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

2. Data about the subject

2.1 Subject name	***Field Specific Research for the Master Thesis***			Subject code	**21.00**
2.2 Course responsible / lecturer	The dissertation advisor.				
2.3 Teachers in charge of seminars / Laboratory / project	In accordance with the decision of the dissertation advisor				
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: 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	7	of which:	Course	-	Seminars	-	Laboratory	-	Project	7
3.2 Number of hours per semester	98	of which:	Course	-	Seminars	-	Laboratory	-	Project	98
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										50
(b) Supplementary study in the library, online and in the field										50
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										40
(d) Tutoring										8
(e) Exams and tests										4
(f) Other activities:										-

3.4 Total hours of individual study (suma (3.3(a)…3.3(f)))	152
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 1,2 and 3
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	**C4** - Contextual integration and integrity of complex artificial intelligence and vision systems • **C4.1** - Demonstration of knowledge and understanding of interoperability and integration elements specific to artificial intelligence and vision systems, taken both as a whole and on modules • **C4.2** - Using interdisciplinary knowledge to adapt complex intelligence and artificial vision systems in relation to the dynamic requirements of the application field • **C4.3** - The combined use of classic and original principles and methods for the integration of the components of artificial intelligence and vision systems • **C4.4** - The use of quality, safety and security standards in information processing and in the integration of complex intelligence and artificial vision systems • **C4.5** - Realization of interdisciplinary projects, including problem identification and analysis, elaboration of specifications, software design, implementation of functional testing and evaluation of specific quality, security and performance criteria, as well as validation of the integrated artificial intelligence and vision system **C5** - Research, development, optimization and implementation of communication networks and complex distributed systems by creatively combining multidisciplinary knowledge in the field of computers and information technology • **C5.1** - Demonstration of thorough knowledge of the fundamental principles of organization and operation of complex distributed and communication systems • **C5.2** - Using the ability to analyze and interpret new situations through the lens of multidisciplinary knowledge in the field of computers and information technology • **C5.3** - The creative combination, based on the discovery of new semantic and functional links, of different modern design principles in the field of computers and information technology to solve communication problems between systems • **C5.4** - Use of criteria and methods for evaluating the quality and security of communication systems and distributed systems • **C5.5** - Carrying out research activities with practical purpose
6.2 Cross competences	**CT1** - Demonstrating knowledge of the economic, ethical, legal and social context of exercising the profession for identifying tasks, planning activities and opting for responsible decisions, culminating in the conception, drafting and presentation of a scientific paper **CT2** - The clear and concise description of the flow of activities, tasks and results in the field of activity, obtained either after assuming the role of leader / project manager, or as a member of a research team, thanks to: the ability to synthesize information from the field, the overall global vision, communication skills with collaborators, the ability to define activities by stages **CT3** - Practicing the continuous self-education and demonstrating critical, innovative and research skills

7. Expected Learning Outcomes

Knowledge	The student has knowledge of: • artificial neural networks • computer programming (Python) • computer simulation • digital data processing • principles of artificial intelligence • visual presentation techniques • machine learning (computer programming) • computer vision • lean project management • digital systems • image recognition • information structure • lean project management
Skills	The student is able to: • create data sets • define technical requirements • design processes • develop statistical software • use data processing techniques • build recommender systems • identify processes for re-engineering • manage ICT data classification • align software with system architectures • analyse business requirements • manage databases • use an application-specific interface
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

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

8.1 General objective	Elaboration of the dissertation
8.2 Specific objectives	In order to achieve these general objectives, the students will integrate the results obtained in the research activity in a paper that complies with the requirements of the department.

9. Contents

9.1 Lectures	Hours	Teaching methods	Notes
-			
Bibliography. Not necessary			
9.2 Applications - Seminars/Laboratory/Project	Hours	Teaching methods	Notes
-			
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	-	-	-
Seminar	-	-	-
Laboratory	-	-	-
Project	Dissertation thesis	Dissertation thesis evaluation	100%
Minimum standard of performance: Average 5			

Date of filling in: 01.09.2025	**Responsible**	**Title First name Last name**	**Signature**
	Course	-	
	Applications	Dissertation Thesis Advisor	

Date of approval in the department 17.09.2025	Head of department, Prof.dr.eng. Rodica Potolea
Date of approval in the Faculty Council 19.09.2025	Dean, Prof.dr.eng. Vlad Mureșan