

CS 558 Syllabus

CS 558: Network Security, Spring 2017
Boston University

January 19, 2017

1 Administrative

1.1 Official Description

Introduces basic principles and techniques of building secure information systems. Covers network security, web security, privacy, and basic cryptographic tools (symmetric and public key cryptography, encryption, key exchange, hashing and signatures). Broader social, legal and political aspects of security addressed.

1.2 Longer Description

This course provides an introduction to the basic principles and techniques of building secure information systems. The focus of the course is on applied cryptography, web security, and network security. Broader social, legal and political aspects of security will also be touched upon. This is meant to be a first course in information and network security. No background in networking or cryptography will be assumed. The only prerequisite is CS210 (or permission of the instructor). CS237 or equivalent course in basic probability is helpful but not required.

1.3 Course Staff.

Instructor: Prof. Sharon Goldberg (MCS135F; goldbe@cs.bu.edu)

Teaching Assistants: Sophia Yakoubov (sonka@bu.edu), Ann-Ming Samborski (asambors@bu.edu), Sean Smith (swsmith@bu.edu).

Graders: Kai Bernadini (kaidb@bu.edu), Viviana Yee (vivyee@bu.edu).

Each teaching assistant is responsible for a disjoint set of assignments. Each assignment will clearly indicate, on its cover page, the teaching assistant that is responsible for the assignment. The course assistant who is responsible for an assignment will run the discussion section and hold office hours during the week that the assignment is due. Graders will assist the teaching assistants and will also grade assignments.

Important: Technical questions about the course material, homeworks, final project, or security news presentations can be asked of the instructor or teaching assistants. But technical questions about the labs should go to the teaching assistants or graders only.

1.4 Textbooks.

There is no course textbook. However, readings will be assigned, and sometimes handouts will be given out in class. The following textbooks are good references, but are not required.

- J. Katz and Y. Lindell. Introduction to Modern Cryptography. Chapman & Hall/CRC Press. August 2007.
- Ross J. Anderson. Security Engineering. Wiley. 2008. Available free online at <http://www.cl.cam.ac.uk/~rja14/book.html>.

2 Course Timing.

| | |
|------------------------------------------------|-----------------------------------------------------|
| CS558 Lectures: | Tuesday, Thursday 2:00-3:15 AM in CAS B12 |
| CS558 Discussions: | Friday 11:15-12:05pm PM in MCS B33 |
| | Friday 12:20-1:10pm PM in MCS B25 |
| | Friday 1:25-2:15pm PM in MCS B25 |
| Prof. Goldberg's Office Hours: | Thursday 1:00-1:50 PM in MCS 135F |
| | Thursday 3:20-4:20 PM in MCS 135F |
| | (But make sure to check the course calendar first!) |
| Ann Ming's Office Hours (Presentations only!): | Wednesday 10:00-11:00 PM in undergrad lab |
| Teaching Assistant Office Hours: | Mondays 9-11 AM in CS undergraduate lab |
| | Wednesdays 9-10 AM in CS undergraduate lab |

The (gcal) course calendar is here:

https://calendar.google.com/calendar/embed?src=93aa6d8kvm43iki5mgcs8taecc%40group.calendar.google.com&ctz=America/New_York

Lecture attendance is required. We do not follow a textbook so it is important that you attend lectures and take notes.

Discussions will occur on certain weeks, indicated on the course's website and Google calendar, and your attendance is highly recommended.

You are responsible for all material covered in lecture. Course topics, reference material, and scheduling (calendar) will either be discussed in class or posted on the course website.

3 Piazza

We will use piazza to communicate with you; please check piazza and the course website regularly. "I did not check piazza" will not be a valid excuse.

You are welcome to use Piazza to set up study groups, to post interesting security incidents you read about, or to discuss the course with other students. The piazza site is here:

piazza.com/bu/spring2017/cs558/home

If you have a question about the course you should:

1. Come to Prof. Goldberg (for questions about course material) or the Course Assistant's office hours (for questions about assignments), OR
2. Post publicly to Piazza. You are welcome to post and answer questions anonymously.

Please do NOT use private messages to ask technical questions about the course material. These questions will not be answered.

Private questions should only be used to discuss private issues (for example, about your class presentation, attendance, or grading issues).

If you need to talk to the course staff in private, you can send us a private message on Piazza to let us know that you want to have a private conversation during office hours. You should not expect a response; instead assume we have read your message and you should then just show up at office hours and tell us you want to have a private conversation.

If you want to talk to one of us in person but absolutely can't make office hours, please send the relevant person an email with **at least three different options** for when you are available to meet.

4 Evaluation

The majority of your grade will be based on projects, assignments and presentations. There is one midterm covering the first 2/3 of the course. There is no exam. We reserve the right to deviate from the following grading formula.

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|----------------------------|-----|
| Labs | 32% |
| Midterm | 30% |
| Security News Presentation | 25% |
| Final Project | 10% |
| Participation & Scribing | 3% |

4.1 Lectures and Participation.

Participation will be based on attendance, asking good questions during security news presentations and lectures, answering questions on Piazza, during discussions, etc.

You are expected to be an active participant in class. **No messaging or web surfing is allowed in class.** All electronic devices including phones, tablets and laptops must be silenced and put away unless being used for note taking, or as part of an in-class demo or assignment. If you are using them for any other purpose you will be asked to leave class. **If you are using them for note taking, then you will be required to email an electronic version of your notes to the professor at the end of the lecture.**

4.2 Homework, labs, presentations, and final project

Labs, presentation, and final project will make up the bulk of the grading in this course.

