

Syllabus: CSCE 790
Topics in Information Technology
(Introduction to Software Analysis)

1 General Information

Instructor:

Prof. Lisa Luo, email: lluo@cse.sc.edu
Meeting hours: MW 3:55–5:10pm, Swearingen Engr Ctr 2A19
Office hours: MW 2:30–3:55pm, or by appointment

Prerequisite:

Knowledge of computer systems and programming languages.

Description:

This course covers the theory and practice of software analysis and recent research in the area. Software analysis is a body of work that concerns discovering facts about a program. Many diverse software analysis techniques exist, including dataflow analysis, constraint-based analysis, type systems, model checking, symbolic execution, and more. Each technique has its own strengths, weaknesses, and applications to testing, debugging, performance, and cyber security. In this course, we will study the underlying principles of software analysis and these approaches and gain hands-on experience applying them to automate testing software, discovering vulnerabilities in complex programs, and dissecting malware.

This is a graduate-level course targeting Ph.D. students and masters students who are interested in software analysis. There is no course prerequisite but students should have the basic knowledge of computer systems and programming languages.

2 Textbooks

There is no required textbook. All relevant materials will be made available online.

3 Grading

Projects: 30%

Quizzes: 10%

Midterm: 25%

Final: 35%

The grading scale is A = 90 to 100, B+ = 87 to 89, B = 80 to 86, C+ = 77 to 79, C = 70 to 76, D = 60 to 69, F \leq 59.

4 Topic Covered:

- Introduction to Software Analysis
- Static Analysis & Dynamic Analysis
- Reverse Engineering
- Control-Flow Analysis
- Data-Flow Analysis
- Pointer Analysis
- Constraint-Based Analysis
- Random Testing
- Automated Test Generation
- Symbolic Execution
- Model Checking
- Taint Analysis

5 Policies

Cheating:

Feel free to discuss assignments with your classmates verbally. However, **do not share your solutions with other students; do not copy solutions of others or online.** Such behaviors will be reported to the University and lead to an “F” grade.

Grading policy:

If you disagree with any grade, send emails to the instructor documenting the reasons and evidence or talk with the instructor directly. For a grade dispute to be considered, the written grievance must be submitted **within two weeks** of when the respective grade is given.

No late submissions:

Late submissions will **be penalized 20% each day. Beyond three days, late submissions will be recorded as zeros.**

Accommodations for Students with Disabilities:

Any student who has a need for accommodation based on the impact of a documented disability, including special accommodations for access to technology resources and electronic instructional materials required for the course, please contact the Office of Student Disability Services: 777-6142, TDD 777-6744, email sasds@mailbox.sc.edu, or stop by LeConte College Room 112A. All accommodations must be approved through the Office of Student Disability Services.