unibz
Fakultät für Informatik
Facoltà di Scienze e Tecnologie informatiche
Faculty of Computer Science

COURSE DESCRIPTION – ACADEMIC YEAR 2016/2017

Course title	**Data and Process Modeling**
Course code	72112
Scientific sector	INF/01
Degree	Master in Computer Science (LM-18)
Semester	2
Year	1
Credits	8
Modular	No

Total lecturing hours	48
Total lab hours	24
Total exercise hours	--
Attendance	Not compulsory
Prerequisites	Fundamentals of databases and of the relational model. Basic knowledge of first-order logic. Elements of software engineering, and in particular of the object-oriented paradigm and of JAVA.
Course page	https://ole.unibz.it/

Specific educational objectives	The course belongs to the type "caratterizzanti – discipline informatiche" in the curriculum "Data and Knowledge Engineering". The main goal of the course is to study and put into practice languages, methodologies, and techniques for the conceptual modeling of data and processes, towards the realization of correct, effective information systems that truly reflect their targeted domains. In this light, the course aims at providing professional skills and knowledge. The first part of the course focuses on data modeling, with emphasis on fact- oriented approaches so as to capture relevant entities, relations, and constraints by starting from the important domain facts. The second part of the course targets process modeling, so as to tackle the (business) processes that regulate the way companies organize their internal work and discipline the interaction with external stakeholders, towards the realization of their strategic objectives.

Lecturer	Marco Montali
Contact	Piazza Domenicani 3, Room 2.01, montali@inf.unibz.it, 0471-016116
Scientific sector of lecturer	ING-INF/05
Teaching language	English
Office hours	Check the home page of the lecturer.
Lecturing Assistant (if any)	--
Contact LA	--
Office hours LA	--
List of topics	• Fact-based structural modeling • Object-Role Modeling (ORM) • Relational mapping for database design • Object-relational mapping techniques • Business process management • Business process modeling and BPMN

	• Process analysis and simulation • Process mining
Teaching format	Frontal lectures, exercises, labs, project.

Learning outcomes	Knowledge and understanding • Know the main techniques and tools for the modelling of business processes. • Know the main methods for the design of user-centred systems. Applying knowledge and understanding • Be able to design and implement information systems in vertical sectors of applications in compliance with technical, functional and organizational requirements. • Be able to use and adapt process modelling software tools for the development of information systems. Making judgments • Be able to plan and re-plan a technical project activity aimed at building an information system and to bring it to completion by meeting the defined deadlines and objectives. • Be able to independently select the documentation required to keep abreast of the frequent technological innovations in the field by using a wide variety of documentary sources: books, web, magazines. Communication skills • Be able to structure and prepare scientific and technical documentation describing project activities. • Be able to interact and collaborate with peers and experts in the realization of a project or research. Ability to learn • Be able to autonomously extend the knowledge acquired during the study course by reading and understanding scientific and technical documentation. • Be able, in the context of a problem-solving activity, to extend even incomplete knowledge taking into account the objective of the project.

Assessment	The assessment of the course consists of two parts: • written exam, with exercises and (verification and transfer of knowledge) questions on all the topics covered by the course; • project, delivered as a written report that details the solution of a problem related to data and process modeling.
Assessment language	English
Evaluation criteria and criteria for awarding marks	The written exam is evaluated by considering correctness, clarity and rationale of the provided answers. The project proposal has to be discussed with the lecturer. It consists in the application of the techniques and methodologies seen in the course on a concrete, non-trivial domain, or in the study of an advanced topic related to data and process modeling. Here, particularly important is the clarity of the report, the

	comprehensiveness of the information sources used as a basis, creativity, and demonstrated skills in critical and analytical thinking. The written exam counts 80% of the final mark, and the project counts 20%.

Required readings	Data modeling • Halpin, T. and Morgan, T.: Information Modeling and Relational Databases. Morgan Kaufmann, 2008. • Halpin, T.: Object-Role Modeling Fundamentals: A Practical Guide to Data Modeling with ORM. Technics Publications, 2015. Business process modelling • Dumas, M., La Rosa, M., Mendling, J. and Reijers, H. A.: Fundamentals of Business Process Management. Springer, 2013. • Silver, B.: BPMN: Method and Style. (2nd edition). Cody-Cassidy Press, 2011.
Supplementary readings	• Olivé, A.: Conceptual Modeling of Information Systems. Springer, 2007. • Weske, M.: Business Process Management: Concepts, Languages, Architectures. Springer, 2007. • van der Aalst, W. M. P.: Process Mining Discovery, Conformance and Enhancement of Business Processes. Springer, 2011. • Additional supplementary material will be posted on the course web site.
Software used	Data modeling with ORM: NORMA for Visual Studio. Business process modeling with BPMN: Oryx Signavio. Object-relational mapping: Java SDK and JBoss Hibernate. Petri nets: WoPeD. Process mining: Disco and ProM.