MODELLO D (inglese)	**A.Y. 2018/2019**
General Information	
Academic subject	**Knowledge Representation and Reasoning**
Degree course	MSc in Computer Science (LM18)
Curriculum	-
ECTS credits	6
Compulsory attendance	No, but attendance is strongly recommended
Language	English

Subject teacher	Name Surname	Mail address	SSD
	Francesca Alessandra LISI	FrancescaAlessandra.Lisi@uniba.it	INF/01

ECTS credits details	Nro of credits	Discipline	SSD
Type T1	5	Computer Science	INF/01
Type T3	1	Computer Science	INF/01

Class schedule	
Period	I semester
Year	II year
Type of class	Lectures and practical project work

Time management	
Hours (total, including individual study)	150
Hours of lectures	40
Hours of practical project work	25

Academic calendar	
Class begins	September 24th, 2018
Class ends	January 11st, 2019

Syllabus	
Prerequisites/requirements	Artificial Intelligence Formal methods in computer science
Expected learning outcomes (according to Dublin Descriptors)	Knowledge representation and reasoning (KR&R) is considered to be the core of Artificial Intelligence (AI). This class provides the foundations in KR&R that every AI practitioner needs. *Knowledge and understanding* Learners for this class will acquire an in-depth knowledge of several formalisms for representing knowledge in computer systems as well as of the main techniques for the automated reasoning of useful inferences over this knowledge under different scenarios (uncertainty, vagueness, etc.). The class will give attendants a solid foundation for understanding the more advanced work found in the research literature of the field. Moreover, the students attending the class will have an opportunity for practicing the English language by learning how to understand and possibly write complex scientific texts on topics of KR&R. *Applying knowledge and understanding* Learners for this class will be able to: - apply the acquired competence in the area of KR&R to address

	problems related to the representation of knowledge and the reasoning over it, even in new, non-familiar or interdisciplinary contexts; - exploit the techniques of knowledge representation and the main algorithms for reasoning in order to develop and evaluate complex computer systems that require the management and integration of structured knowledge; - apply their own competences to identify effective solutions to complex problems involving the reasoning over structured knowledge, and to justify, support and argue their choices. *Making informed judgements and choices* Learners for this class will be able to: - make their own assessment and define a critical judgment, and support it within the team during the practical project work; - integrate necessary knowledge in an autonomous way as well as manage the complexity resulting from the limited or incomplete information available; - make decisions and identify solutions in the area of KR&R by taking into account the social and ethical implications and the professional responsibilities that they imply. *Communicating knowledge and understanding* Learners for this class will be able to: - choose the appropriate form and means of communication for the interlocutors, both specialists and non-specialists; - communicate effectively information, ideas, problems and solutions related to the area of KR&R. *Lifelong learning skills* Learners for this class will be able to: - develop a high level of autonomy in acquiring new concepts of KR&R; - keep up-to-date with the evolution of the area of KR&R by accessing bibliographic sources in either Italian or English; - pursue their own training course by undertaking high-level studies.
Contents	The course will cover advanced topics of KR&R such as: • Structured knowledge • Nonmonotonic reasoning • Defeasible reasoning • Reasoning under uncertainty and/or vagueness • Reasoning about actions • Explanation and diagnosis • Trade-off between expressiveness and tractability
Course program	
Bibliography	*Reference book*: R.J. Brachman & H. J. Levesque. Knowledge Representation and Reasoning. Morgan Kaufmann, 2004. *Further specialized readings*: F. van Harmelen, V. Lifschitz, B. Porter (Eds.). Handbook of Knowledge Representation. Elsevier, 2008. F. Baader, D. Calvanese, D. L. McGuinness, D. Nardi, P. F. Patel-Schneider (Eds.). The Description Logic Handbook: Theory, Implementation, Applications. Cambridge University Press, 2003.

Notes	Integration with material prepared by the teacher, and with research articles, especially on the topics not covered in the reference book.
Teaching methods	Lectures with the support of slides, and practical project work on a case study.
Assessment methods	The assessment is carried out during the exam sessions at the end of the class. The exam consists of an oral test with discussion of the practical project work. While the project work can be carried out in groups of maximum three students, the discussion is individual and does not exceed 45 minutes.
Evaluation criteria	During the exam the student will have to demonstrate: - to have acquired knowledge of the theoretical, methodological and practical aspects of KR&R, and to have thoroughly understood them; - to have gained competence in the application of the acquired knowledge in KR&R in order to identify effective solutions to the problems encountered during the practical project work; - to be able to adequately justify the project choices, by supporting them with critical arguments and with remarks about potential socio-ethical implications and professional responsibilities; - to know how to communicate clearly and comprehensively; - to have reached a high level of autonomy, through the clear indication of his/her own contribution to the project work when it has been developed by a team. The exam score is expressed over a 30-point scale. The exam is passed with a minimum score of 18/30. The score is determined by taking into account the following requirements concerning the solutions proposed in the practical project work: 1) correctness of the solutions; 2) completeness of the solutions; 3) coherence of the solutions; 4) degree of formalization for the description of the solutions; 5) degree of innovation of the solutions. To pass the exam, the student should be able to propose solutions that satisfy at least the first requirement. Students able to deliver a project work satisfying the requirements 2) -5) get higher scores.
Further information	