

# Course Program

## ETSN15 Requirements Engineering

<http://cs.lth.se/etsn15>

**Björn Regnell, Elizabeth Bjarnason**

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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
6. be able to describe the relation between requirements engineering and market-driven product management
7. be able to discuss some scientific results within requirements engineering research

### 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

The release plan defines which requirements that are implemented by the project group as mock-up designs in release R3, and which requirements are selected to be fully implemented in the imagined releases R4 and R5.

### 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
5. be able to consciously see the problem in the relation between requirements engineering and economical aspects of product development

## 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
9. Market-driven requirements engineering and product management

### 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 is carried out in groups of 6-8 students. The project involves a number of deliverables and a final project conference where the learning outcome of each project is presented. Project groups are established during the first course week. Project assignments are established during the second course week.

### 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 100 points. The pass limit is 50 points.
- The final course grade on the scale fail/3/4/5 is based on the written exam points 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"

MDRE "Market-Driven Requirements Engineering for Software Products", Björn Regnell and Sjaak Brinkkemper, Engineering and Managing Software Requirements, Eds. A. Aurum and C. Wohlin, Springer, ISBN 3-540-25043-3, 2005

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

OSSRE "Understanding Requirements for Open Source Software", Walt Scacchi, Design Requirements Engineering: A Ten-Year Perspective, Springer, pp. 467-494, 2009

PRMAN "Software product management.", Fricker, S. A., In Software for People, pp. 53-81. Springer, Berlin, Heidelberg.2012

RP "The Art and Science of Software Release Planning", Günther Ruhe and Moshood Omolade Saliu, IEEE Software, November/December, pp. 47-53, 2005

QUPER Supporting Roadmapping of Quality Requirements - Björn 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

INTDEP "An industrial survey of requirements interdependencies in software product release planning", Carlshamre, P., Sandahl, K., Lindvall, M., Regnell, B., Natt och Dag, J.: Int. Conf. on Requirements Engineering (RE01), Toronto, Canada, pp. 84-91, 2001

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

	<i>Topic</i>	<i>Literature</i>	<i>When</i>
<b>W1</b>	L1 Introduction BR	Lau:1	Tue 15-17
	L2 Mission lottery JL Elicit, Prio BR	Lau:8, PRIO	Wed 15-17
	E1 Requirements types, Context diagram	Lau:1	Thu 10-12 or 13-15
<b>W2</b>	L3 Specification 1, reqT BR	Lau: 2-4, reqT.org	Tue 15-17
	L4 Specification 2 BR		Wed 15-17
	P Project Mission -> supervisor		Thu 09:00
	E2 Elicitation	Lau: 8	Thu 10-12 or 13-15
	Lab1 Requirements Modelling, Prio	LAB1	Fr 8-10, 10-12 or 13-15
	P Meeting with supervisor		
<b>W3</b>	L5 Product mgmt, Market-driven + Open Source RE, Interdependencies JL	PRMAN, MDRE, OS-SRE, INTDEP	Tue 15-17
	L6 Prototyping. Guest: Hampus Jacobsson, Rel plan BR	RP	Wed 15-17
	E3 Functional requirements	Lau:2-4	Thu 10-12 or 13-15
<b>W4</b>	P Release R1 -> supervisor		Deadline Mon 09:00
	P Meeting with supervisor		
	L7 Validation, Inspections, Agile RE EB	Lau:9, INSP, AGRE, APCR	Tue 15-17
	L8 Specification 3, Quality, Lifecycle	Lau:5-7, QUPER	Wed 15-17
	E4 Quality requirements	Lau:6, QUPER	Thu 10-12 or 13-15
Lab2 Prioritization, Release Planning	LAB2	Fr 8-10, 10-12 or 13-15	
<b>W5</b>	E5 Validation JL, DH	Lau:9, INSP	Thu 10-12 or 13-15
<b>W6</b>	P Release R2 -> validation group, supervisor		Deadline Mon 09:00
	P Meeting with supervisor		
	P Validation Checklist-> validation group & supervisors		Deadline Mon 09:00
	P Validation Report-> authoring group & supervisors		Deadline Fri 09:00
<b>W7</b>	P Conference presentation -> EB JL		Deadline Mon 12:00
	DH		
	L9 Project conference		Wed 15:05-17
<b>Mar 18 Feb</b>	P Release R3 -> supervisor		Deadline Sun 23:59
	Exam	All literature	March 22, Fre 14-19
	P Course Evaluation -> BR EB, 1 per project		Mar 29, Fr 09:00

## 7 Personnel

Bjorn.Regnell BR  
Elizabeth.Bjarnason EB

Johan.Linaker JL  
Daniel.Helgesson DH  
Ulrika Templing  
...all e-mails @cs.lth.se

Coordinator, Lectures, Labs, Exam  
Coordinator, Lecture, Exercises, Project supervision, Exam  
Lecture, Project and lab supervision  
Project supervision  
Course Secretary

## 8 Rooms

<i>What</i>	<i>Where</i>
Lectures	MA3 (Tue), E:B (Wed)
Exercises	E:1147/49
LAB	E:Gamma (Fr 8-10, 10-12), E:Mars (Fr 13-15)
Exam	MA:MA09-E-F