unibz Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

UNIVERSITY OF OULU

POLITÉCNICA

COURSE DESCRIPTION – ACADEMIC YEAR 2019/2020

Course title	**Requirements and Design for Dependable Systems**
Course code	76052
Scientific sector	INF/01
Degree	Master in Software Engineering for Information Systems (LM-18)
Semester	1
Year	1
Credits	6
Modular	No

Total lecturing hours	40
Total exercise hours	20
Attendance	Not compulsory. Non-attending students have to contact the lecturer at the start of the course to agree on the modalities of the independent study.
Prerequisites	Basic courses in Programming and Software Engineering. Familiarity with UML and software modelling.
Course page	https://ole.unibz.it/

Specific educational objectives	The course belongs to the type caratterizzanti – discipline informatiche and is part of the Foundations in Software Engineering. The course objective is to familiarize students with tools and techniques to acquire and analyze software requirements, and to define and design a software-based system with the focus on dependability as the key concern. Emphasis is given to traceability of requirements to architecture, to justification of design decisions based on collected requirements, to consequences of design decisions for dependable systems. Students will acquire skills and competencies resulting from the conception, negotiation, documentation and maintenance of dependability requirements in a specific domain and environment. Requirements analysis aims at reviewing, assessing, prioritizing, and balancing the requirements by developing technical specifications (functional and non-functional) for building a system that will meet the needs of the stakeholders. The design of dependable software-based systems aims at identifying or building software components that define the characteristics and quality of such a system. The students are exposed to problem-solving techniques that allow the synthesis of software solutions satisfying the requirements of the system.

Lecturer	Claus Pahl
Contact LA	Piazza Domenicani 3, Room 1.11, Claus.Pahl@unibz.it
Scientific sector of lecturer	INF/01
Teaching language	English
Office hours	During the lecture times, and by arrangement by email. Faculty of CS, Piazza Domenicani 3, Office 1.11
Lecturing Assistant (if any)	---
Contact LA	---
Office hours LA	---

List of topics	• Requirements Engineering • Software Architecture and Design • Dependable Systems • Reliability and Availability • Safety and Security
Teaching format	Frontal lectures, exercises; team projects.

Learning outcomes	Knowledge and understanding • D1.1 To have a sound knowledge of both the fundamentals and the application aspects of the various core areas of information technology; • D1.2 To be able to analyze and solve even complex problems in the area of Software Engineering for Information Systems with particular emphasis on the use of studies, methods, techniques and technologies of empirical evaluation; • D1.3 To know in depth the scientific method of investigation applied to complex systems and innovative technologies that support information technology and its applications; Applying knowledge and understanding • D2.3 To know how to apply the principles of software engineering to domains of different complexity, both IT and non-IT, in which software technology is of great importance, such as, for example, in the transport sector or in the medical field; • D2.4 To be able to define an innovative technical solution to an application problem that meets technical, functional and organisational constraints and requirements; Making judgments • D3.2 To be able to plan and re-plan a technical project activity and to carry it out in accordance with defined deadlines and objectives; • D3.3 To be able to define work objectives compatible with the time and resources available; Communication skills • D4.3 To be able to structure and draft scientific and technical documentation describing project activities; • D4.4 To be able to coordinate project teams and to identify activities to achieve project objectives; • D4.6 To be able to interact and collaborate during the implementation of a project or research with peers and experts; • D4.7 To be able to carry out research and projects in collaborative manner; Learning skills: • D5.3 In the context of a problem solving activity, to be able to extend knowledge, even if incomplete, taking into account the final objective of the project;

Assessment	Project assessment (50% of exam mark): project requirements and project design size, internal coherence and completeness of the documents, adequateness and mastery of techniques, assessed on

	the written document (this mark is the same for all group participants); awareness and personal contribution to group work, assessed at project presentation (this mark is individual, it confirms or decreases the group mark up to 1/3). Final written exam (50% of exam mark): clarity of answers, knowledge of the proposed topics both as definitions and as examples, use of adequate technical terminology, ability to summarize, evaluate, and establish relationships among topics.
Assessment language	English
Assessment typology	Monocratic
Evaluation criteria and criteria for awarding marks	Project assessment (50% of exam mark): project requirements and project design size, internal coherence and completeness of the documents, adequateness and mastery of techniques, assessed on the written document (this mark is the same for all group participants); awareness and personal contribution to group work, assessed at project presentation (this mark is individual, it confirms or decreases the group mark up to 1/3). Final exam assessment (50% of exam mark): clarity of answers, knowledge of the proposed topics both as definitions and as examples, use of adequate technical terminology, ability to summarize, evaluate and establish relationships among topics.

Required readings	The course will be based on lecture notes.
Supplementary readings	Selected chapters from the following book/ebooks (available with unibz credentials from the library website): • Ian Sommerville. Software Engineering, Addison Wesley. Available in library. Open educational resources, representing alternative or supplementary materials, shall be linked to the course website.
Software used	Software Modelling (e.g. Argo UML, Papyrus, StarUML)