



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Programvarutestning Software Testing

ETSN20, 7,5 credits, A (Second Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED C/D

Date of Decision: 2023-04-18

General Information

Elective for: C4, D4-se, E4-pv, F4, F4-pv, I4-pvs

Language of instruction: The course will be given in English

Aim

The objective of the course is to give basic and advanced knowledge and skills within testing and reviews for large-scale development of systems completely or partly based on software. The course gives practical skills in methods and techniques for software testing. Further, the course aims to train the student in searching and assessing knowledge at the research front in software testing.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- be able to define basic concepts and principles within software testing
- give an account of the most common techniques for software testing and reviews
- be able to describe the relation between the software testing process and other processes in the product lifecycle, as well as organizational issues
- be able to describe the relation between verification and the requirements of a software system in terms of functionality and quality
- be able to report an in-depth area of own choice, and demonstrate theoretical depth or practical application, related to the state-of-art of the area

Competences and skills

For a passing grade the student must

- be able to motivate the choice of test strategy and organization for different types of software systems
- be able to analyse and create test cases for which box and black box testing
- be able to perform a review
- be able to apply a systematic approach for software testing

Judgement and approach

For a passing grade the student must

- understand the complexity of the task to perform tests and reviews of a software system and be aware of the costs and the impact of different testing activities during the development of a software product
- be able to value and synthesize the information given in published scientific articles about software testing

Contents

Verification and validation activities at different levels in software development

- planning, design, execution/reporting, and analysis

Different types of verification and validation and trade-offs between them

- Static – dynamic verification (test – review)
- Interface based – structure based verification (black-box – white-box)
- Exploratory – Scripted
- Manual – automated
- Functional tests – quality tests
- Unit tests – Integration/regression/system tests
- Developer tests – Acceptance tests

Testing techniques

- Equivalence class partitioning
- Boundary value analysis
- Coverage-based testing
- Combinatorial testing

Test management

- Data collection during reviews and testing: reliability, coverage
- Defect management
- Test organizations
- Social aspects in reviews and tests

Lectures give a theoretical overview and help for private studies.

Lab sessions give practical training in applying different test techniques and relate theory to practice through discussions of problems and solutions.

Projects give practical skills and training in different areas of software testing by literature search, analysis and presentation.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: Examination is based on both individual and group assessment. Project work is assessed in groups, lab sessions are assessed in pairs, and the written exam is assessed individually. For final mark the student must pass lab sessions, project and written exam. The final mark is a combination of written exam marking and project marking.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Parts

Code: 0119. **Name:** Software Testing.

Credits: 4,5. **Grading scale:** TH. **Assessment:** Written examination. **Contents:** Written exam

Code: 0219. **Name:** Project.

Credits: 3. **Grading scale:** UG. **Assessment:** Project in teams. **Contents:** Project in teams

Code: 0319. **Name:** Labs.

Credits: 0. **Grading scale:** UG.

Admission

Admission requirements:

- ETSA01 Software Engineering Process - Methodology OR ETSA05 Software Engineering Process - Soft Issues OR EDAN80 Coaching of Programming Teams OR ETSA02 Software Engineering - Methodology OR ETSF25 The Business of Software OR ETSN05 Software Development for Large Systems, performed course tasks OR ADAG05 Agile Software Development - Project OR ETSA03 Software Engineering - Methodology
- EDA016 Programming, First Course or EDA017 Programming, First Course or EDAA10 Computer Programming in Java or EDAA20 Programming and Databases or EDAA45 Introduction to Programming or EDAA50 Programming, First Course or EDAA55 Programming, First Course or EDAA65 Programming, First Course

The number of participants is limited to: No

The course overlaps following course/s: ETS200

Reading list

- K Naik and P Tripathy: Software Testing and Quality Assurance: Theory and Practice. Wiley, 2008, ISBN: 978-0-471-78911-6.
- Additional literature assigned by the department.

Contact and other information

Course coordinator: Prof. Per Runeson, Per.Runeson@cs.lth.se

Course homepage: <http://cs.lth.se/etsn20>

Further information: Compulsory items: project, lab sessions, presentations, reports.