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

COURSE DESCRIPTION – ACADEMIC YEAR 2016/2017

Course title	**Intelligent Agents**
Course code	72054
Scientific sector	INF/01
Degree	Master in Computer Science (LM-18)
Semester	1
Year	2
Credits	8
Modular	No

Total lecturing hours	48
Total lab hours	24
Total exercise hours	--
Attendance	Not compulsory, but recommended.
Prerequisites	Elements of software engineering and programming, 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".
	This course provides an overview and understanding of the problems and techniques for building intelligent agents in different settings. The teaching format includes 'hands-on' practical sessions: the concepts studied in the theory will be demonstrated through the development of simple agent-based systems, with the objective of learning problem solving using multi-agent systems, of developing analysis and design skills appropriate to complex AI problems, and of enhancing AI programming skills.
	The first part of the course focuses on single-agent settings and deals with the trade-offs inherent in the design of agent-based systems and the influence of the environment and its dynamics. The second part addresses multi-agent systems and architectures, considering both cooperation and adversarial settings, to study communication, objectives and strategic reasoning. The course will also address basic elements and tools for verification, that is to asses whether the executions of a multi-agent systems meets given specifications.

Lecturers	Paolo Felli
Contact	Piazza Domenicani 3, Room 2.01, paolo.felli@unibz.it
Scientific sector of lecturer	INF/01
Teaching language	English
Office hours	Arrange beforehand by email. Check the home page of the lecturer.
Lecturing Assistant (if any)	--
Contact LA	--
Office hours LA	--
List of topics	• Agents and agent architectures • Models and algorithms for individual agents • Multi-agent systems. Communication and cooperation. Self-interested agents and teamwork. Goal-oriented behaviours

	• Elements of logical foundations for multi-agent systems • Verification and reasoning • Agent-based languages, software platforms and tools
Teaching format	Frontal lectures, exercises and lab activity

Learning outcomes	Knowledge and understanding • Know the required concepts and the main methods for defining intelligent agent behaviours in single- and multi-agent systems • Know the main techniques and tools for the modelling and analysis of agent-based systems Applying knowledge and understanding • Be able to design intelligent agent behaviours in agent-based systems • Be able to implement, execute and evaluate agent-based systems through modelling software, in compliance with specified objectives and requirements 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 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. 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 is made through five assignments (involving either software development or written reports on advanced topics) and a final assignment to be agreed with the teacher. Each assignment can be awarded a mark between 0 and 5, and the final assignment between 0 and 8.
Assessment language	English
Evaluation criteria and criteria for awarding marks	Assignments are evaluated by considering the achievement of the objective, correctness, creativity, clarity of the documentation (for software code and documentation), or correctness, clarity, analytical thinking (in case of reports).

Required readings	• M. Wooldridge: An Introduction to MultiAgent Systems, 2nd Edition, John Wiley & Sons, 2009.

	• F. Bellifemine et al, Developing Multi-Agent Systems with JADE, John Wiley & Sons, 2007. • 2APL, A Practical Agent Programming Language, User Guide.
Supplementary readings	• S. Russell and P. Norvig: Artificial Intelligence: A Modern Approach (2nd/3rd Edition), Prentice Hall Series in Artificial Intelligence, 2003/2009. • Additional supplementary material will be posted on the course web site.
Software used	Java SDK, JADE, 2APL, MCMAS