:00 AM – 11:00 AM; By Appointment

Time and Location: MW 3:55 PM – 5:10 PM, McAdams Hall 114/Zucker 104

Class website: https://people.cs.clemson.edu/~hongxih/teaching/2019spring/2019spring.htm

Course Description: In this course, we will discuss emerging networking techniques, inducing Software-defined Networking (SDN), Network Function Visualization (NFV), and Internet of Things (IoT). We will also discuss corresponding security issues in SDN, NFV and IoT. Course will involve readings and discussion of classic and new papers on recent developments in computer networking research. Students will explore new ideas through projects, improve skills in presentations, and enhance critical thinking, systems and security programming, and creativity. The class format will consist of lectures, student presentations, and class project presentations.

Topics:

Basic security principles:
- Access Control
- IP and TCP Security
- Firewall and IDS

Advanced networking:
- Software-Defined Networking (SDN)
- Network Function Virtualization (NFV)
- Internet of Things (IoT)
- Security in SDN
- SDN-based Security Defense
- Security in NFV
- NFV-based Security Defense
- IoT Security
**Text book**


**Evaluation Procedures:**

<table>
<thead>
<tr>
<th>Evaluation Procedure</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Midterm Exam</td>
<td>10%</td>
</tr>
<tr>
<td>Paper Presentation</td>
<td>10%</td>
</tr>
<tr>
<td>Survey Papers</td>
<td>10%</td>
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<tr>
<td>Lab Assignments</td>
<td>20%</td>
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<tr>
<td>Participation</td>
<td>5%</td>
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<tr>
<td>Final Project Proposal, Presentation and Report</td>
<td>45%</td>
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**Grading:**

Letter Grade

- A: 90 – 100
- B: 80 – 89
- C: 70 – 79
- D: 60 – 69
- F: 0 – 59

**Project**

The project in this course has two goals. The first goal is to help you learn more about doing research in general. The second goal is to give you the opportunity to study particular areas of Security in greater detail. Therefore, you are expected to perform a substantial research project; this involves selecting an open problem, reading the related work, designing, implementing, and evaluating a solution, and presenting your results.

For your project, you need to pose a question, design a framework in which to answer the question, conduct the research, and write up your experience and results. There will be three deliverables for this project which will count toward your final project grade: a project proposal (30%), class presentations (30%), and a final report (40%). You are encouraged to schedule periodic project status meetings with the instructor.

1. **Project proposal**

Your project proposal should be around 2 pages in length. The project proposal should clearly state the goals of your project and the research question you are investigating. Describe why you think the project you are proposing is interesting and important. Your research plan should include (1) related work that shows you have enough background in the area to know that you are not simply reproducing someone else's work, (2) hypotheses about the conclusions you expect to draw from the work, (3) experimental setup which describes what experiments you plan to conduct and how you plan to do your measurements, (4) a description of hardware or software you will need for your work so that we can make sure we have it available, and (5) a detailed schedule for your work including dates, milestones, and tasks that will be done by each group member.
2. **Project presentations**
   Each group will give 3 presentations on their project in class. **Proposal Presentation** should be 5 minutes, with about 2 minutes for questions afterwards. **Midterm Project Presentation** should be 10 minutes, with about 2 minutes for questions afterwards. **Final Project Presentation** should be 20 minutes, with about 5 minutes for questions afterwards.

3. **Final report**
   Your final report should be roughly 6 pages in length, including graphs, diagrams, and citations. You should complete the writing early enough that you have time to reread your work and critique it with the same rigor that you applied in reviewing other papers for the course. There should be a complete description of experimental results with all support measurements and data. You should be honest and state shortcomings in your work. You should discuss future work and possible follow-on projects. In addition, there should be a description about contributions of each group member.

**Submission**
All work will be submitted **electronically**. Homework and Projects are due at 11:59 PM on the due date described in the assignments. Late policy is as follows:

- 10% grade penalty for one day of lateness
- 50% grade penalty for two days of lateness
- A grade of zero for >2 days of lateness

**Academic Integrity**

As members of the Clemson University community, we have inherited Thomas Green Clemson’s vision of this institution as a “high seminary of learning.” Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form. In instances where academic standards may have been compromised, Clemson University has a responsibility to respond appropriately to charges of violations of academic integrity.