SYLLABUS

1. Program Information

1.1 Higher education institution	Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Automation and Computer Science
1.3 Department	Department of Automation
1.4 Field of study	Automation, Applied Informatics and Intelligent Systems
1.5 Cycle of studies	Bachelor
1.6 Study Programme/Qualification	Intelligent Automation Systems (dual, in English language)
1.7 Form of education	IF – full-time education
1.8 Course code	12.00

2. Course information

2.1 Course title	**Data Management and Infrastructure in Industrial Automation**					
2.2 Course lecturer	-					
2.3 Seminar / Laboratory / Project Lecturer	*Dr.ing. Sergiu Pascu (Emerson)* *Ing. Marian Borzan (Emerson)*					
2.4 Year of study	1	2.5 Semester	2	2.6 Type of assessment		V
2.7 Course status	Formative category *(DF, DS, DC)*					DS
	Optionality *(DOB, DOP, DFac)*					DOB

3.Total estimated time

3.1 Number of hours per week	4	of which:	HEI	Lecture	0	Seminar	0	Laboratory	0	Project	0
			CO		0		0		0		4
3.2 Number of hours per semester	56	of which:	HEI	Lecture	0	Seminar	0	Laboratory	0	Project	0
			CO		0		0		0		56

3.3 Distribution of time allocation (hours per semester) for:	HEI	CO
(a) Study based on textbook, course support, bibliography, and notes	-	14
(b) Additional documentation in library, specialized electronic platforms, and fieldwork	-	28
(c) Preparation of seminars/laboratories, assignments, papers, portfolios and essays	-	14
(d) Tutoring	-	10
(e) Examinations	-	3
(f) Other activities:	-	-
3.4 Total individual study hours (sum (3.3(a)... 3.3(f)))	-	69
3.5 Total hours per semester (3.2+3.4)	-	125
3.6 Number of credits per semester	-	5

(HEI = Higher Education Institution, CO = Company)

4. Prerequisites (where applicable)

4.1 Curriculum Prerequisites	Computer Architecture, Operating Systems and Fundamentals of Computer Networking, Industrial Automation Platforms
4.2 Competency Prerequisites	Ability to independently explore technical documentation, troubleshoot problems, and manage project tasks. Ability to solve configuration tasks. Understand and apply control strategies using DCS systems.

5. Conditions (where applicable)

5.1. Course Organization Conditions	-
5.2. Seminar / Laboratory / Project organization conditions	Computer, Specific Software

6. Specific Competencies Acquired

Professional Competencies	• PC01, Adjust engineering designs • PC02, Analyse test data • PC06, Define technical requirements • PC08, Design automation components • PC12, Gather technical information • PC13, Interact professionally in research and professional environments • PC21, Report analysis results • PC26, Use information technology tools • PC30, Design control systems
Transversal Competencies	• TC01, Apply knowledge of science, technology and engineering • TC03, Demonstrate responsability • TC04, Work in teams • TC05, Interpret mathematical information

7. Learning outcomes

Knowledge:	• The student will be able to describe and explain key concepts related to data management, industrial automation systems, and virtualization technologies. • The student will be able to summarize and identify procedures for configuring real and virtual industrial systems (e.g., Ovation, DeltaV). • The student will be able to explain the role and use of network and storage solutions in an industrial environment.
Skills:	• The student will be able to configure and manage physical and virtual systems, including OS installation, virtualization (Hyper-V), and backup solutions (NAS). • The student will be able to design, calculate, and simulate basic networks and verify network connectivity. • The student will be able to implement, document, and troubleshoot configurations of industrial control systems.
Responsibility and autonomy:	• The student will be able to work independently and collaboratively to execute configuration tasks for industrial systems. • The student will apply best practices for system deployment and maintenance following internal procedures and knowledge bases. • The student will demonstrate accountability and initiative in addressing real-world industrial data management challenges.

8. Course Objectives

8.1 General objective of the course	To provide students with practical and theoretical knowledge in data management for industrial automation systems, focusing on real and virtual environments, system deployment, and basic networking.
8.2 Specific objectives	• To develop students' competence in configuring and managing real and virtual operating systems in industrial contexts. • To enable students to set up and maintain data storage solutions (NAS) and configure networking equipment in lab and simulated environments. • To familiarize students with calculating IP addressing schemes and performing network simulations using tools like Cisco Packet Tracer.

	• To provide hands-on experience in deploying industrial control systems (Ovation and DeltaV) in virtualized environments using internal procedures and knowledge bases. • To ensure students can troubleshoot, document, and optimize system configurations, emphasizing the practical applications of the learned concepts.

9. Contents

9.1 Lectures	No. of hours	Teaching methods	Obs.
Bibliography			

9.2 Seminar / laboratory / project	Hours HEI	Hours CO	Teaching methods	Obs.
1. Real Systems	-	4	-	-
2. HCI Virtualization	-	4		
3. Storage Solutions for Backups (NAS)	-	4		
4. Networking Equipment (Switches)	-	4		
5. Networking implementation (Calculating networks, Network simulations in Cisco Packet Tracer)	-	4		
6. OS installation and templatization	-	4		
7. Ovation system configuration	-	16		
8. DeltaV system configuration	-	16		

Bibliography

1. KB0015751 - T3 - RVO2 - Template Management - DeltaV Template Creation Procedure
2. KB0015685 - RVO2 - Ovation -Installation Guide for Ovation
3. KB0036664 - T3 - RVO2 - How to Deploy DeltaV Systems in Domain
4. HCI installation manual

10. Correlation of course content with the expectations of the epistemic community representatives, professional associations, and major employers in the field related to the program

The course content is aligned with DCS industry standards and guidelines, ensuring that students acquire skills relevant for professional certification and meet industry benchmarks.

11. Evaluation

Activity Type	Evaluation criteria	Evaluation methods	Weight in final grade
11.1 Lecture	-	-	-
11.2 Seminar/ Laboratory/Project	Practical execution skills, conceptual explanation, troubleshooting and debugging, use of tools and commands	Practical applications	100%
11.3 Minimum Performance Standard			

Date of completion: 11.05.2025	Program responsible	Conf.dr.ing. Roxana Rusu-Both	

Date of approval by the Department of Automation Council 24.11.2025	Director of the Department of Automation Prof.dr.ing. Honoriu VĂLEAN
Date of approval by the Faculty of Automation and Computer Science Council 28.11.2025	Dean Prof.dr.ing. Vlad MUREȘAN