

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	Masters
1.6 Program of study / Qualification	Artificial Intelligence and Vision / Masters
1.7 Form of education	Full time

2. Data about the subject

2.1 Subject name	Semantic Web and Agents				Subject code	9
2.2 Course responsible / lecturer	Lect. dr. eng. Feier Cristina - Cristina.Feier@cs.utcluj.ro					
2.3 Teachers in charge of seminars / Laboratory / project	Lect. dr. eng. Feier Cristina - Cristina.Feier@cs.utcluj.ro					
2.4 Year of study	I	2.5 Semester	2	2.6 Type of assessment (E - exam, C - colloquium, V – verification)	E	
2.7 Subject category	Formative category: DF – fundamental, DS – speciality, DC – complementary					DS
	Optionality: DOB – mandatory, DOP – optional (alternative), DFA – optional (free choice)					DOB

3. Estimated total time

3.1 Number of hours per week	3	of which:	Course	2	Seminars	-	Laboratory	1	Project	-
3.2 Number of hours per semester	42	of which:	Course	28	Seminars	-	Laboratory	14	Project	-
3.3 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:										-
3.4 Total hours of individual study (suma (3.3(a)...3.3(f)))					58					
3.5 Total hours per semester (3.2+3.4)					100					
3.6 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 compulsory 100% for admission to final exam

6. Specific competence

6.1 Professional competences	• analyse business requirements • analyse big data • apply ICT systems theory • create data sets • define technical requirements • design process • develop creative ideas • develop statistical software • deliver visual presentation of data • creatively use digital technologies • use data processing techniques • acquire system component • align software with system architectures • create data models • manage system testing • assess ICT knowledge • manage database • implement ICT security policies • integrate system components • design enterprise architecture • design information system • use an application-specific interface • use markup languages • build predictive models • build recommender systems • utilise machine learning • conduct scholarly research • develop computer vision system • apply statistical analysis techniques • manage data collection systems
6.2 Cross competences	The graduate: • develop an analytical approach • taking a proactive approach • developing strategies to solve problems • being open minded • coordinate engineering teams

7. Expected Learning Outcomes

Knowledge	The student has knowledge of: • business intelligence • information structure • principles of artificial intelligence • web programming
Skills	• The student is able to: • creatively use digital technologies • assess ICT knowledge • use an application-specific interface • manage databases

Responsibilities and autonomy	The student has the ability to work independently in order to: • develop an analytical approach • take a proactive approach • develop strategies to solve problems • be open-minded • coordinate engineering teams
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8. Discipline objective (as results from the *key competences gained*)

8.1 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
8.2 Specific objectives	Usage of intelligent agents available in reasoning and representation of knowledge

9. Contents

9.1 Lectures				Hours	Teaching methods	Notes
Introduction to semantic reasoning				2		
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.						
9.2 Applications - Seminars/Laboratory/Project				Hours	Teaching methods	Notes
Description logics				2		
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:						

**Se vor preciza, după caz: tematica seminariilor, lucrările de laborator, tematica și etapele proiectului.*

10. 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.

11. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Ability to solve problems specific to the domain.	Onsite	75%
Seminar	-	-	-
Laboratory	Knowledge of problems solved in the domain.	Onsite	
Project	-	-	-
Minimum standard of performance: Capacity to model/represent knowledge and reasoning at the level of the covered chapters.			

Date of filling in: 29.04.2026	Responsible	Title First name Last name	Signature
	Course	Lect.dr.eng. Cristina FEIER	
	Applications	Lect.dr.eng. Cristina FEIER	

Date of approval in the department	Head of department, Prof.dr.eng. Rodica Potolea
Date of approval in the Faculty Council	Dean, Prof.dr.eng. Vlad Mureșan