DIT848 Model-Based Testing, 7.5 credits

Modellbaserad testning, 7,5 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by The IT Faculty Board on 2010-09-24 and was last revised on 2019-12-09 by Department of Computer Science and Engineering to be valid from 2021-01-18, spring semester of 2021.

Field of education: Science 100%
Department: Department of Computer Science and Engineering

Position in the educational system

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

The course can be part of the following programmes: 1) Computer Science, Master's Programme (N2COS), 2) Applied Data Science Master's Programme (N2ADS) and 3) Software Engineering and Management Master's Programme (N2SOF)

Main field of studies	*Specialization*
Computer Science	A1F, Second cycle, has second-cycle course/s as entry requirements
Software Engineering	A1F, Second cycle, has second-cycle course/s as entry requirements

Entry requirements

To be eligible for the course Model-Based Testing, the student should have a bachelor degree in Software Engineering, Computer Science, Computer Engineering, Information Technology, Information Systems or equivalent.

In addition, the student should have completed courses in:

- 7.5 credits programming (e.g. DIT948 Programming, DIT012 Imperative Programming with Basic Object Orientation, DIT143 Functional Programming 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

After completion of the course the student should be able to:

Knowledge and understanding
- explain the distinction between software verification and software validation
- describe the connection between software development phases and kinds of testing
- describe and explain (a number of) different test methods, and use them in practical situations
- describe and explain what model-based testing is
- describe many different types of models and explain their relative merits
- describe and explain current research trends in automated testing

Competence and skills
- construct models in the modeling and specification languages learned in the course
- construct appropriate and meaningfuls tests and explain to stakeholders the results of applying them
- apply model-based testing and automated testing technologies on realistic examples using relevant tools

Judgement and approach
- understand the trade-offs between and judge which model-based testing approaches and tools best suit a particular situation
- identify and hypothesize about sources of program failures, and reflect on how to better verify the correctness of such programs

Course content

Testing is one of the most used verification and validation technique in industry. This course provides the students with a general background on testing techniques, with a focus on the theory and practice of model-based testing.

The course provides the students with a background on the theory and practice of model-based testing, including how testing tools can be used to improve software quality. General test techniques are explained with focus on model-based testing. Students will get hands-on experience in building models for testing and use these

models for both testing and verification purposes.

Sub-courses

1. **Written examination** *(Skriftlig tentamen),* 4.5 credits
   Grading scale: Pass with Distinction (VG), Pass (G) and Fail (U)

2. **Assignments** *(Inlämningsuppgifter),* 3 credits
   Grading scale: Pass with Distinction (VG), Pass (G) and Fail (U)

Form of teaching

The course is provided in the form of modules, which combines lectures, discussions and supervised practical work with exercises in small groups (assignments). The students are expected to have prepared for and to be active during the whole module. The exercises are both theoretical and practical in nature.

Language of instruction: English

Assessment

The course is examined by an individual written exam carried out in an examination hall and written assignments. Some of the assignments are carried out individually, some in small groups of normally 2-3 students, and some in larger groups.
The assignments are graded individually, taking into account the group work as well as the student's individual contribution to the group work.

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.

In order to get the grade Pass with Distinction (VG) the student must get the grade VG on all sub-courses.

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

The course is a joint course together with Chalmers.

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