

General information

Section: 001, Credit hours: 3, Class meetings: MW 3:30-4:45pm in CIS 3074

Instructor: Jay Ligatti (ligatti@cse.usf.edu), Office location: ENB 333

Office hours: MW 2-3:30pm, and other times by appointment

Course description: Introduction to research in foundations of software security. Basic static and dynamic enforcement of security policies. Roles and meanings of policies, properties, mechanisms, and enforcement. Language-based security and tools for specifying security. **Student outcomes:** Students having successfully completed this course will obtain a breadth of knowledge in the foundations of software security by reading a selection of research papers in the area and will obtain a depth of knowledge by performing independent research in the area.

Course materials

All readings will be from papers available online or handed out in class. Please check the course website (<http://www.cse.usf.edu/~ligatti/foss/19>) regularly for announcements, links to reading material, and an up-to-date schedule. Grades will be posted on Canvas (<http://my.usf.edu/>). I may also send announcements via Canvas, so please ensure that your current email address is stored there.

Tentative schedule

<u>Week</u>	<u>Dates</u>	<u>Topics</u>
1	08/26, 08/28	Introduction and definitions; enforceability theory
2	09/04	Enforceability theory
3	09/09, 09/11	Enforceability theory
4	09/16, 09/18	Enforceability theory; Policy specification and composition
5	09/23, 09/25	Policy specification and visualization
6	09/30, 10/02	Test 1; Firewalls
7	10/07, 10/09	Authentication
8	10/14, 10/16	Vulnerability trends; Buffer overflows
9	10/21, 10/23	Code and noncode injection attacks
10	10/28, 10/30	Injection attacks
11	11/04, 11/06	Test 2; CFI
12	11/13	CFI
13	11/18, 11/20	Noninterference and information flow
14	11/25, 11/27	Usable security; DRM
15	12/02, 12/04	Trustworthiness; backdoors
Final	12/11 (12:30pm)	Final exam (all tests are cumulative)

Final-grade breakdown:

- 40% Tests 1-2 (20% each)
- 30% Final exam
- 30% Research paper, due in class on December 4

Class meetings and tests: Most class meetings will be spent reading and discussing research papers in the broad area of software-security foundations (i.e., theories, models, and philosophies underpinning software security).

The readings will be posted at <http://www.cse.usf.edu/~ligatti/foss/19>. Please attend each class with a copy of the paper we are discussing that day. Our in-class discussions will often reference specific definitions and passages in the research papers.

The two tests and final exam will cover material discussed in class. All tests and the exam are cumulative; earlier material may appear on any test. All tests and the final exam are closed notes, neighbors, phones, laptops, etc.

Tests and the final exam may include one or more essay questions. Respond in complete sentences. Avoid extraneous details in your responses. Essays will be graded based on readability, correctness, and thoroughness.

Research paper: Besides the two tests and final exam, your grade is determined by a research paper due in hard copy in class on December 4. You may complete this paper alone or with another student. The paper should present original, but likely small-scale, research in the broad area of software security. This paper will be graded on readability, correctness, thoroughness, novelty, and significance. It is expected that your paper would be 4-8 pages in length, including well-formatted references.

Late submission: The only graded item that can be turned in late for credit is the research paper, which you may submit up to two days late with a 10% penalty.

Usage of phones and other devices: Besides taking notes (which is encouraged), please do not record class meetings in any way, including taking photographs or audio or video recordings.

Grading system: The scale for final letter grades is as follows, using standard notation for ranges: A ($\infty, 93.3$], A- (93.3, 90], B+ (90, 86.7], B (86.7, 83.3], B- (83.3, 80], C+ (80, 76.7], C (76.7, 73.3], C- (73.3, 70], D+ (70, 66.7], D (66.7, 63.3], D- (63.3, 60], and F (60, $-\infty$). A+ grades may be awarded for exceptionally outstanding work.

Academic honesty: Everything you turn in for this class must be your own work. Students caught violating academic integrity, for example by using notes or a phone during a test, or plagiarizing in a research paper, will receive an FF grade for the course.

Additional USF policies (e.g., regarding academic integrity) may be accessed at: <https://www.usf.edu/provost/faculty/core-syllabus-policy-statements.aspx>