Presentation of the Curricular Unit

Requirements Engineering and Software Modeling

MESW

2024/2025

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Learning Objectives

Plan

Evaluation

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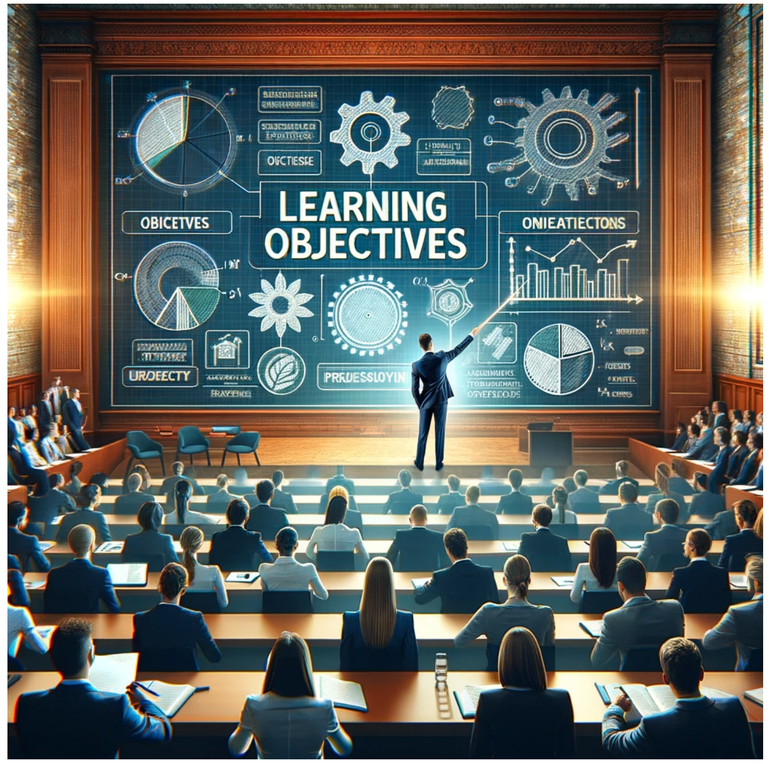
By the end of the course, students should be able to:



- know the basic fundamentals of requirements engineering (importance in the software development process, Requirements Level Classification, Types of requirements, The role of stakeholders);
- select, describe, and apply multiple techniques for gathering requirements;
- write a complete requirements document following best practices and standards;
- validate and verify requirements (including performing risk analyses);
- understand how formal validation can help in the requirements validation process;
- describe the requirements specification process in agile methodologies;
- select tools to support the requirements engineering process;
- apply requirements management techniques.

Learning Objectives

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Class 1 Introduction to Requirements Engineering	**Class 2** Requirements Elicitation	**Class 3** Writing the Requirements Document	**Class 4** Requirements Validations and Verifications	**Class 5** Formal Methods	**Class 6** Requirements Specification and Agile Methodologies
Class 7 Requirements Management	**Class 8** Tool Support for Requirements Engineering	**Class 9** Case Studies and Real-world Examples	**Class 10** Case Studies and Real-world Examples	**Class 11** Test	

Plan

Class 1

Introduction to Requirements Engineering

- Introduction to Requirements Engineering
- Importance of requirements in software development.
- Requirements Level Classification
- Types of requirements (functional, non-functional, domain-specific).
- The role of stakeholders in requirements engineering.

Plan

Class 2

Requirements Elicitation

- Introduction to Requirements Elicitation
- Challenges in requirements elicitation
- Identifying and involving relevant stakeholders
- Techniques for gathering requirements (23 techniques)

Plan

Class 3

Writing the Requirements Document

- Requirements Agreement and Analysis
- Requirements Representation
- ISO/IEC/IEEE Standard 29148
- UML/SysML
- The Requirements Document
- Behavioral Specifications
- Best Practices and Recommendations

Plan

Class 4

Requirements Validations and Verifications

What Is Requirements Risk Management?

Validation and Verification

Standards for V&V

Example - Validation of Requirements

Plan

Class 5

	Motivation
Formal Methods	What are formal methods?
	Examples

Plan

Class 6

Requirements Specification and Agile Methodologies

Introduction to Agile Methodologies
- Extreme Programming
- Scrum
- Kanban
- Lean Development

Requirement Engineering for Agile Methodologies
- Requirements Engineering in XP
- Requirements Engineering in Scrum
- Gathering User Stories
- Writing User Stories
- Estimating User Stories
- Prioritizing User Stories
- User Stories vs. Use Cases

Plan

Class 7

Tool Support for Requirements Engineering

Traceability Support
- Requirements Linkage Traceability Matrix
- Requirements Source Traceability Matrix

Requirements Management Tools
- Jira
- Aha!
- Jama Connect
- IBM’s DOORS

Tool Selection

Requirements Engineering Tool Best Practices

Plan

Class 8

Requirements Management

Requirements Management Process

Configuration Management and Control

Reconciling Differences
- Managing Divergent Agendas
- Consensus Building
- Analytical Hierarchical Process (AHP)
- Wideband Delphi Technique

Global Requirements Management

Antipatterns in Requirements Management
- Divergent Goals
- Process Clash
- Metric Abuse
- Mushroom Management

Standards for Requirements Management
- CMMI
- ISO 9001
- ISO/IEEE 12207
- Six Sigma

Plan

Class 9 & 10

Case Studies and
Real-world
Examples

Plan

Class 11

test

Teaching methods and learning activities

The program topics are exposed in a series of expositive classes.

Throughout the semester, students will carry out 2 group projects (mostly in class) where they put the knowledge acquired into practice:

In the first project students will be able to simulate a requirement gathering workshop and create a requirements document for a hypothetical software project.

In the second project students will conduct an analysis of an existing requirements tool.

Theoretical concepts are assessed through a test.

In order to provide students with industry views on the topics of the curricular unit, some speakers will be invited throughout the semester to give presentations on the management of requirements in their companies.

Learning Objectives

Plan

Evaluation

Evaluation

GP I
30%

GP II
25%

T
30%

P
15%

GP I - Group project I (group)
GP II - Group project II (group)
T - Test (individual)
P - Participation in classes (individual)

Questions?

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