

## Description of individual course unit

<b>Course title:</b>	Knowledge Representation and Reasoning in Natural Language Processing systems
<b>Course code:</b>	
<b>Type of course:</b>	Optional
<b>Level of course:</b>	Advanced / PhD
<b>Year of study:</b>	1st year
<b>Semester:</b>	1st
<b>Number of credits allocated (workload based):</b>	6
<b>Name of lecturer:</b>	Irene Pimenta Rodrigues
<b>Objective of the course (expected learning outcomes and competences to be acquired):</b>	<p>After this course students should understand different knowledge sources and logics developed for knowledge representation in order to use automatic reasoning frameworks such as: propositional logic, first order logic and descriptive logics. Students are introduced to different techniques for symbolic processing of natural language at different stages: lexical analysis, syntactic, semantic and pragmatic.</p> <p>Students should be able to use and to build natural language processing applications.</p>
<b>Prerequisites</b>	An Artificial Intelligence course and a declarative programming course
<b>Course contents:</b>	<p>Conceptual Maps and Semantic Networks.  Propositional description logic.  Knowledge Bases formalization.  Ontologies.  Description Logics and Databases.  Time and causality.  Semantic Web  Lexical Analysis;  Sintatic Analysis: Grammars logical (DCGs, XGS), tags, and HPSGs CFG.  Semantic Analysis: DRT, and other semantic compositionality.  Pragmatic Analysis: Theory of speech acts, Anaphora resolution, dialogue.  Aplications of Natural Language Processing Tools.</p>
<b>Recommended reading:</b>	<p>A. Borgida, R. J. Brachman. Conceptual Modelling with Description Logics. In the Description Logic Handbook, edited by F. Baader, D. Calvanese, D.L. Mc Guinness, D. Nardi, P.F. Patel- Schneider, Cambridge University Press, 2002</p> <p>The Description Logic Handbook: Theory, Implementation and Applications. Cambridge University Press, 2002. ISBN 0521781760. Edited by F. Baader, D. Calvanese, D. Mc Guinness, D. Nardi, P. F. Patel-</p>

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<b>Teaching methods:</b>	Lectures are of two kinds: theoretical classes where the topics are exposed; and practical classes with some exercises and the implementation of some algorithms
<b>Assessment methods:</b>	A state of the art overview and some practical work including the development of a natural language processing system using NLP tools and knowledge representation and reasoning.
<b>Language of instruction:</b>	Portuguese and English. English is essential for the recommended bibliographic references.