Projects. The final project and security news presentations are discussed in a separate handout.

Practice problems. We will sometimes also assign practice problems. Practice problems are assigned to help you study for the midterm. It is your responsibility to solve these problems; they will be discussed during discussion sessions, but they will not be graded. If you need help with these problems, you can (1) ask for help during the discussion sessions, or (2) ask the the TA or instructor during office hours.

Labs. Labs involve a significant problems-solving, programming, or data-analysis efforts. Most labs will be equally weighted; once in a while we might assign a “half-weighted” lab. The exact

list and weighting of labs is TBA. If you need help with the labs, you can ask the TA during office hours or post to piazza. The instructor will NOT answer questions about the labs.

Late lab submission. You start the semester with a credit of 3 late days. For the purpose of counting late days, a “day” is 24 hours starting at 11:59PM on the assignment’s due date. Partial days are rounded up to the next full day. You are free to divide your late days among the **labs** any way you want: submit three assignments 1 day late, submit one assignment 3 days late, etc. After your 3 days are used up, no late submissions will be accepted and you will automatically receive 0 points for each late assignment. **Late days are not available for the presentation or final project.**

Regrading. If you would like to request a re-grade of an exam question or an assignment, be aware that question or assignment will be completely re-graded (and potentially result in a lower grade). Regrading will be handled by the teaching assistant that administered the lab.

4.3 Submission policy.

Homeworks and Labs must be submitted as a **PDF** electronically through websubmit by 11:59PM on the day they are due. You may choose to hand-write your assignment and then scan it in before submitting, or you may choose to type up the assignment and then convert it to a PDF. You are encouraged to use LaTeX – an optional LaTeX template is available on the course website. **No format other than PDF will be accepted.** Please make sure the electronic version of your assignment is legible; illegible assignments will not be graded kindly.

Every submitted assignment MUST include the following information:

1. List of collaborators
2. List of references used (online material, course notes, textbooks, wikipedia, etc.)
3. Number of late days used on this assignment
4. Total number of late days used thus far in the entire semester

If any of this information is missing, at least 20% of the points for the assignment will automatically be deducted from your assignment. See also discussion on plagiarism below.

4.4 Scribing

All students will have to scribe once during the semester. Everyone should fill in their preference on which day they are scribing on the scribe sign up sheet by **11:59PM January 23, 2017.**

<https://docs.google.com/spreadsheets/d/1uXWyNR15o3gM6v1xGLmmzwzg4iSHyDZUNBb4KzQJXi0/edit#gid=538390803>

Here is how to scribe:

1. During class take careful handwritten or electronic notes. Try to capture everything written on the board as well as interesting questions and discussions.
2. After the class review your notes and type them up.
3. Compile your notes into a .pdf file.

4. Email the .pdf file to the instructor by 11:59PM the end of the next day after the class (i.e. by Wednesday for a Tuesday class or by Friday for a Thursday class).

5 Important Dates

Please take note of the following dates and plan your travel accordingly.

Thursday March 21, 2:00-3:15PM Midterm. The midterm will cover material from the first two-thirds of the course.

Friday March 31 Last day to drop course with a W. If you are considering dropping the course, please make sure to see Prof. Goldberg first during her office hours.

Wednesday May 3, 4:30-9PM CS558 open poster session; the CS department will be invited, and you are welcome to invite colleagues from industry and friends. The course instructors also often invite our own colleagues from industry to attend this event.

6 Ethics

To defend a system you need to be able to think like an attacker, and that includes understanding techniques that can be used to compromise security. However, using those techniques in the real world may violate the law or the university's rules, and it may be unethical. Under some circumstances, even probing for weaknesses may result in severe penalties, up to and including expulsion, civil fines, and jail time. Our policy is that you must respect the privacy and property rights of others at all times, or else **you will fail the course**.

Acting lawfully and ethically is your responsibility. Carefully read the Computer Fraud and Abuse Act (CFAA), a federal statute that broadly criminalizes computer intrusion. This is one of several laws that govern "hacking." Understand what this law prohibits.

Read BU's Conditions of Use and Policy on Computing Ethics (<http://www.bu.edu/tech/about/policies/computing-ethics/>) and the BU's Academic Conduct Code (<http://www.bu.edu/academics/policies/academic-conduct-code/>). As members of the university, you are required to abide by these policies.

7 Collaboration Policy

You are strongly encouraged to collaborate with one another in studying the course material. As long as it satisfies the following conditions, collaboration on the homework assignments is encouraged and will not reduce your grade:

- You may discuss ideas and approaches with other students in the class, but:
 - You may not share actual code. In other words, the code you write must be entirely your own, which you must write and debug without looking at other people's code. Do not permit others to copy your code.
 - You must write up your solutions completely on your own, without looking at other people's write-ups.

You must also acknowledge clearly in your solutions people with whom you discussed ideas, either for your written solutions or for your code.

- You may not work with people outside this class (but come and talk to us if you have a tutor), get someone else to do it for you, etc.
- You are welcome to use any textbooks, online sources, blogs, research papers, Wikipedia, etc in your assignment, **as long as these are properly cited in any submitted work**. Failure to do this is plagiarism and is serious violation of the CAS Academic Conduct Code and basic scientific ethics, and will not be tolerated.
- You are not permitted to collaborate on exams.

It is your responsibility to know and understand the provisions of the CAS Academic Conduct Code.