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 (English)
1.7 Form of education	Full time

2. Data about the subject

2.1 Subject name	***Research Methods***			Subject code	**4.00**
2.2 Course responsible / lecturer	Prof. Habil. Eng. Eva-H. DULF, PhD				
2.3 Teachers in charge of seminars / Laboratory / project	Prof. Habil. Eng. Eva-H. DULF, PhD				
2.4 Year of study	1	2.5 Semester	1	2.6 Type of assessment (E - exam, C - colloquium, V – verification)	E
2.7 Subject category	Formative category: DA – advanced, DS – speciality, DC – complementary				DA
	Optionality: DI – imposed, DO – optional (alternative), DF – optional (free choice)				DI

3. Estimated total time

3.1 Number of hours per week	3	of which:	Course	2	Seminars	0	Laboratory	1	Project	0
3.2 Number of hours per semester	42	of which:	Course	28	Seminars	0	Laboratory	14	Project	0
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										14
(b) Supplementary study in the library, online and in the field										14
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										28
(d) Tutoring										0
(e) Exams and tests										2
(f) Other activities:										0

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	4.00

4. Pre-requisites (where appropriate)

4.1 Curriculum	Bachelor degree
4.2 Competence	English, Basic Systems Engineering knowledge

5. Requirements (where appropriate)

5.1. For the course	Prior reading of the course slides
5.2. For the applications	Prior reading of the documentation

6. Specific competence

6.1 Professional competences	• Interacts professionally in research and professional environments • Analyses test data • Applies the principles of scientific ethics and integrity in research activities • Communicates scientific findings • Conducts interdisciplinary research • Conducts literature research • Disseminates results to the scientific community • Conduct scientific research • Manage research data • Manages intellectual property rights • Manages open publications • Thinks abstractly • Presents analysis results • Promotes public involvement in research • Promotes open innovation in research • Promotes knowledge transfer • Publishes academic research papers • Performs data analysis • Writes scientific and academic papers and technical documentation • Develop scientific publications • Synthesizes information • Applies for research funding
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 • 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 • how to conduct research • how to write a scientific paper • how to publish a scientific paper
Skills	The student will be able to • conduct scientific and interdisciplinary research, analyze data, and communicate results effectively to professional and academic audiences • apply ethical principles, academic integrity, and responsible research practices in professional activities • integrate multidisciplinary knowledge to write and publish a scientific paper
Responsibilities and autonomy	• The student will be responsible for carrying out research 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	This course introduces the students to research methods and their application across liberal and professional studies as preparation for lifelong inquiry.
8.2 Specific objectives	The course aims to provide in-depth knowledge of research design and methodology and to train the student in writing a study plan and critically reviewing scientific literature. On completion of the course, the student should be able to: Knowledge and understanding, understand different scientific research designs and methods, learn how to set up a research study, Understand correct ways to refer to and cite from scientific literature

9. Contents

9.1 Lectures	Hours	Teaching methods	Notes
What Is Research and What Makes a Good Research Question?	4	Presentation and discussions, case studies	In case of force majeure, online on Teams
Critical Literature Review	4		
Planning and Management Skills in Research	4		
Research Techniques	4		
Interpretation and Report	4		
Scientific writing	4		
Scientific presentation	4		

Bibliography:

- https://www.sokogskriv.no/en/
- https://subjectguides.york.ac.uk/academic-writing/academic-style
- Trochim, W. M. K., Donnelly, J. P., & Arora, K. (2016). Research methods: The essential knowledge base. Boston, MA: Cengage Learning. Wadsworth Publishing, ISBN 978-1133954774
- https://pitt.libguides.com/citationhelp
- Glasman-Deal, Hilary Science research writing for non-native speakers of English
- London: Imperial College Press, cop. 2010 - xiii, 257 s. ISBN:9781848163096

9.2 Applications - Seminars/Laboratory/Project	Hours	Teaching methods	Notes
Selecting a problem and reviewing the literature	2	Exemplification, Individual discussions	In case of force majeure, online on Teams
Planning the selected research	2		
Discussing the research techniques	2		
Writing an article or an implementation-ready research proposal employing the most suitable research methods on the selected topic	6		
Presenting the conducted research.	2		

Bibliography

- www.GoogleScholar.com
- ScienceDirect (www.sciencedirect.com)
- https://www.webofknowledge.com/

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 content of the lectures and laboratory classes corresponds to some of the newest approaches in the field. Selected case studies refer to emerging applications, ranging from aerodynamics to biomedical engineering. The content of the lectures and the laboratory classes has been discussed with companies in Romania.

10. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Evaluation of the acquired skills and activity within lectures	Written exam	50%
Seminar			
Laboratory	Evaluation of the final project	Oral exam	50%
Project			

Minimum standard of performance:
Exam grade >= 5 and lab assessment grade >= 5

Date of filling in: 01.09.2025	**Responsible**	**Title First name Last name**	**Signature**
	Course	Prof. Habil. Dr. Eng. DULF Eva-H.	
	Applications	Prof. Habil. Dr. Eng. DULF Eva-H.	

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