

4IZ440 REPREZENTACE A ZPRACOVÁNÍ ZNALOSTÍ NA WWW

Course code	4IZ440
Course title in language of instruction	Reprezentace a zpracování znalostí na WWW
Course title in Czech	Reprezentace a zpracování znalostí na WWW
Course title in English	Knowledge Representation and Reasoning on the WWW
Mode of completion and number of credits	Credit (4 credits), Exam (4 credits), Exam ECTS (6 credits) One ECTS credit corresponds to 26 hours of workload for an average student.
Type of course	Daily attendance: 2/2 (hours of lectures per week / hours of seminars per week)
Language of instruction	Czech
Level of course and year of study	master: 4; master continuing: 1
Semester	WS 2011/2012 – FIS
Name of lecturer	doc. Ing. Vojtěch Svátek, Dr. (supervisor)
Prerequisites	none

Aims of the course

The students oriented to practice will get the knowledge and skills needed in connection with increasing application of semantic technologies in the enterprise and government sphere, in particular of the Linked Data concept and use of ontological models and semantic annotation.

The students considering PhD study or researcher career will be prepared to involvement in the research activities of the department in the respective field.

Learning outcomes and competences

Upon successful completion of this course, the students will be able to design applications on the top of Linked Data on the WWW, as well as to create ontological models for such data.

Course contents

1 Initial overview and motivation

1.1 Agenda of the course

1.2 Notion of semantic web

1.3 Sample applications of semantic web

1.4 Comparison of semantic web with conventional web applications and centralized databases

2 RDF Technology

2.1 Structure of knowledge in RDF format

2.2 Relation between RDF and XML, RDF serializations

2.3 RDF Schema (RDFS) – basic language of semantic vocabularies

2.4 SPARQL query language

2.5 Programming interfaces to RDF

2.6 Semantic RDF repositories

- 2.7 RDF inside HTML
- 2.8 Advanced modelling in RDFS
- 3 Linked Data
 - 3.1 Linked Data Principles
 - 3.2 Overview of prominent Linked Data resources
 - 3.3 Technology of data transformation and linking for the semantic web
- 4 Data resources and vocabularies in real application domains
 - 4.1 E-commerce
 - 4.2 Enterprise integration
 - 4.3 Government
 - 4.4 Biomedicine
 - 4.5 (Multi)Media and libraries
- 5 Ontological engineering basics
 - 5.1 OWL language constructions
 - 5.2 Description logics and reasoning
 - 5.3 Principles and methodologies of ontological engineering
 - 5.4 Ontological design patterns
 - 5.5 Topic Maps
- 6 Knowledge acquisition from texts
 - 6.1 Manual semantic annotation of documents
 - 6.2 Automatic semantic annotation and information extraction
- 7 Student presentations from reading

Teaching methods and student workload

Type of teaching method	Hours of workload
	daily attendance
Participation in lectures	26
Preparation for lectures	13
Attendance at seminars/workshops/tutorials	26
Preparation for seminars/workshops/tutorials	13
Preparation of term paper	39
Preparation of presentation	26
Preparation for mid-term test(s)	13
Total	156

Assessment methods

Requirement type	Weight
	daily attendance
Term paper	45 %
Presentation	15 %
Mid-term test(s)	40 %
Total	100 %
Special requirements and details: Test 1: 5 pts out of 15. Test 2: 10 pts out of 25. Presentation: 10 pts out of 15. Project: 20 pts out of 45.	

Recommended reading

Type*	Author	Title	Published in	Publisher	Year	ISBN
R	ANTONIOU, G. – HARMELEN, F. V.	A semantic web primer	Cambridge	MIT Press	2004	0-262-01210-3
R	ALLEMANG, D. – HENDLER, J. A.	Semantic web for the working ontologist modeling in RDF, RDFS and OWL	Burlington	Morgan Kaufmann Publishers	2008	978-0-12-373556-0
R	HUNTING, S. – PARK, J.	XML topic maps : creating and using topic maps for the Web	Boston	Addison- Wesley	2002	0-201-74960-2
A	Materiály W3C, ISO a další elektronické zdroje					

* R – required reading, A – additional reading