Computer Systems Security / Computer Systems Security Lab
CS166 / CS162

Syllabus
Spring 2019

Revised January 19, 2019

Overview and Learning Goals

CS166 This course teaches principles of computer security from an applied viewpoint and provides hands-on experience with security threats and countermeasures. The course additionally covers principles and skills useful for making informed security decisions and for understanding how security interacts with the world around it. The main topics covered are cryptography, authentication, access control, operating systems security, web security, and network security. Other topics include general security principles, human factors such as trust and social engineering, the security of complex systems, and the economics of security. The course aims to balance theory and practice.

CS162 This course is a half-credit lab intended to be taken concurrently with CS166 and provides students with a deeper understanding of the material by doing advanced versions of the CS166's projects. These advanced versions focus on real-world skills: performing attacks that are more difficult and rely on less serious vulnerabilities, performing attacks against systems with more real-world constraints, and creating attacks that achieve a higher standard of quality than a mere "proof of concept."

Topics

Security Principles, Cryptography, Passwords, Authentication and Authorization, Operating Systems Security, Web Security, Network Security, Trust, Human Factors, Systems Security, Physical security, Cyber Risk Management, Penetration Testing

Diversity and Inclusion

The course welcomes diverse ideas and perspectives in class discussions and encourages a class environment that is respectful of everyone's viewpoints and comments. The content of lectures and the assignments have been designed to be inclusive for all, as we would like everyone to feel fully included in the learning activities. Please do not hesitate to speak to the instructor, TAs, or members of the *Student Advocates for Diversity and Inclusion* if you feel any course content has been exclusive or potentially insensitive to anyone.

Learning Activities and Expected Workload

CS166 Attending lectures and active class participation is highly encouraged. While we post lecture slides on the website, they are not a full transcript of the lectures. Also, class participation will help the instructor better assess your understanding of the topics in the determination of the final grade.

Coursework consists of several homeworks and hands-on projects. Homeworks ask you to think critically about computer security questions related to the topics taught in class. Projects ask you to get down into

the mud and do some making, breaking, and fixing, i.e., identifying vulnerabilities in computer systems, developing code that exploits the vulnerabilities, coming up with approaches to repair the vulnerabilities, and building systems that satisfy given security requirements.

Over 14 weeks, students will spend about 3 hours per week in class (42 hours total), 4 hours per week on homeworks (56 hours total), and 6 hours per week on projects (84 hours total), for a total expected course workload of 182 hours.

CS162 Attending lab sessions and active participation in them is highly encouraged as it will help the instructor better assess your understanding of the projects in the determination of the final grade.

Coursework consists of doing advanced versions of the 166 projects.

Over 14 weeks, students will spend about one hour per week in labs (14 hours total) and 6 hours per week on projects (84 hours total), for a total expected course workload of 98 hours.

Time and Place

CS166	TuTh	1:00–2:20 pm	CIT 368
CS162	W	4:30–5:50 pm	CIT 368

Grading

A final numerical grade will be computed by weighing the grades of the assignments as follows.

CS166		**CS166 and CS162**	
Homeworks	40%	Homeworks	30%
Project 0	5%	Project 0	5%
Project 1	11%	Project 1	13%
Project 2	11%	Project 2	13%
Project 3	11%	Project 3	13%
Final Project	22%	Final Project	26%

The weights depend on whether one is taking only CS166 or both CS166 and CS162. When calculating the homework portion of the grade, the lowest homework grade will be omitted and the remaining homeworks will be equally weighed. The final letter grade will be determined by the instructor taking into account the final numerical grade and class participation. Students taking both CS166 and CS162 will receive the same final grade in the two courses.

Prerequisites

In order to take CS166, you have must have previously completed (1) CS016, CS018, or CS019; and (2) CS033. Students who have previously taken CS1951-E (a course no longer offered by the department) should not enroll in CS166 given the significant overlap between CS166 and CS1951-E.

Instructor permission is required for CS162. Students enrolling in CS162 must be also simultaneously enrolled in 166.

Textbook

Michael T. Goodrich and Roberto Tamassia: Introduction to Computer Security, Addison Wesley, 2011. ISBN-13: 9780321512949.

Additional Resources

Announcements, lecture slides, additional reading materials, assignments, office hours, and other course information will be posted on the course website, `http://cs.brown.edu/courses/cs166/`. We will use Piazza for questions and answers about course topics and assignments.

Staff

Roberto Tamassia (Instructor)

Zachary Espiritu (Head TA)
Zachary Kirschenbaum (Head TA)

Andrej Simeski (TA)
Hannah Baackmann-Friedlaender (TA)
Harrison Xu (TA)
Kimberly Le (TA)
Linda Park (TA)
Olivia Langley (TA)
Priya Lotun (TA)

For office hours and contact information, see the course website.

iClicker

The course will make use of iClicker Cloud: at each class meeting there will be one or more questions to which you can respond to using your smartphone or laptop. Please visit `https://ithelp.brown.edu/kb/articles/iclicker-cloud-reef-instructions-for-students` for instructions on how to set this up.

iClicker questions will not directly factor into your grade, though they are provided to give students another opportunity to engage with the course material in class meetings.

Late Policy

Homeworks Late homeworks will *not* be accepted.

Projects Each student begins the semester with five late days to use on the first four projects (Projects 0 through 3), *though no more than three late days may be applied to any one deadline.* Submitting any such project late (including intermediate deadlines) will use up the appropriate number of late days. Any further late days will reduce your grade by 25% additively (that is, one day late will incur a 25% penalty, two days late incur a 50% penalty, and so on).

For certain project deadlines, we will not accept any late handins unless you declare the number of late days you'd like to use prior to the deadline; these deadlines will be clearly marked and the process for declaring late days will be discussed in the project handouts.

CS162 students have an additional two late days (seven late days total) to use on the first four projects. However, for students that drop CS162, the number of late days will revert to the CS166 quota and late penalties will be applied if you are over this quota.

Note: No late days can be used for the final project or its intermediate deadlines.

Extenuating Circumstances If there are extenuating circumstances preventing you from completing an assignment on time (e.g., illness), please contact the instructor *before the assignment is due.* We will provide a form to contact the instructor regarding such circumstances and request special arrangements.

Capstone and 2000-Level Credit

Capstone CS166 can be used as a capstone course. Students wishing to take CS166 for capstone credit *must* take CS162, and should register for both CS166 and CS162 in Banner. If you are planning on using CS166 as your capstone course, please email the Head TA list.

2000-Level Credit CS166 and CS162 can be taken together by master's students for 2000-level credit. Students wishing to do this should only register for CS166 (not CS162) in Banner, and should email the Head TA list.

Student Responsibilities

All Brown students are responsible for understanding and following the *Brown Academic Code* and the *Principles of the Brown University Community*. Also, students taking 166/162 must understand and agree to follow the course collaboration policy, which is available on the course website.

Accessibility

Brown University is committed to full inclusion of all students. Students who, by nature of a documented disability, require academic accommodations should contact the professor. Students may also contact Student and Employee Accessibility Services at 401-863-9588 or `SEAS@brown.edu` to discuss the process for requesting accommodations.