

Project Semester including Bachelor Thesis Project: Secure, Mobile Systems

Programme course

30 credits

Projekttermin inklusive kandidatprojekt: Säkra,
mobila system

TDDD82

Valid from: 2017 Spring semester

Determined by

Board of Studies for Computer Science and
Media Technology

Date determined

2017-01-25

Main field of study

Information Technology

Course level

First cycle

Advancement level

G2X

Course offered for

- Information Technology, M Sc in Engineering

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

Basic computer science, data structures, computer networks, data bases, mobile networks, mathematical statistics, calculus and linear algebra. Completed courses concerning programming i.e. Object oriented programming, Data Structures and Algorithms, Interaction programming, Computer Hardware and Architecture. Furthermore, students should fulfill the requirements to start a bachelor's thesis project.

Intended learning outcomes

The aim of the course is to teach the content by imitating the situation many engineers are introduced to when they begin their professional careers. As a new employee at a company there is a lot to learn in a short time. Many companies send their employees on intensive courses, where they are expected to learn skills that are necessary in order to work with the company's projects.

As a student you are expected to take on the role of a new employee at a company. You

are expected to learn technical-, group- and project aspects that are necessary to function within the company. You are expected to fulfill the technical requirements as well as the professional communication skills necessary to communicate with clients and internal decision makers. During the semester you will work within a project and get practical experience both in project planning and feedback.

You will learn to cooperate with members of your team, clients and experts with a different background than yours. You will see how organizations affect the working groups structure and the individual's ability to act. Furthermore, you will learn to see the wider picture and thereby reflect upon social and ethical aspects.

After a completed course, the student should know how to:

Information security:

- explain and use security terminology and security principles that are presented during the course.
- analyze a situation or an application from an information security standpoint and value fitting mediations that take into consideration risks and threats.
- implement and describe how safe identification and authentication can be implemented in a distributed architecture.
- explain basic cryptographic algorithms and how they are used.

System software:

- understand basic concepts in concurrent programming, such as synchronization, mutual exclusion, semaphores, monitors, and deadlock related problems.
- understand the need for admission control in networks with limited resources, and relate to standard methods to deal with available resources.
- identify and apply methods for fault tolerance in nodes and channels to achieve a predictable level of availability and reliability in communications.
- develop a distributed application that meets requirements on consistency, robustness, and availability.

Software engineering:

- explain the software engineering process and relate it to one's own project.
- explain agile development methods and relate it to one's own project.
- use and demonstrate skills in the development of larger systems on modern mobile platforms such as Android.

Use and integrate knowledge

- show how previously gained knowledge and terminology, techniques and methods

within mobile networks integrates with the subjects presented throughout the course.

- demonstrate previously gained knowledge from mathematics and statistics in a larger context.
- assimilate the content of literature and integrate it with one's own work.

Individual and work related skills

- formulate questions and create boundaries within timeframes.
- search and value information from scientific literature and relate to the information in a professional manner and to the current project.

Working in a group

- plan and complete an independently run group project, where decisions are made in relation to relevant scientific, social and ethical aspects.
- describe and use basic group-psychological concepts such as structure, process and development.
- show the contextual dependence for a groups structure and their ability to solve practical problems, specifically with regards to situations that relate to the groups security and risk.
- describe and explain the role of leadership for individuals and groups efficiency, specifically with regards to situations that relate to the groups security and risk.
- experience from discussing with external consultants about different forms of professional support for development of the groups ability to solve internal questions and problems.

Communication

- professional written and oral communication.
- review and discuss an oral and a written independently completed project and report.
- show active participation at presentations.
- communicate how judgment has been used in a project in relation to scientific, social and ethical aspects.

CDIO

- construct an architectural plan for a larger system where considerations are made to economical- (time), social-, ethical-, business-, and corporate conditions.
- create a larger technical system from analyses and evaluations of existing solutions.
- assess a part of a project deeper in an individual and independently run project.

- describe basic normative ethical theories, principals and concepts.
- describe and reflect about social scientific theories regarding risk and communication, specifically in relation to technical development.
- use ethical, group-psychological and social concepts on a specific case.
- use basic normative ethical theories, principles and concepts on social related information technology cases.
- from an ethical perspective reflect about social questions that concern the use of information technology , specifically on questions concerning priority, risk and security.

Course content

Information security: Basic theory regarding information security. Concepts such as risk, threat, confidentiality, integrity and availability. Implementation of cryptographic algorithms for security problems. Identification and authentication. Basic network security. Security in distributed systems.

System software: Concurrent processes, communication, synchronisation and shared resources. Distributed systems with special emphasis on alternative system models, and trade-offs between different requirements like availability, performance, fault tolerance, and security. Dependability terminology, fault modes, and metrics for evaluation of availability and reliable communication during overloads. Methods for management of network resources to satisfy quality of service (QoS) in wired networks.

Software engineering: Basic knowledge regarding software development methods, agile methods and development on modern mobile applications such as Android.

Group-psychology: Basic knowledge regarding the structure and processes of work groups in an organisational context, with focus on risk and security.

Sociotechnological: Basic knowledge of theory regarding social theory of risk, security and communication concerning technical and social development.

Teaching and working methods

The course starts with an intensive set of lectures and individual exams. After this period the group project starts. The examination is done group-wise. A bachelor thesis is completed in pairs, this thesis is a further development of the group-project. The course stretches across the entire semester.

Examination

PRA1	Project assignment with oral and written presentation	U, G	16 credits
UPG1	Written test and seminars in Man-Technology-Society	U, G	6 credits

UPG2 Hand-in-assignments in software engineering	U, G	2 credits
TEN1 Written examination in information security	U, 3, 4, 5	3 credits
TEN2 Written examination in system software	U, 3, 4, 5	3 credits

Grades

Four-grade scale, LiU, U, 3, 4, 5

Department

Institutionen för datavetenskap

Director of Studies or equivalent

Patrick Lambrix

Examiner

Nahid Shahmehri

Education components

Preliminary scheduled hours: 240 h

Recommended self-study hours: 560 h

Course literature

Se litteraturlista på kursens hemsida.