Blekinge Institute of Technology
Department of Computer Science

Revision: 1
Reg.no: BTH-4.1.14-0311-2022

COURSE SYLLABUS

Programvarusäkerhet

Software Security

7.5 credits (7,5 högskolepoäng)

Course code: DV2620
Main field of study: Computer Science, Software Engineering
Disciplinary domain: Technology
Education level: Second cycle
Specialization: A1N - Second cycle, has only first cycle course/s as entry requirements

Language of instruction: English
Applies from: 2022-08-29
Approved: 2022-03-01

1. Decision

This course is established by Dean 2021-12-03. The course syllabus is approved by Head of Department of Computer Science 2022-03-01 and applies from 2022-08-29.

2. Entry requirements

Admission to the course requires 90 credits, of which at least 40 credits are in a technical area where one completed course shall be in programming in C or C++ with a minimum of 6 credits or at least 120 credits, of which at least 90 credits are in a technical area, and a minimum of 2 years professional experience within an area related to software-intensive product and/or service development (shown by, for example, a work certificate from an employer).

3. Objective and content

3.1 Objective

The main purpose of the course is to understand and manage various software security problems in a safe and controlled environment. Risky programming patterns that can be exploited for nefarious purposes can cause significant financial losses and reputational damage to organizations that use or develop vulnerable products. The knowledge and skills imparted during the course are intended to limit the above-mentioned risks and are therefore important for companies and organizations where professional software is being developed.

3.2 Content

The student will learn to understand the adversary's "modus operandi" and to identify risky programming patterns to be avoided. During the course, the student will become familiar with various security mechanisms built into operating systems or provided by specific development tools. The student will also learn to use tools for both code and binaries for purpose to understand exploitation techniques as well as protect software. The course includes the following elements:

- Background to software security and causes of vulnerabilities in software
- Quick introduction to assembler programming for x86-32/64 bit microprocessors
- Handling vulnerabilities in memory management, in system calls and calls to library functions
- Methods and measures to counter unsafe handling of input data
- Tools for analyzing source code and binaries
- Introduction to threat modeling

4. Learning outcomes

The following learning outcomes are examined in the course:

4.1 Knowledge and understanding

On completion of the course, the student will be able to:
- explain how software vulnerability exploitation techniques work.
- explain how protection against specific exploitation techniques in software works.
- explain techniques and implementation choices that lead to safe handling of input data.

4.2 Competence and skills

On completion of the course, the student will be able to:

• apply the tools for analysis of source code and binaries presented during the course.

4.3 Judgement and approach

On completion of the course, the student will be able to:

• evaluate limitations of selected measures and protection mechanisms in relation to a specific vulnerability or lack of security.

5. Learning activities

The teaching takes place in the form of lectures, recorded video material, as well as own studies of fundamentals literature, research literature and other written material. During the course, communication, feedback and discussions with teachers and other participants take place via e-mail, the course's learning platform and via physical or online meetings.

6. Assessment and grading

Modes of examinations of the course

Code	Module	Credits	Grade
2210	Written Assignments 1	2.5 credits	GU
2220	Written Assignments 2	3.5 credits	GU
2230	Written Assignments 3	1.5 credits	GU

The course will be graded G Pass, UX Fail, supplementation required, U Fail.

The information before a course occasion states the assessment criteria and make explicit in which modes of examination that the learning outcomes are assessed.

An examiner can, after consulting the Disability Advisor at BTH, decide on a customized examination form for a student with a long-term disability to be provided with an examination equivalent to one given to a student who is not disabled.

7. Course evaluation

The course evaluation should be carried out in line with BTH:s course evaluation template and process.

8. Restrictions regarding degree

The course can form part of a degree but not together with another course the content of which completely or partly corresponds with the contents of this course.

9. Course literature and other materials of instruction

Materials such as research articles and other course material are provided on the course's learning platform and via BTHs library resources, as well as recommendations for further reading.

10. Additional information

This course replaces the course DV2546.