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	Automation
1.4 Field of study	System's Engineering
1.5 Cycle of study	Master
1.6 Program of study / Qualification	Cyber-physical systems
1.7 Form of education	Full time

2. Data about the subject

2.1 Subject name	***Project Cyber-physical systems 1***			Subject code	**5.00**
2.2 Course responsible / lecturer	Not necessary				
2.3 Teachers in charge of seminars / Laboratory / project	At the student's choice				
2.4 Year of study	1	2.5 Semester	1	2.6 Type of assessment (E - exam, C - colloquium, V – verification)	C
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	2	of which:	Course	0	Seminars	0	Laboratory	0	Project	2
3.2 Number of hours per semester	28	of which:	Course	0	Seminars	0	Laboratory	0	Project	28
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										28
(b) Supplementary study in the library, online and in the field										42
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										
(d) Tutoring										
(e) Exams and tests										2
(f) Other activities:										

3.4 Total hours of individual study (suma (3.3(a)…3.3(f)))	72
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	Not necessary
4.2 Competence	Use of fundamental automation concepts

5. Requirements (where appropriate)

5.1. For the course	Not necessary
5.2. For the applications	Not necessary

6. Specific competence

6.1 Professional competences	• Interacts professionally in research and professional environments • Applies the principles of scientific ethics and integrity in research activities • Ensures project management • Communicates scientific findings • Conducts interdisciplinary research • Conducts literature research • Develops professional networks with researchers • Disseminates results to the scientific community • Demonstrates disciplinary expertise • Conduct scientific research • Thinks abstractly • Promotes public involvement in research • Promotes open innovation in research • Promotes knowledge transfer • Publishes academic research papers
6.2 Cross competences	• Show initiative • Think analytically • Apply scientific, technological, and engineering knowledge • Work in teams

7. Expected Learning Outcomes

Knowledge	The student will know • advanced concepts, principles, and methodologies in systems engineering, automation, and cyber-physical systems • principles of design, operation, and evaluation for complex control systems, industrial networks, and related hardware and software components • standards, best practices, and regulations for quality, safety, security, and ethical conduct in professional and research activities • the principles of scientific ethics, academic integrity, and responsible management of research and experimental data • interdisciplinary concepts from mathematics, signal processing, automation, control theory, and computer science applicable to the design and optimization of complex systems
Skills	The student will be able to • conduct scientific and interdisciplinary research, analyze data, and communicate results effectively to professional and academic audiences • design, develop, simulate, and implement hardware, software, and control applications for industrial and cyber-physical systems • apply ethical principles, academic integrity, and responsible research practices in professional activities • integrate multidisciplinary knowledge to design, optimize, implement, and evaluate innovative solutions for complex control systems and industrial networks
Responsibilities and autonomy	• The student will be responsible for carrying out professional or research projects in compliance with quality, safety, and security standard • The student will be responsible for ensuring ethical conduct, academic integrity, and proper management of research and experimental data • The student will be responsible for promoting collaboration, teamwork, knowledge transfer, and innovation within professional and research environments

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

8.1 General objective	- Training of young engineers, researchers and developers. - Supporting master's students in the proper preparation of dissertations, research projects, dissemination of results. - Choosing strategies, methods, techniques and tools to develop and implement a project.
8.2 Specific objectives	Acquiring of transdisciplinary and interdisciplinary knowledge

9. Contents

9.1 Lectures	Hours	Teaching methods	Notes
Not necessary			
Bibliography:			
9.2 Applications - Seminars/Laboratory/Project	Hours	Teaching methods	Notes
The specific content and research objectives are tailored to the student's chosen field of study. Under the guidance of the project responsible, the project content will include literature review, methodology design, implementation/experimentation, and a final synthesis of results relevant to the specific domain.		Presentation of examples, discussions, practical applications	

Bibliography

- Kuada, J., 2012. *Research methodology: A project guide for university students*. Samfundslitteratur.
- Literature recommended by the supervisor

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

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

• The discipline meets the current requirements of development and evolution on a national and international level of higher technical education in the field of Systems Engineering.
• The students are provided with skills related to the needs of the current qualifications, a scientific and technical training corresponding to the master's level, which will allow them to quickly enter the labour market after graduation, but also the possibility of continuing their studies through doctoral programs.
• The study program is included in the policy and strategy of the Technical University of Cluj-Napoca, both in terms of content and structure, as well as in terms of learning outcomes and openness offered to students on the job market in Systems Engineering.

10. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course			
Seminar			
Laboratory			
Project	Project Proposal 15% Methodological Rigor 30% Results & Innovation 35% Documentation 20%	Oral evaluation	100%
Minimum standard of performance: Project grade>=5			

Date of filling in: 01.09.2025	**Responsible**	Teachers in charge of application	**Signature**
	Course		
	Applications		

Date of approval in the department of Automation _____	Head of department, Prof.dr.eng. Honoriu VĂLEAN
Date of approval in the Faculty of Automation and Computer Science Council _____	Dean, Prof.dr.eng. Vlad MUREȘAN