Course Program
TFRG55 Requirements Engineering for Digital Systems
http://cs.lth.se/krav

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The objective of the course is to give basic and advanced knowledge and skills within requirements engineering for large-scale development of systems completely or partly based on software. The course gives both theoretical knowledge and practical skills in methods and techniques for requirements engineering. The course gives training in scientific paper reading.

1 Learning Objectives

1.1 Knowledge and understanding

For a passing grade the student must

1. be able to define basic concepts and principles within requirements engineering
2. give an account of several different types of requirements
3. be able to describe and value several different methods and techniques for requirements engineering
4. be able to describe and relate different sub-processes within requirements engineering
5. be able to describe the relation between the requirements engineering process and other processes in the product lifecycle

1.2 Skills and abilities

For a passing grade the student must

1. be able to choose suitable requirements techniques for a given context
2. be able to apply several different techniques for requirements elicitation
3. be able to apply several different techniques for requirements specification
4. be able to apply several different techniques for requirements validation
5. be able to apply several different techniques for requirements prioritisation

1.3 Judgement and approach

For a passing grade the student must

1. be able to consciously select a process depending on the nature of the requirements
2. show a systematic and long-term approach to processes
3. be able to consciously see the problem in the relation between the quality of requirements and the quality of the resulting implementation
4. be able to adequately involve users in the requirements engineering process

2 Contents

The course includes theory and practice regarding the following topics:

1. Requirements on different abstraction levels and in different contexts
2. Sub-processes of requirements engineering and their relation
3. Specification of data requirements, e.g. using virtual windows and data models
4. Specification of functional requirements, e.g. using textual feature requirements and task descriptions
5. Specification of different types of non-functional requirements, e.g. usability, performance, reliability
6. Different techniques for requirements elicitation
7. Different techniques for requirements validation
8. Different techniques for requirements prioritization

3 Course elements

L: Lectures The lectures provide an overview of the literature. They do not cover every detail, but give a high-level structure of the subject and thereby aid self-studies of the literature. Discussions are promoted.

E: Exercises The main objective of the exercises is to support the project and prepare for the written exam through prototypical problems, by connecting theory to practice and to give opportunity to discuss details of RE techniques.

LAB: Computer lab sessions The lab sessions illustrate computer supported prioritization and release planning, and demonstrates the complexity of requirements selection and scheduling. Preparations are mandatory.

P: Project The project involves performing practical requirements engineering for a given case, and in performed individually. The project involves a number of deliverables.

4 Assessment

- The project is graded fail/3/4/5 based on project deliverables.

- Approved lab session preparations and assignments are required for passing.

- The written exam comprises two parts: a multple-choice part and a part with essay and practical assignments. 50 percent is required for each part for passing. The essay and practical assignment part yields max 100 points and determines the grade 3-4-5.

- The final course grade on the scale fail/3/4/5 is based on the written exam points (from essay and practical assignment) and the project grade using the following mapping:

	Project: 3	Project: 4	Project: 5
	Exam points		
Final: 3	≥ 50	≥ 50	≥ 50
Final: 4	≥ 75	≥ 67	≥ 60
Final: 5	≥ 90	≥ 83	≥ 75

5 Literature

The course elements and the written exam will cover the following literature:

Lau	Soren Lauesen, Software Requirements - Styles and Techniques, Addison-Wesley, ISBN 0-201-74570-4, 2002.
LAB1&2	Preparations and instructions for Lab 1: "Requirements Modeling" and Lab 2: "Requirements Prioritization and Release Planning"
PRIO	"Requirements Prioritization", Patrik Berander and Anneliese Andrews, Engineering and Managing Software Requirements, Eds. A. Aurum and C. Wohlin, Springer, ISBN 3-540-25043-3, 2005
QUPER	Supporting Roadmapping of Quality Requirements - B Regnell, Richard Berntsson Svensson, Thomas Olsson, IEEE Software 25(2) pp 42-47 March-April 2008
INSP	"Att inspektera krav". Sid 67-76, Framgångsrik kravhantering, andra utgåvan, Teknikföretagen, Joachim Karlsson, V040072, ISSN 1103-7008, 1998
AGRE	"Agile Requirements Engineering Practices: An Empirical Study", Lan Cao, Balasubramaniam Ramesh, IEEE Software , January/February 2008, pp.60-67, 2008
ATCR	"A multi-case study of agile requirements engineering and the use of test cases as requirements.", Bjarnason, E., et al., Information and Software Technology 77, 2016, pp. 61-79, 2016

6 Overview

		Topic	Literature	When
W1	L1	Introduction BR	Lau:1	Tue 15-17
	L2	Meet your Product Owner, Elicit, Prio BR	Lau:8, PRIO	Wed 13-15
	E1	Requirements types, Context diagram	Lau:1	Thu 10-12 or 13-15
W2	L3	Specification 1, reqT BR	Lau: 2-4	Tue 15-17
	L4	Specification 2 BR		Wed 13-15
	P	Project Mission: hand-in		Tue 23.59
	E2	Elicitation	Lau: 8	Thu 10-12 or 13-15
	Lab1	Reqts Modelling, Prio	LAB1	We 15-17, Fr 10-12 or 15-17
	P	Supervision meeting		
W3	L5	RE in the real world. Guest: Hampus Jacobsson++, Rel plan BR,	RP	Tue 15-17
	L6	Product mgmt, Market-driven + Open Source RE, Interdependencies Guest: Johan Linåker	MDRE, OSSRE, INTDEP	Wed 13-15
	E3	Functional requirements	Lau:2-4	Thu 10-12 or 13-15
	P	Release R1: hand-in		Deadline Sun 23.59
W4	P	Supervision meeting		
	L7	Specification 3, Quality, Lifecycle	Lau:5-7, QUPER	Tu 15-17
	E4	Quality requirements	Lau:6, QUPER	Thu 10-12 or 13-15
	Lab2	Prioritization, Release Planning	LAB2	We 15-17, Fr 10-12 or 15-17
W5	L8	Validation, Inspections, Agile RE EB	Lau:9, INSP, AGRE, ATCR	Tue 15-17
	E5	Validation	Lau:9, INSP	Thu 10-12 or 13-15
	P	Release R2: hand-in and send to validation group		Deadline Sun 23.59
	P	Validation Checklist: hand-in and to validation group		Deadline Sun 23.59
W6	P	Supervision meeting		
	P	Validation Report: hand-in and to authoring group		Deadline Thu 23.59
W7	P	Release R3: hand-in		Deadline Sun 23:59
Mar		Exam	All literature	March 18, Fr 8-13
	P	Course Evaluation -> BR EB, 1 per project		March 25, Fr 23.59

NOTE: Lecture L6 is optional for TFRG55.

7 Personnel

Bjorn.Regnell BR	Coordinator, Lectures, Exam
Elizabeth.Bjarnason EB	Coordinator, Lecture, Exercises, Exam
Johan.Linaker JL	Lecture
Sergio.Rico SR	Project and lab supervision
TBD	Project and lab supervision
Ulrika Templing	Course Secretary

...all e-mails @cs.lth.se

8 Rooms

What	Where
Lectures	E:C, for all but L2 E:A
Exercises	E:1124. For E5 in E:1145
LAB	E:Val
Exam	MA 9A, 9B