DD2529 Project Course on Operating Systems and Compiler Support for Security 7.5 credits

Projektkurs i operativsystem och kompilatorstöd för säkerhet

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

Grading scale

P, F

Education cycle

Second cycle

Main field of study

Computer Science and Engineering

Specific prerequisites

Knowledge and skills in programming, 5 credits, equivalent to completed course DD1310-DD1318/DD1331/DD1333/DD1337/DD100N/ID1018/ID1022.

Knowledge in cybersecurity, 6 credits, equivalent to completed course DD2391/DD2395/IK2206/IV1013.

Intended learning outcomes

After passing the course, the student should be able to

- identify vulnerability of systems, exploit them and evaluate their impact
- compare the efficacy of different countermeasures
- design and implement security mechanisms for computer systems
- document their arguments and results

in order to be able to evaluate and improve the security of computer systems.

Course contents

During the course the students work in groups to develop techniques for protecting system software. We focus on vulnerabilities such as buffer overflows, code injection, control flow manipulation, side-channel attacks, and fault injection. The project will use techniques based on memory isolation, runtime monitoring, static analysis, and diversification to prevent, detect, or mitigate illegal behavior. Our experiments are based on an existing operating system and existing compilers.

- Part I. Introductions and tutorials on the operating system and compiler chosen by the teacher for this course.
- Part II. Lectures on the latest defense mechanisms.

Examination

- INL1 - Project Documentation, 1.0 credits, grading scale: P, F
- PRO1 - Project Work, 6.5 credits, grading scale: P, F

Based on recommendation from KTH’s coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability. The examiner may apply another examination format when re-examining individual students. If the course is discontinued, students may request to be examined during the following two academic years.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.