

COURSE SYLLABUS

Ekosystem och system-av-system

Eco Systems and Systems-of-Systems

7.5 credits (7,5 högskolepoäng)

Course code: PA2573 Main field of study: Software Engineering Disciplinary domain: Technology Education level: Second cycle Specialization: AIN - Second cycle, has only first cycle course/s as entry requirements Language of instruction: English Applies from: 2023-01-16 Approved: 2022-09-01

I. Decision

This course is established by Dean 2018-05-22. The course syllabus is approved by Head of Department of Software Engineering 2022-09-01 and applies from 2023-01-16.

2. Entry requirements

Admission to the course requires completed courses in Software Architectures, 6 credits, Operating systems, 6 hp and Software Development, 6 credits.

3. Objective and content

3.1 Objective

The aim of the course is to better understand how ecosystems and systems of systems contribute to making software products successful. This includes an understanding of different elements of software ecosystems and their supporting role in the creation of systems of systems. The course includes an understanding of different elements of systems of systems. The course explains how the APIs are developed and orchestrated in software ecosystems. This course complements the technology and development focus that dominates the software engineering field today.

3.2 Content

The first part of the course focuses on the nature of software ecosystems, their main components, and forming and management mechanisms. We also discuss the activities associated with the governance of software ecosystems. As the software platform is the core element of each software ecosystem, the course will focus on understanding how APIs support creating and maintaining a healthy ecosystem. The course explains how the APIs are developed and integrated into software ecosystems. Finally, the course covers strategies for building systems of systems with the help of software ecosystems.

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:
- · Gain knowledge of the main elements of a software ecosystem and how they support building systems of systems
- · Gain knowledge of the main elements of systems of systems
- Gain knowledge of planning APIs for the software ecosystems and how stable APIs support growing healthy software ecosystems

4.2 Competence and skills

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

• Evaluate the health of an example ecosystem and the key improvements needed for ensuring healthy growth (as a governance strategy)

• Plan and develop APIs for the software ecosystem that support governance and healthy growth

4.3 Judgement and approach

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

- Justify efforts needed for a software organization to engage in the governance activities of an example ecosystem
- Justify efforts needed for creating stable and robust APIs for the growth of a software ecosystem

5. Learning activities

The course builds upon individual readings, lectures, individual research work, as well as teamwork in assignments. The course is organized around several lectures and seminars where the students are expected to actively participate by discussing, questioning, and reflecting on their understanding of concepts they have read in the course literature and in research papers in the area. These lectures, together with their readings constitute the pillars upon which the group assignments build upon. The two assignments consist of real-world exercises in which the students are intended to apply the concepts, methods and techniques presented in class to document, evaluate and analyze software ecosystems.

6. Assessment and grading

Modes of examinations of the course

| Code | Module | Credits | Grade | |
|------|-----------------------|-------------|-------|--|
| 2305 | Written Assignment I | 2.5 credits | GU | |
| 2315 | Written Assignment 2 | 2.5 credits | GU | |
| 2325 | Take-home Examination | 2.5 credits | GU | |

The course will be graded A Excellent, B Very good, C Good, D Satisfactory, E Sufficient, FX Fail, supplementation required, F 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

Jansen, Slinger, Michael A. Cusumano, and Sjaak Brinkkemper, eds. Software ecosystems: analyzing and managing business networks in the software industry. Edward Elgar Publishing, 2013.

Luzeaux, Dominique, and Jean-Luc Wippler, eds. Complex systems and systems of systems engineering. Wiley-ISTE [Imprint], 2013.

Axelsson, J., Papatheocharous, E., & Andersson, J. (2014). Characteristics of software ecosystems for Federated Embedded Systems: A case study. Information and Software Technology, 56(11), 1457–1475.

In addition to the above books, the course literature shall also include relevant peer-reviewed research articles on the topic, which will be shared on the course page.

