DIT278   Empirical Software Engineering, 7.5 credits

Empirical Software Engineering, 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 2019-10-28 by Department of Computer Science and Engineering to be valid from 2020-08-31, autumn semester of 2020.

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

Position in the educational system

The course is a compulsory course in the Software Engineering, Master's Programme. The course is offered within the framework of several degree programmes. The course 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), 3) Game Design & Technology Master's Programme (N2GDT), 4) Software Engineering Master's Programme (N2SOM) and 5) Software Engineering and Management Master's Programme (N2SOF)

Main field of studies	*Specialization*
Software Engineering	A1N, Second cycle, has only first-cycle course/s as entry requirements

Entry requirements

To be eligible for the course Empirical Software Engineering the student should have a bachelor degree in Software Engineering, Computer Science or equivalent.

Applicants must also 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 is expected to be able to:

Knowledge and understanding
- describe, understand, and apply empiricism in software engineering
- describe, understand, and partly apply the principles of case study research/experiments/surveys.
- describe and understand the underlying principles of meta-analytical studies.
- explain the importance of research ethics.
- recognise and define code of ethics for when conducting research in software engineering.
- discuss and explain the most common ethical models in research.
- state and explain the importance of threats to validity and how to control said threats.

Competence and skills
- design and implement an empirical study
- assess suitability of and apply methods of analysis on data
- analyse descriptive statistics and decide on appropriate analysis methods.
- use and interpret code of ethics for software engineering research.

Judgement and approach
- state and discuss the tools used for data analysis and, in particular, judge their output.
- judge the appropriateness of particular empirical methods and their applicability to attack various and disparate software engineering problems.
- question and assess common ethical issues in software engineering research.

Course content

This course is for students who are interested in the empirical methods applied to the field of software engineering. The course introduces quantitative and qualitative methods in software engineering with accompanying statistical methods used for analysis.

The course contains:

- Descriptive and inferential statistical methods applied to software engineering.
- Conducting qualitative and quantitative methods in software engineering.
- Methods for analyzing quantitative and qualitative data in software engineering.

- Usage of statistical tools.

Sub-courses

1. **Assignments** *(Inlämningsuppgifter),* 2.5 credits
   Grading scale: Pass (G) and Fail (U)

2. **Written hall examination** *(Skriftlig salstentamen),* 5 credits
   Grading scale: Pass with Distinction (VG), Pass (G) and Fail (U)

Form of teaching
Lectures, laboratory work, group supervision, problem-based teaching.

Language of instruction: English

Assessment
The course is examined by written lab assignment carried out in groups of normally 3-4 students (2.5 hec). The assignments are graded individually, taking into account the group work as well as the student's individual contribution to the group work.
The course is also examined by an individual written exam carried out in an examination hall (5 hec). The assignment are both theoretical and practical in nature.

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).
To be awarded the grade Pass for the full course, the student should get the grade Pass on both the sub-courses.
To be awarded the grade Pass with Distinction, the student should get the grade Pass with Distinction on the sub-course Written Exam and get the grade Pass on the sub-course assignment.

Course evaluation

The course is evaluated through meetings both during and 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.