



Course Specification Document

Title	Basics of Software Engineering
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Credits	3.5 ECTS
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Aims	This course aims to familiarize the student with the fundamentals of software engineering, software process models, and the main development activities, in order to build software that meets the required quality standards. Additionally, it seeks to introduce the student to the requirements engineering process, its associated activities, and various modeling tools employed in requirements modeling (such as BPMN) and software system modeling (such as UML).
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Intended learning outcomes

On successful completion of this course, the student will be able to:

- Understand software process models and assess the suitability of each model for a specific class of problems. This includes comprehending their activities (specification, construction, validation, evolution) and the significance of each activity and its outputs.
- Know the field of requirements engineering, master the techniques of collecting and categorizing requirements (functional and non-functional) and write a specifications document (SRS).
- Understand the concept of modeling and its tools to model requirements, context, and software systems from various perspectives using relevant diagrams.
- Compare process models to select the appropriate process for developing the required software.
- Use requirements gathering and classification techniques efficiently.
- Model the software systems from different perspectives (interaction, behavior, structure).
- Apply an iterative procedure and use BPMN models along with some UML models to analyze a real-world problem.

Syllabus

- **Introduction to software engineering:** Software engineering concepts, the ethical considerations in the software engineering profession.
- **Software process models:** Overview of the general process, exploration of planning-driven software process models (such as Waterfall, Incremental, Integration and Reuse-Oriented, and the Unified Procedural Model - RUP), Agile models.
- **Requirements engineering** Types of requirements, classification of system requirements into functional and non-functional categories, the requirements engineering process (including requirements gathering, analysis, validation, and requirements management).
- **Modeling the system:** Context modeling, interaction modeling (including Use Cases and SSD - System Sequence Diagrams), process modeling using BPMN, structure modeling (classes and class diagrams), behavior modeling using sequence and collaboration diagrams, and state diagrams.

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