



DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DIT635 Software Quality and Testing, 7.5 credits

Mjukvarukvalitet och testning, 7,5 högskolepoäng

First Cycle

Confirmation

This course syllabus was confirmed by Department of Computer Science and Engineering on 2017-12-19 to be valid from 2018-08-19, autumn semester of 2018.

Field of education: Science 100%

Department: Department of Computer Science and Engineering

Position in the educational system

The course is compulsory within the Software Engineering and Management Bachelor's Programme. It is also a single subject course at the University of Gothenburg.

The course can be part of the following programmes: 1) Software Engineering and Management Bachelor's Programme (N1SOF) and 2) Software Engineering and Management, Bachelor's Programme (N1SEM)

Main field of studies

Software Engineering

Specialization

G1F, First Cycle, has less than 60 credits in first-cycle course/s as entry requirements

Entry requirements

To be eligible for this course, students must have successfully completed a 7.5 credits course in object-oriented programming (e.g., DIT042 Object-Oriented Programming, 7.5 credits, or equivalent).

Applicants must prove knowledge of English: English 6/English B or the equivalent level of an internationally recognized test, for example TOEFL, IELTS.

Learning outcomes

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

Knowledge and understanding

- explain quality assurance models in software engineering and the contents of quality assurance plans
- describe the distinction between software verification and software validation
- name and describe the basic concepts on testing, as well as different testing techniques and approaches
- describe the connection between software development phases and kinds of testing
- exemplify and describe a number of different test methods, and be able to use them in practical situations
- exemplify and describe tools used for testing software, and be able to use them and interpret their output

Competence and skills

- exemplify and describe the area of formal verification in general, including model checking and runtime verification, and its relationship to software quality
- define metrics required for monitoring the quality of projects, products and processes in software engineering
- construct appropriate and meaningful test cases, and interpret and explain (to stakeholders) the results of the application of such test cases (using appropriate tools) to practical examples
- write models in at least one formal specification language
- plan and produce appropriate documentation for testing
- apply different testing techniques on realistic examples

Judgement and approach

- identify emerging techniques and methods for quality management using relevant information sources
- identify and hypothesize about sources of program failures, and reflect on how to better verify the correctness of such programs

Course content

The course introduces the students to the concepts and best practices of quality assurance and testing in software engineering. The course has two general themes: (1) the role of quality assurance in software development; (2) the role of testing in software quality assurance.

The course first introduces the notion of software quality. The students are made acquainted with quality and quality assurance. They learn methods and techniques to assure quality of both the end product (a system or application), and for the software

process itself. The role of quality assurance is described for software, for a software process, and for a software project. It is explained how these are related in an organization.

The course then covers testing tools, techniques and methods that can be used to assess the quality and correctness of software systems. The course brings understanding on how these methods, techniques and tools can be used in a software development project to increase the software quality. An overview of other verification techniques are also presented. Students will get hands-on experience in building a model for testing and they use this model for both testing and verification purposes.

Sub-courses

- 1. Written examination** (*Skriftlig tentamen*), 4.5 higher education credits
Grading scale: Pass with Distinction (VG), Pass (G) and Fail (U)
- 2. Assignments** (*Inlämningsuppgifter*), 3 higher education credits
Grading scale: Pass (G) and Fail (U)

Form of teaching

The teaching consists of lectures, exercises and examination parts, as well as supervision in connection to the exercises.

Language of instruction: English

Assessment

The course is examined by an individual written exam carried out in an examination hall and written assignments carried out in groups of normally 2-3 students. The assignments part is examined on the basis of solutions to compulsory problems handed in during the course and on the basis of individual contribution to the group work.

Students are required to complete written self- and peer-assessment forms during the course which will be part of the assessment of the student's individual contribution to the project.

Retake examinations of the assignments part consist of written individual assignments.

If a student, who has failed the same examined component twice, wishes to change examiner before the next examination, a written application shall be sent to the department responsible for the course and shall be granted unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

In cases where a course has been discontinued or has undergone major changes, the student shall normally be guaranteed at least three examination occasions (including the ordinary examination) during a period of at least one year from the last time the course

was given.

Grades

The grading scale comprises: Pass with Distinction (VG), Pass (G) and Fail (U). A Pass grade (G) for the entire course requires at least a Pass grade for all sub-courses.

To be awarded Pass with Distinction (VG) for a full course, the student must, in addition, receive a VG on the sub-course Written examination.

Course evaluation

The course is evaluated through meeting after the course between teachers and student representatives. Further, an anonymous questionnaire is used to ensure written information. The outcome of the evaluations serves to improve the course by indicating which parts could be added, improved, changed or removed.

Additional information

Course literature to be announced the latest 8 weeks prior to the start of the course.

The course replaces the course DIT085, 6.0 credits. The course cannot be included in a degree which contains DIT085. Neither can the course be included in a degree which is based on another degree in which the course DIT085 is included.