Teaching Guide				
Identifying Data				2023/24
Subject (*)	Web Intelligence and Semantic Technologies		Code	614544010
Study programme	Máster Universitario en Intelixencia Artificial			
Descriptors				
Cycle	Period	Year	Type	Credits
Official Master's Degree	2nd four-month period	First	Optional	6
Language	English			
Teaching method	Face-to-face			
Prerequisites				
Department	Ciencias da Computación e Tecnoloxías da Información			
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Web				
General description	The course introduces the student to the extraction, evaluation and analysis of information present on the Web through the use of technologies that interpret the semantics underlying the format of its contents. In this context, the student will be trained in its exploitation as a global source of data, regardless of their location and the device or platform of access, whether they are expressed in natural language or in languages directly interpretable by intelligent agents. In short, the aim is to facilitate access, sharing and integration of information between Web users.			

Study programme competences / results	
Code	Study programme competences / results
A2	CE01 - Understanding and command of techniques for lexical, syntactic and semantic processing of text in natural language
A3	CE02 - Understanding and command of fundamentals and techniques for processing linked documents, both structured and unstructured, and of the representation of their contents
A4	CE03 - Understanding and knowledge of the techniques for knowledge representation and processing for ontologies, graphs and RDF, together with their associated tools
B1	CG01 - Maintaining and extending theoretical foundations to allow the introduction and exploitation of new and advanced technologies in the field of AI
B3	CG03 - Searching and selecting that useful information required to solve complex problems, with a confident handling of bibliographical sources in the field
B4	CG04 - Suitably elaborating written essays or motivated arguments, including some point of originality, writing plans, work projects, scientific papers and formulating reasonable hypotheses in the field
B6	CB01 - Acquiring and understanding knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, frequently in a research context
B7	CB02 - The students will be able to apply the acquired knowledge and to use their capacity of solving problems in new or poorly explored environments inside wider (or multidisciplinary) contexts related to their field of study
B10	CB05 - The students will acquire learning abilities to allow them to continue studying in way that will mostly be self-directed or autonomous
C2	CT02 - Command in understanding and expression, both in oral and written forms, of a foreign language
C3	CT03 - Use of the basic tools of Information and Communications Technology (ICT) required for the student's professional practice and learning along her life
C7	CT07 - Developing the ability to work in interdisciplinary or cross-disciplinary teams to provide proposal that contribute to a sustainable environmental, economic, political and social development
C8	CT08 - Appreciating the importance of research, innovation and technological development in the socioeconomic and cultural progress of society

Learning outcomes

Learning outcomes	Study programme competences / results		
Know, understand and analyse the different models for web search and mining	AC2 AC3	BC3 BC4 BC6	
Know, understand and analyse the different models for semantic technologies		BC1 BC7	CC3 CC7 CC8
Know, understand and analyse the software platforms for the creation of these systems	AC1	BC10	CC2
Know techniques, methods and good practices for the representation and publication of data and their subsequent consultation, using semantic technologies	AC2 AC3	BC1 BC6	
Design, implement and know how to use algorithms and data structures for recommendation systems	AC2	BC7	CC7 CC8

Contents	
Topic	Sub-topic
Web structure. Search engines. Analysis and mining of web content and usage	
Personalization, discovery and filtering. Recommender systems	
Semantic technologies and semantic web. Ontologies and knowledge graphs	
Data modeling languages. Linked data and open linked data	
Applications and success stories	

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Problem solving	A2 A3 A4 B1 B3 B6 B7 B10 C2 C3 C7	11	55	66
Laboratory practice	A2 A3 A4 B1 B3 B6 C2 C7	10	30	40
Mixed objective/subjective test	A2 A3 A4 B4 C8	2	0	2
Guest lecture / keynote speech	A2 A3 A4 B1	21	21	42
Personalized attention		0	0	0
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Problem solving	Sessions whose objective is that students acquire certain skills based on the resolution of exercises, case studies and projects that require the student to apply the knowledge and skills developed during the course. These sessions may require the student to present orally the solution to the problems posed. The work carried out by the students can be done individually or in work groups.
Laboratory practice	Classes dedicated to the development of practical work involving the resolution of complex problems, and the analysis and design of solutions that constitute a means for their resolution. This activity may require students to present their work orally. The work carried out by the students can be done individually or in work groups.
Mixed objective/subjective test	Final exam

