BIRZEIT UNIVERSITY

Faculty of Engineering and Technology
Master of Software Engineering (SWEN)

Software Requirements Engineering (SWEN6303)
First Semester 2019/2020

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Course Description

One of the main challenges in software development is to make sure you are developing the right system, i.e. to understand the requirements that need to be fulfilled. The focus of this course is how to find and collect requirements from relevant sources both at the start and during a software development project. But also how to manage changes as a software projects evolves. Different methods for this as well as different underlying principles and formats for documenting and maintaining requirements are covered.

The course covers the state-of-the-art and state-of-the-practice in software requirements engineering; topics include how to determine, specify and validate the requirement (both functional and non-functional) of a software system, in-depth coverage of requirement engineering methods, techniques, tools, notations, validation techniques for the analysis and specification of software requirements.

Course Content

- Basics of requirements engineering
- Requirements inception and elicitation
- Requirements analysis and specification - modeling techniques
- Requirements verification, and validation
- Requirements management
- Examples of requirements approaches in typical development processes

Intended Learning Outcomes (ILOs):

The course aims to develop comprehensive understanding in requirements engineering techniques and methods, and apply them through case studies, team project work and research investigations.

1. Discuss the importance of requirements engineering to successful software engineering
2. Describe the challenges involved in requirements engineering
3. Distinguish between various types of requirements
4. Apply requirements engineering task, elicitation, validation, specification, and prioritization, according to up-to-date industrial standards
5. Apply state of-the-practice requirements engineering process and techniques on different project types.
6. Apply analysis techniques such as needs analysis, goal analysis and use case analysis to analyze requirements.
7. Apply UML and other modeling languages to represent system models.
8. Analyze and criticize current research in requirements engineering.

Schedule

week	Topics	Reading
1,2	1. Basics of requirements engineering	Ch01 [1], ch 01 [2],Ch4.1-4.4 [4]
	1.1. definition of requirements engineering	
	1.2. importance of requirements engineering	
	1.3. place of requirements engineering in development process	
	1.4. types of requirements: functional requirements, non-functional requirements, quality attributes	
	1.5. main requirements engineering activities, documents and processes	Ch 03 [2]
3,4	2. Requirements inception and elicitation	Ch02 [1],
	2.1. product vision and project scope	Ch05 [2]
	2.2. traditional elicitation approaches (interviews, stakeholders study, workshops, ...)	Ch06-ch07 [2]
	2.3. scenario/use case approaches	ch08 [2]
	2.4. prototyping	Ch02 [1]
5	3. Requirements Evaluation	Ch 03 [1], ch16[2]
	4. Requirements analysis and specification - modeling techniques	
6	4.1. inception vs. specification	Ch04 .1 [1]

	4.2. techniques for writing high-quality requirements	Ch04.2-4.3 [1]
8	4.3. documentation standards (e.g., IEEE 830-1998)	Ch10,11,14[2]
9	4.4. goal-oriented modeling	Ch07,ch08 [1]
10	4.5. Object Oriented analysis and other techniques	Ch10 [1]
11	4.6. Modeling System Operations	Ch 12 [1]
12	4.7. Modeling System Behaviors	Ch 13 [1]
13	4.8. Goal-Oriented Model Building Method in Action	Ch 15 [1]
14	5. Requirements verification, and validation	Ch 5.1[1], Ch 17[2]
15	6. Requirements management	
	6.1. traceability, and change management	Ch 06 [1]
	6.2. tool support (e.g., DOORS)	Ch 09 [5]

Evaluation

- Group Project 30%
- Research Assignments and Presentation 15%
- HomeWorks 15%
- Final Exam 40%

References

1. *Axel van Lamsweerde, Requirements Engineering: From System Goals to UML Models to Software Specifications, Wiley, 2009.*
2. *Karl E. Wiegers, Joy Beatty, Software Requirements, 3rd edition, Microsoft Press, 2013*
3. Soren Lauesen, Software Requirements - Styles and Techniques, Addison-Wesley, ISBN 0-201-74570-4, 2002.
4. I. Sommerville, Software Engineering, 9th ed., Addison-Wesley, 2011.
5. Jeremy Dick, Elizabeth Hull, Ken Jackson, Requirements Engineering, 3rd edition, Springer-Verlag, 2010 (discusses IBM DOORS).
6. Ian Alexander and Ljerka Beus-Dukic, Discovering Requirements: How to Specify Products and Services, Wiley, 2010

Research Papers, will be given before and after lectures.