Fakultät für Ingenieurwesen
Facoltà di Ingegneria
Faculty of Engineering

unibz

COURSE DESCRIPTION – ACADEMIC YEAR 2023/2024

Course title	**Information Systems Design**
Course code	73061
Scientific sector	INF/01
Degree	Master in Computing for Data Science (LM-18)
Semester	1
Year	1
Credits	6
Modular	No

Total lecturing hours	40
Total lab hours	20
Attendance	Mandatory
Prerequisites	None
Course page	Microsoft Teams, https://ole.unibz.it/

Specific educational objectives	The course belongs to the type "caratterizzanti – discipline informatiche".
	The primary objective of this course is to explore and apply various languages, methodologies, and techniques essential for designing information systems. It begins with leveraging analysis deliverables, starting from methodologies (such as UML and ER) familiar to students and leveraging to approaches and methods that see an Information Ssytem not only as a software artefact. Unlike many methodologies focused solely on software design, this course recognizes that an Information System is a multifaceted entity comprising hardware, software, networks, data, processes, procedures, and people. Consequently, we will cover methods and tools to design Information Systems comprehensively, considering all components, not just software.
	A significant emphasis will be on the System Development Life Cycle, highlighting design-related issues and the impact of emerging technologies on IS design, like cloud and edge computing, HPC, scalability, business continuity, BYOD etc. These technologies necessitate a multi-dimensional design approach that extends beyond just software. Analysis represents the 'what' of an Information System, whereas design embodies the 'how'. This course adopts a practical 'hands-on' approach, examining real-world solutions for designing information systems.
	Central to the design phase is the planning stage, where the 'how' is articulated in a coherent plan for stakeholders, detailing scope, timeline, and costs of the Information System design. Project management, a vital element in any design phase, encompasses the comprehensive costs associated with the system's various components. The course will also delve into planning and implementing an Information System, focusing on these areas and their methodologies in the lab sessions, with examples of information system planning.

	Lastly, the course will introduce SysML language, a higher-level language that transcends the limitations of software-centric methodologies like UML and E-R. This inclusion is key, as Information Systems encompass more than just software components.

Lecturer	Andrea Molinari
Contact	Piazza Domenicani 3, Office 1.04, andrea.molinari@unibz.it
Scientific sector of lecturer	INF/01
Teaching language	English
Office hours	To be arranged beforehand by email.
Lecturing Assistant (if any)	--
Contact LA	--
Office hours LA	--
List of topics	- Design of complex static object structures and role-based modelling - Design of complex relational properties - Design of complex enterprise events - Verification and validation of models - Patterns and anti-patterns - Model-based code generation and mapping to different implementation platforms
Teaching format	Frontal lectures, modelling exercises, projects in groups.

Learning outcomes	Knowledge and understanding: - D1.2 - Understanding of the skills, tools and techniques required for an effective use of data science - D1.5 - Knowledge of principles and models for the representation, management and processing of complex and heterogeneous data - D1.10 - Knowledge of languages, methodologies and architectures for modelling data, processes and organisations Applying knowledge and understanding: - D2.1 - Practical application and evaluation of tools and techniques in the field of data science - D2.10 - Application of languages, tools, and methods for the design of information systems and their corresponding software applications for data, process, and organization management Making judgments - D3.2 - Ability to autonomously select the documentation (in the form of books, web, magazines, etc.) needed to keep up to date in a given sector Communication skills - D4.1 - Ability to use English at an advanced level with particular reference to disciplinary terminology - D4.2 - Ability to present one's work in a clear and comprehensible way in front of an audience, including non-specialists

	• D4.3 - Ability to structure and draft scientific and technical documentation • D4.5 - Ability to interact and collaborate in the implementation of a project or research with peers and experts Learning skills • D5.1 - Ability to autonomously extend the knowledge acquired during the study course • D5.3 - Ability to deal with problems in a systematic and creative way and to appropriate problem solving techniques

Assessment	The assessment of this course consists of two parts: • A theoretical part: a written exam with open questions on the theoretical materials presented during frontal lectures • A project assignment: for the project assignment, a project plan for an Information System, complete of scope, time, cost, resources, risks and stakeholders management to be produced and be handed in on the pre-announced date and time.
Assessment language	English
Assessment Typology	Monocratic
Evaluation criteria and criteria for awarding marks	50% Written part on theoretical materials, 50% creation of a Project of an Information System, presentation and discussion All parts must be positive. **Written exam:** creativity, skills in critical thinking; ability to summarize in own words and concisely present (intermediate and final) results; clarity of answers, mastery of language, ability to clearly explain, summarize, evaluate, and establish relationships between topics; demonstrate a deep understanding of the subjects covered during the course and be able to describe them precisely and clearly. **Relevant for project assignment**: creativity, introduce oneself into new topics and research literature on your own to create a deep understanding; demonstrate a deep understanding of the subjects covered during the course and be able to use them precisely and clearly in a project plan

Required readings	Material provided by the teacher in form of slides, web pages or scientific papers
Supplementary readings	• Modern Systems Analysis and Design, eBook, Global Edition - Joe Valacich; Joey George – ISBN 978-1292154145 • Tilley, S., 2019. Systems analysis and design. Cengage Learning.

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Software used	- Community version of Visual Paradigm: https://www.visual-paradigm.com/download/community.jsp - Microsoft Project – Available from unibz Vmware Horizon virtualization