

COURSE DESCRIPTION – ACADEMIC YEAR 2017/2018

Course title	Artificial Intelligence (EMCL-A-AI)
Course code	74025
Scientific sector	INF/01
Degree	European Master's Program in Computational Logic (LM-18)
Semester	1
Year	1
Credits	12
Modular	Yes
University	unibz
Total lecturing hours	48
Total lab hours	24
Total exercise hours	--
Attendance	Not compulsory, but strongly recommended.
Prerequisites	Students should have a good knowledge of probability and algorithms and suitable programming skills for projects.
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 course aims at developing a deep understanding of the strengths and the limitations of a wide range of data mining techniques to be able to identify their use cases and important applications. Given a data-mining problem, students will be able to define what are the data sources to be exploited, the mining tasks to be performed, and the algorithms that need to be used to solve the problem. To this end, students will have the possibility to actively participate in data mining projects to perform extensive experiments on real datasets and potentially propose extensions to existing algorithms. A useful takeaway from the course will be the ability to identify the knowledge to be mined from data and employ mining algorithms using easy-to-use software and cases.
Module 1	Data Mining
Module code	74025A
Module scientific sector	INF/01
Lecturer	Mouna Kacimi El Hassani
Contact	Piazza Domenicani 3 , Room 2.02, Mouna.Kacimi@unibz.it , +39 0471 016114
Scientific sector of lecturer	INF/01
Teaching language	English
Office hours	To be arrange beforehand by email or during the lecture.
Lecturing assistant (if any)	--
Office hours LA	--
Credits	8
Lecturing hours	48
Lab hours	24
Exercise hours	--
List of topics	• Data types, quality and pre-processing • Data exploration

	• Classification • Association analysis • Clustering • Error estimation • Data mining applications • Data mining tools
Teaching format	Lectures and labs with theoretical and practical exercises. Group projects.

Module 2	Research Project in Artificial Intelligence
Module code	74025B
Module scientific sector	INF/01
Lecturer	Mouna Kacimi El Hassani
Contact	Piazza Domenicani 3 , Room 2.02, Mouna.Kacimi@unibz.it , +39 0471 016114
Scientific sector of lecturer	INF/01
Teaching language	English
Office hours	To be arrange beforehand by email
Lecturing assistant (if any)	--
Office hours LA	--
Credits	4
Lecturing hours	--
Lab hours	--
Exercise hours	--
List of topics	The student will further investigate a specific topic covered by the first module. The selection of the topic and the research activity shall be carried out under the supervision of a tutor selected in agreement with the lecturer of the first module.
Teaching format	Supervised project activities.

Learning outcomes	Knowledge and understanding • Knowledge of main information extraction techniques from structured and unstructured data • Understand and being able to use mathematical tools, both concerning discrete and continuous domains, to support computer science studies and development • Know the main methods for the design of user-centred systems. Applying knowledge and understanding • Be able to assess the usability of a web and mobile information system with quantitative and heuristic methods. • Be able to design and execute experimental analyses on information systems or their components. • Be able to identify new application requirements and business opportunities in the field of systems based on data and knowledge. 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.
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	- 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 Communication skills - Be able to structure and prepare scientific and technical documentation describing project activities. - Be able to coordinate the work of a project team and to interact positively with members of the group. - Be able to interact and collaborate with peers and experts in the realization of a project or research. Learning skills - Be able to independently keep up to date with developments in the most important areas of Data Mining. - Be able to autonomously extend the knowledge acquired during the study course by reading and understanding scientific and technical. - 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 different parts: Final written exam: with verification questions and problem solving tests Project: consists in two parts (1) acquiring the basic data mining knowledge via assignments and (2) applying or adapting existing techniques to solve a concrete problem chosen by the student. The project results are a written report, implementation of the used techniques, and a presentation. Mid-term exam (optional): with verification questions and problem solving tests
Assessment language	English
Evaluation criteria and criteria for awarding marks	- Written final exam: 50% of the mark - Project: 50% of the mark - The project marks are valid for the three exam sessions. The project is a prerequisite for attending the written exam. Criteria for awarding marks - Exam: correctness and clarity of answers, the ability to adequately solve data mining problems and to understand how to choose the right technique. - Project: ability to apply data mining tools and algorithm in a real world problem, creativity, and ability to work in team.
Required readings	Jiawei Han and Micheline Kamber, "Data Mining: Concepts and Techniques", Second Edition, 2006
Supplementary readings	Additional sources will be announced during the course.