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

# COURSE DESCRIPTION – ACADEMIC YEAR 2018/2019

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| **Course title** | **Intelligent Agents** |
| **Course code** | 73028 |
| **Scientific sector** | INF/01 |
| **Degree** | Master in Computational Data Science (LM-18) |
| **Semester** | 1 |
| **Year** | 1 |
| **Credits** | 6 |
| **Modular** | No |

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| **Total lecturing hours** | 40 |
| **Total lab hours** | 20 |
| **Attendance** | Not compulsory, but recommended.<br>Non-attending students should contact the lecturer at the start of the course to agree on the modalities of the independent study. |
| **Prerequisites** | Elements of software engineering and programming, of the object-oriented paradigm and of JAVA. |
| **Course page** | https://ole.unibz.it/ |

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| **Specific educational objectives** | The course belongs to the type "caratterizzanti – discipline informatiche" in the curricula "Data Analytics" and "Data Management".<br><br>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.<br><br>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, studying the types of agents and environments, their abstract formalisation, and the different types of agent architectures. The second part addresses multi-agent systems and architectures, considering both cooperation and adversarial settings, to study communication, coordination, organisational structures, strategic reasoning. |

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| **Lecturer** | Paolo Felli |
| **Contact** | Piazza Domenicani 3, Room 2.03, 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<br>● Models and algorithms for individual agents |

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| | • Multiagent systems<br>• Communication and cooperation, self-interested agents and teamwork, goal-oriented behaviours<br>• Verification and reasoning<br>• Agent-based languages, software platforms and tools |
| **Teaching format** | Frontal lectures, exercises and lab activity |

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| **Learning outcomes** | Knowledge and understanding:<br>• D1.5 - Knowledge of principles and models for the representation, management and processing of complex and heterogeneous data<br>Applying knowledge and understanding:<br>• D2.4 - Ability to develop programmes and use tools for the analysis and management of data and related infrastructures<br>• D2.11 - Ability to develop intelligent software systems for decision support<br>Making judgments<br>• 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<br>Communication skills<br>• D4.1 - Ability to use English at an advanced level with particular reference to disciplinary terminology<br>• D4.3 - Ability to structure and draft scientific and technical documentation<br>Learning skills<br>• D5.3 - Ability to deal with problems in a systematic and creative way and to appropriate problem solving techniques. |

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| **Assessment** | The assessment of the course is made through three small assignments (involving either software development or reports/class presentations on advanced topics) plus a final project (involving software development and documentation) to be agreed with the lecturer. Each assignment will be awarded a mark between 0 and 6 (total 18), and the final assignment between 0 and 12. |
| **Assessment language** | English |
| **Assessment Typology** | Monocratic |
| **Evaluation criteria and criteria for awarding marks** | The project and the assignments and the project 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/presentations). |

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| **Required readings** | M. Wooldridge: An Introduction to MultiAgent Systems, 2nd Edition, John Wiley & Sons, 2009.<br><br>Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it |

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| **Supplementary readings** | S. Russell and P. Norvig: Artificial Intelligence: A Modern Approach (2nd/3rd Edition), Prentice Hall Series in Artificial Intelligence, 2003/2009.<br><br>Additional supplementary material will be posted on the course web site. |
| **Software used** | SWI-Prolog, 2APL, Java SDK, JADE, SARL |