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	Data Science / Masters
1.7 Form of education	Full time

2. Data about the subject

2.1 Subject name	***Research Activity 2***			Subject code	**12**
2.2 Course responsible / lecturer	Not necessary.				
2.3 Teachers in charge of seminars / Laboratory / project	Not necessary.				
2.4 Year of study	I	2.5 Semester	2	2.6 Type of assessment (E - exam, C - colloquium, V – verification)	V
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	14	of which:	Course	-	Seminars	-	Laboratory	-	Project	14
3.2 Number of hours per semester	196	of which:	Course	-	Seminars	-	Laboratory	--	Project	196
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										-
(b) Supplementary study in the library, online and in the field										10
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										25
(d) Tutoring										15
(e) Exams and tests										4
(f) Other activities:										-

3.4 Total hours of individual study (suma (3.3(a)…3.3(f)))	54
3.5 Total hours per semester (3.2+3.4)	250
3.6 Number of credit points	10

4. Pre-requisites (where appropriate)

4.1 Curriculum	Research Activity 1
4.2 Competence	Related to the discipline above

5. Requirements (where appropriate)

5.1. For the course	It's not necessary
5.2. For the applications	Computers, equipment and specific software

6. Specific competence

6.1 Professional competences	• analyse big data • analyse business processes • analyse decentralised applications • build predictive models • create data models • debug software • define software architecture • define technical requirements • design cloud architecture • design process for blockchain-based systems • develop blockchain innovative architectures • develop software prototype • develop with cloud services • evaluate blockchain architectures • explain blockchain implications • explain distributed ledger technologies principles • identify blockchain innovation opportunities • implement smart contracts • interpret technical requirements • manage cloud data and storage • outline blockchain-based identity management • oversee development of software • perform data cleansing • perform data mining • perform scientific research • provide technical documentation • recognise blockchain application areas • recognise blockchain risks • use data processing techniques • use software design patterns • use software libraries • utilise computer-aided software engineering tools • utilise machine learning
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: • cloud technologies • computer science • data warehouse • statistics • blockchain application security principles • blockchain architecture • blockchain-based business models

Skills	The student is able to: • manage data • manage research data • process data • store digital data and systems
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

8. Discipline objective (as results from the *key competences gained*)

8.1 General objective	Development of research and design skills and competencies in the field of intelligence and artificial vision, computers and information technology
8.2 Specific objectives	Assimilation of knowledge and skills regarding: • elaboration of the general scheme or the architecture of the artificial intelligence and vision system to be developed • performing experiments, tests and checks • stating some working hypotheses and validating them through experiments • designing the components of an application system

9. Contents

9.1 Lectures	Hours	Teaching methods	Notes
Not necessary			
Bibliography: Not necessary			
9.2 Applications - Seminars/Laboratory/Project	Hours	Teaching methods	Notes
Establishing the theme of the dissertation project;		Individual work and periodic checks.	10 credits
Establishing the main chapters;			
Documentation on the dissertation topic;			
Creating a synthesis regarding the bibliographic documentation			
Bibliography: Establishd by each advisor in accordance with the research topics			

**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

It is carried out through periodic meetings with representatives of the economic environment.

11. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Not necessary	-	-
Seminar	-	-	-
Laboratory	-	-	-
Project	Based on the practical results and the elaborated report	Oral examination, Report evaluation	60% 40%
Minimum standard of performance: Average 5			

Date of filling in: 29.04.2026	**Responsible**	**Title First name Last name**	**Signature**
	Course	-	
	Applications	-	

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