

Department of Computer & Information Science

IUPUI

CSCI 59000 Security Engineering

Fall 2017

Tentative Syllabus

Instructor Information

Instructor: Arjan Durresi

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Objective

This course has the following five general objectives:

1. Communication and Quantitative Skills
2. Critical Thinking
3. Integration & Application of Knowledge
4. Instinctual Depth, Breadth and Adaptiveness
5. Values and Ethics

Most of these principles will be integrated in various parts of the course such as homework, exams, and projects.

Course Description:

This course aims at explaining how to build systems to remain dependable in the face of malice, error, or mischance. The course focuses on the tools, processes, and methods needed to design, implement, and test complete systems, and to adapt existing systems as their environment evolves. The course builds on students' prior foundational from studies in computer security, networks, operating systems and computer architecture. Material covered in the class will include some concepts from several textbooks and research papers. The course is highly interactive, based on class discussions. An important part of the course will be dedicated to improving the research skills, such as writing papers and preparing presentations.

Cyberspace has transformed the daily lives of people for the better. The rush to adopt cyberspace, however, has exposed its fragility and vulnerabilities: corporations, agencies, national infrastructure, and individuals have been victims of cyber-attacks. Therefore, major efforts are in progress are being made to the education in bolster education and training in cybersecurity. And this course is part of such efforts. The course covers the major areas of security engineering of computing systems such as security, reliability, privacy, and usability. The course will expose the students to the state of the art issues trustworthy computing and tools for security in real organizations. In the course, we will discuss the central concept of a security protocol, human-computer interface issues, access controls, cryptology, and distributed system issues. We will include our research results in the field of trust management. Furthermore, we will illustrate the trustworthiness concepts in some important applications, such as military communications, medical record systems, cash machines, mobile phones, and social networks. These are used to introduce more of the advanced technologies and concepts. It also considers information security from the viewpoint of some different interest groups, such as companies, consumers, criminals, police, and spies. Finally, we will discuss organizational and policy issues: how computer security interacts with law, with evidence, and with corporate politics; how we can gain confidence that a system will perform as intended; and how the whole business of security engineering can best be managed.

More specifically, the course specific topics cover the architectural aspects of modern trust and system security. The course builds on students' prerequisite knowledge from studies in computer security, operating systems and computer architecture. Material covered in the class will include some concepts from various textbooks and research papers. Please pay attention to the class discussion and lecture. Some topics to be covered are together with a tentative schedule are:

1. Course Overview
2. Usability and Psychology
3. Protocols
4. Access Control
5. Cryptography

6. Distributed Systems
7. Economics
8. Multilevel Security
9. Multilateral Security
10. Monitoring and Metering
11. Electronic and Information Warfare
12. Telecom System Security
13. Managing and Development of Secure Systems
14. Trust and Trust Management
15. System Evaluation and Assurance

Besides the technical content, the instructor will cover other aspects of research activities, such as how to select a research topic, how to write research papers, and how to present research results.

Textbook

No textbook is required.

Research Papers

Students will read and review several research papers, which will cover important topics in Security and trust. The reports based on the review of research papers are part of homework.

Presentations

Students will present reviews of research papers.

Project

An important component of the course will be the project. The projects can be individual or in teams, after the instructor approval. The topics of the projects will be approved by the instructor. The report of the project will be in the form of a research paper.

Online Communication

The canvas will be used in this class for online communications, electronic handouts, grade information, etc. You will need your IUPUI network id to access canvas. When you officially register for the course, you will have access to the class material automatically.

Grading Information

There will be two exams in this class. There will also be some homework (including a report of review papers). Students will also accomplish a project and write a project report in the form of a research paper.

The breakdown of the percentages on the final grade is as follows:

Activity in the class, involvement in class discussions	35%
Project	30%
Exams	35%

The grades will be kept as numerical values throughout the semester, and the instructor will assign a letter grade for the class at the very end based on the total weighted course score as described above. The letter grade assignment will be curved and will be based on the ranked values of the total weighted scores computed for the course. The letter grade thresholds will be determined based on the distribution of these total course scores.

Academic Honesty and Student Responsibilities

Students are responsible for getting their work done in time, working independently, attending class, checking Canvas and email for new announcements and assignments. They are responsible not only for the reading material from the textbook and research papers but also all the material covered in lectures, including material not covered in textbook or research papers.

Your work in this class must be your own and cheating is not tolerated. The Academic Integrity of IUPUI standard will be followed.