COURSE DESCRIPTION – ACADEMIC YEAR 2017/2018

Course title	**Principles of Data Management**
Course code	74027
Scientific sector	INF/01
Degree	European Master's Program in Computational Logic (LM-18)
Semester	2
Year	1
Credits	12
Modular	Yes
University	UniBZ

Total lecturing hours	72
Total lab hours	24
Total exercise hours	12
Attendance	Not compulsory
Prerequisites	None
Course page	https://ole.unibz.it/

Specific educational objectives	The course belongs to the type "caratterizzanti – discipline informatiche". The course is part of the advanced topics offered within the degree and can be selected by the student as one of the three which must be completed according to the study plan. This module aims to provide students with a detailed theoretical and practical knowledge of intelligent access and management of data. The module present advanced topics on database systems management as conceptual modeling and advanced data models. After the completion of the module students will have a deeper understanding of the use of advanced formalisms which underpin the development and use of databases. In particular, they'll learn how to additional conceptual modeling methodologies beside the standard UML and ER design. In addition they will be able to leverage advanced data models which go beyond the standard relational model.

Module 1	**Data and Process Modelling**
Module code	74027A
Module scientific sector	INF/01
Lecturer	Marco Montali
Contact	Piazza Domenicani 3, Room 2.01, montali@inf.unibz.it, 0471-016116
Scientific sector of lecturer	INF/01
Teaching language	English
Office hours	Check the home page of the lecturer.
Lecturing assistant (if any)	--
Office hours LA	--
Credits	8
Lecturing hours	48
Lab hours	24
Exercise hours	--
List of topics	• Fact-based structural modeling • Object-Role Modeling (ORM) • Relational mapping for database design • Object-relational mapping techniques for software development • Business process management

	• Business process modelling and BPMN
	• Process analysis and simulation
	• Process mining
Teaching format	Frontal lectures, labs, projects.

Module 2	**Research Project in Data Semantics**
Module code	74027B
Module scientific sector	INF/01
Lecturer	Giancarlo Guizzardi
Contact	Piazza Domenicani 3, Room 3.04, giancarlo.guizzardi@unibz.it, 0471-016187
Scientific sector of lecturer	INF/01
Teaching language	English
Office hours	By appointment via mail.
Lecturing assistant (if any)	--
Office hours LA	--
Credits	4
Lecturing hours	24
Lab hours	--
Exercise hours	12
List of topics	• Foundations of Conceptual Modelling
	• Logic and Databases
	• Theory of Object-Role Modelling (ORM)
	• The Logic of Query Answering with Conceptual Models
Teaching format	Introduction by the lecturers and discussion and presentation by the students of seminal papers on some topic of the course, jointly chosen by students and lecturers. The lecturer will assist students in studying the papers, including the most relevant related work, and in preparing the presentation.

Learning outcomes	*Knowledge and understanding*
	• Knowledge of the main modelling techniques of unstructured data and content and the main research techniques on these types of data.
	• Knowledge of the main techniques and tools for the modelling of business processes.
	Applying knowledge and understanding
	• Ability to plan and deploy vertical information systems satisfying given technical, functional and organisational requirements
	• Ability to use and adapt process modelling tools for developing information systems
	Making judgments
	• 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.
	• Be able to identify reasonable work goals and estimate the resources required to achieve the objectives.
	• 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.
	Communication skills

	• Be able to present in a fixed time the content of a scientific / technical report in front of an audience also composed of non-specialists. • Be able to structure and prepare scientific and technical documentation describing research publications. *Learning skills* • Be able to autonomously extend the knowledge acquired during the study course by reading and understanding scientific and technical documentation. • Be able to independently keep up to date with developments in the most important areas of Computer Science.
Assessment	• Written exam, with exercises and (verification and transfer of knowledge) questions on all the topics covered by the course - covered in M1; • Project, delivered as a written report that details the solution of a problem related to data and process modelling - covered in M1; • Presentation of the chosen paper(s) by the student and active participation in the lectures - covered in M2; • Final oral exam on the papers presented by all the students during the course - covered in M2.
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 modelling. 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%. Presentation of the paper(s) and active participation in the lectures: this part of the assessment mainly covers the communication skills, during discussions the students can also show their ability to classify and judge research publications. This counts 80% of the final mark. Final oral exam: the exam consists of questions on the topics presented in the seminars, in particular about the other papers. In this part, students mainly demonstrate their ability to learn by showing that they have internalized the topics discussed in the lecture. This counts 20% of the final mark.
Required readings	**Module 1: Data and Process Modelling** Data modelling: • 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. **Module 2: Research Project in Data Semantics** The reading list will be provided/decided on during the course.
Supplementary readings	Additional sources will be announced during the course.