Guest lecture / keynote speech	Oral exposition complemented with the use of audiovisual media and the introduction of some questions directed to the students, with the purpose of transmitting knowledge and facilitating learning. In addition to the time of oral exposition by the professor, this formative activity requires the student to dedicate some time to prepare and review on their own the materials object of the class.

Personalized attention	
Methodologies	**Description**
Problem solving Laboratory practice	The individual work of the students will be evaluated. Values of equality will be promoted following current recommendations.

Assessment			
Methodologies	**Competencies / Results**	**Description**	**Qualification**
Laboratory practice	A2 A3 A4 B1 B3 B6 C2 C7	Evaluation of practical works	50
Mixed objective/subjective test	A2 A3 A4 B4 C8	Final exam	50

Assessment comments
It will be necessary to reach 40% of the score in each part. The evaluation will be considered as not presented when no practical work or final exam is submitted. Second opportunity The evaluation will be carried out with the same criteria described above. A new deadline will be opened for the delivery of the practical works, in the event that they are not delivered at the first opportunity.- The fraudulent performance of tests or evaluation activities, once verified, will directly imply the qualification of fail in the call in which it is committed: the student will be graded with "suspense" (numerical note 0) in the corresponding call of the academic year, whether the commission of the foul occurs on the first opportunity or on the second. To do this, her rating will be modified in the first opportunity report, if necessary.

Sources of information	
Basic	- W.B. Croft, D. Metzler, T. Strohman. 2009 Search Engines. Information Retrieval in Practice Pearson Education - C.D. Manning, P. Raghavan, H. Schutze. 2008 Introduction to Information Retrieval Cambridge University Press - Berners-Lee, T., Hendler, J., & Lassila, O. (2001). The semantic web. Scientific american, 284(5), 34-43.- Gomez-Pérez, A., Fernández, M., Corcho, O. (2003) Ontological Engineering. Springer- Ehrlinger, Lisa; Wöß, Wolfram (2016). Towards a Definition of Knowledge Graphs (PDF). SEMANTiCS2016. Leipzig: Joint Proceedings of the Posters and Demos Track of 12 th International Conference on Semantic Systems - SEMANTiCS2016 and 1 st International Workshop on Semantic Change & Evolving Semantics (SuCCESS16). pp. 13?16.
Complementary	- Introduction to Semantic Web Technologies. Ivan Herman, W3C June 22nd, 2010: https://www.w3.org/2010/Talks/0622-SemTech-IH/Tutorial.pdf. Retrieved 2022-05-11.- What is a Knowledge Graph?| Ontotext". Ontotext. https://www.ontotext.com/blog/ontotext-platform-building-smart-enterprise-applications/. Retrieved 2022-05-11.- Krötsch, Markus; Weikum, Gerhard (March 2016). "Editorial of the Special Issue on Knowledge Graphs". Journal of Web Semantics. 37?38: 53?54. doi:10.1016/ j. websem.2016.04.002. Retrieved 2022-05-11.- Semantic Web at W3 C: https://www.w3.org/standards/semanticweb/ Retrieved 2022-05-11.- R. Baeza-Yates and B. Ribeiro-Neto. 2011 Modern Information Retrieval (second edition) Addison Wesley/Pearson Education - F. Cacheda, J.M. Fernández, J. Huete (eds.) 2011 Recuperación de Información. Un enfoque práctico y multidisciplinar Ra-Ma

Recommendations

Subjects that it is recommended to have taken before
Natural Language Understanding/614544008
Subjects that are recommended to be taken simultaneously
Language Modelling/614544009
Subjects that continue the syllabus
Text Mining/614544011
Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.