

Spring 2016: ICS 695 – Advanced Special Topics in Security:

Advanced Security and Privacy for Internet of Things and its Applications

Time	Monday & Wednesday, 12:00-01:15pm.
Location	HOLM 247
Course Pre-requisites	N/A
Instructor	Depeng Li (depengli@hawaii.edu)

Course Description:

The growing importance of Internet of Things (IoT) and Cloud Computing and their use to support critical applications, has made security & privacy a central issue today. However, it becomes evident how vulnerable our information system, communication system and infrastructure system actually are. Meanwhile, sensitive / private information can be stolen / leaked while it is collected, stored, processed, and shared at the cloud, the personal devices or the communication channels in between.

The main objectives of this course are to: 1) introduce high quality works highlighting security issues, 2) explain the state-of-the-art methodologies in security, 3) model threats and countermeasures, and 4) discuss corresponding case studies, in areas of IoT, cloud computing and software-defined networks. The cutting-edge research on threat detections, preventions, and countermeasures will also be circulated through the students.

The general theme of this course is to provide students an overview for the security and privacy. This research oriented class will introduce participants to interesting topics in security and privacy with the support of practical examples e.g. cloud computing, wearable computing, modern vehicles, smart grids, software-defined networks, applied cryptography, etc. Students will read assigned research papers and make presentations to discuss the related research problems. Topics intended for discussion include but are not limited to basic concepts and techniques in information security and management such as authentication, access control, network attacks and defense, intrusion detection, physical security, multilevel security, privacy mechanisms and security management. High-level concepts such as confidentiality, integrity, and availability will be covered. Students in this course will be armed with a set of techniques which enable them to address the security & privacy challenges.

Lecture Schedule (Tentative)

1. Overview of Security and Privacy in Information System

2. Applied Cryptography & Intrusion Detection

- 2.1 Architecture of Applied Cryptography
 - 2.2 One Way Hash Function and Integrity
 - 2.3 Encryption Algorithms and Confidentiality
 - 2.4 Digital Signature and Authentication
 - 2.5 Modern Cryptography I: Attribute-Based Encryption (ABE)
 - 2.6 Modern Cryptography II: Honey Encryption
 - 2.7 Modern Cryptography III: Homomorphic Encryption (HE)
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3. Internet of Things Security & Privacy

- 3.1 Introduction of Internet Of Things
 - 3.2 Security and Privacy for IoT
 - 3.3 Case Study 1: Smart Home
 - 3.4 Case Study 2: Smart Grid Network
 - 3.5 Case Study 3: Modern Vehicle
 - 3.6 Case Study 4: Wearable Computing & BYOD
 - 3.7 Case Study 5: Mobile HealthCare
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4. Privacy Preservation

- 4.1 Location Privacy
 - 4.2 Personally Identifiable Information
 - 4.3 personal health record and Electronic Medical Records
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Textbook:

This class does not have a required textbook.