SYLLABUS

1. Data about the program of study

1.1	Institution	The Technical University of Cluj-Napoca
1.2	Faculty	Faculty of Automation and Computer Science
1.3	Department	Computer Science
1.4	Field of study	Computer Science and Information Technology
1.5	Cycle of study	Master of Science
1.6	Program of study/Qualification	Artificial Intelligence and Vision
1.7	Form of education	Full time
1.8	Subject code	9.

2. Data about the subject

2.1	Subject name			***Semantic Web and Agents***			
2.2	Subject area			Artificial Intelligence and Vision			
2.2	Course responsible/lecturer			Prof.dr.ing. Ioan Alfred Letia- letia@cs.utcluj.ro			
2.3	Teachers in charge of seminars			Prof.dr.ing. Ioan Alfred Letia- letia@cs.utcluj.ro			
2.4 Year of study	I	2.5 Semester	2	2.6 Assessment	E–**e**xam, C–**c**olloq., V-**v**erif.		E
2.7 Subject category	Formative category: DA – advanced, DS – speciality, DC – complementary						DS
	Optionality: DI – imposed, DO – optional (alternative), DF – optional (free choice)						DI

3. Estimated total time

3.1 Number of hours per week	3	of which	3.2 Course	2	3.3 Seminar	-	3.3 Laborator	1	3.3 Proiect	-
3.4 Total hours in the curriculum	42	of which	3.5 Course	28	3.6 Seminar	-	3.6 Laborator	14	3.6 Proiect	-

3.7 Individual study:	
(a) Manual, lecture material and notes, bibliography	20
(b) Supplementary study in the library, online and in the field	10
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays	10
(d) Tutoring	16
(e) Exams and tests	2
(f) Other activities	-

3.8 Total hours of individual study (summ (3.7(a)…3.7(f)))	58
3.9 Total hours per semester (3.4+3.8)	100
3.10 Number of credit points	4

4. Pre-requisites (where appropriate)

4.1	Curriculum	Sisteme de Agenti Inteligenti
4.2	Competence	Competences of above course

5. Requirements (where appropriate)

5.1	For the course	Projector, Computer
5.2	For the applications	Presence compulsary 100% for admission to final exam

6. Specific competences

Professional competences	**C2 –** Usage of computer technique in domains of artificial intelligence and its applications **C2.1 -** Identification and description of the structure and functioning of the components of intelligent systems **C2.2 –** Explanation of the role, interactions and functional characteristics of the components of most recent intelligent systems shown in the scientific literature for the web **C2.3 -** Concepts for inteligent systems working on the web, using the description în OWL with the facilities based on description logics **C2.4 –** Evaluation of functional characteristics of intelligent systems **C2.5 –** Implementation of reasoning systems in OWL and various description logics to help users understand the knowledge available on the web **C3 -** Inovative projects of intelligent systems and software components used in specific applications **C3.1 –** Demonstration of knowledge of technologies, programs and concepts specific to intelligent systems **C3.2 -** Analysis and explanations of the roles, interactions and functioning of the components developed on the basis of the most new methodologies described în the scientific literature for intelligent systems **C3.3 -** Analysis and discovery of aspects susceptibe of optimization, followed by the application inovative solutions for the developement of intelligent systems **C3.4 –** Evaluation of comparative, synhtetic, inclusive experimental alternatives for solving optimization performances, based on usage criteria **C3.5 -** Development and implementation of original information solutions for problems specific to the domain, starting from a set of requirements informally specified **C4 –** Contextual integration and usage of dedicated information systems **C4.1 –** Establish criteria relevant for the quality and security in information systems **C4.2 -** Usage of multidisciplinary knowledge for the integration of information systems **C4.3 –** Usage of concepts and new methods to ensure security and comfort in the age of integrated information systems **C4.4 -** Development of tests, usage and adaptaion of quality standards and security în dedicated information systems **C4.5 -** Realisation of interdisciplinary research-development projects according to standards of quality, security and safety
Cross competences	**N/A**

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	Acquiring the fundamental notions of the semantic web and intelligent agents, as general logics used in the domain of computer science, on the line of modelling the representation of knowledge and reasoning on them
7.2	Specific objectives	Usage of intelligent agents available in reasoning and representation of knowledge

8. Contents

8.1. Lecture (syllabus)	Number of hours	Teaching methods	Notes
Introduction to semantic reasoning	2	Face to face	
Description logics	2		
Framework for semantic policy representation	2		
Contextualized knowledge repositories	2		
Services based on ontology for solving eterogeneity	2		
Relationship extraction methods and models for knowledge graph creation	2		

Representing and classifying arguments on the Semantic Web	2		
From keywords to semantic queries - Incremental query	2		
Ontology-based search and mining of biomedical resources	2		
Explaining and predicting abnormal expenses	2		
The SSN ontology of the W3C semantic sensor network incubator group	2		
Discovering semantic web services using SPARQL and intelligent agents	2		
Agents with foundation models	2		
Ontology for understanding the transittability of complex biomolecular networks	2		
Bibliography Articles from journals on Artificial Intelligence and Web of Science.			
8.2. Seminars /Laboratory/Project	Number of hours	Teaching methods	Notes
Description logics	2	Face to face	
Information extraction for ontology mapping	2		
End-end composition of web services	2		
Tracking the normative state of contracts	2		
Norm management in multi-agent systems	2		
Multi-agent systems for information interchange	2		
Bibliography			

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

The semantic web and intelligent agents are increasingly used in the society based on knowledge, an important domain in the European Union, regarding software systems.

10. Evaluation

Activity type	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Ability to solve problems specific to the domain	Onsite or online (Moodle + zoom)	75%
10.5 Seminars /Laboratory/Project	Knowledge of problems solved in the domain	Onsite or online (Moodle + zoom)	
10.6 Minimum standard of performance			
Capacity to model/represent knowledge and reasoning at the level of the covered chapters			

Date of filling in:		**Title Surname Name**	**Signature**
	Lecturer	Prof.dr.ing. Ioan Alfred Letia	
	Teachers in charge of application	Prof.dr.ing. Ioan Alfred Letia	

Date of approval in the department 20.02.2024	Head of department Prof.dr.ing. Rodica Potolea
Date of approval in the faculty council 22.02.2024	Dean Prof.dr.ing. Liviu Miclea