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	Department of Automation
1.4	Field of study	Systems Engineering
1.5	Cycle of study	Master of Science
1.6	Program of study/Qualification	Cyber Physical Systems (English)
1.7	Form of education	Full time
1.8	Subject code	4.00

2. Data about the subject

2.1	Subject name			Research Methods			
2.2	Subject area			Science			
2.2	Course responsible/lecturer			Prof. Eng. Eva-H. DULF, PhD, Eva.Dulf@aut.utcluj.ro			
2.3	Teachers in charge of seminars			Prof. Eng. Eva-H. DULF, PhD, Eva.Dulf@aut.utcluj.ro			
2.4 Year of study	1	2.5 Semester	1	2.6 Assessment	Exam		E
2.7 Subject category	Formative category						DA
	Optionality						DI

3. Estimated total time

3.1 Number of hours per week	3	of which	3.2 Course	2	3.3 Seminar	0	3.3 Laboratory	1	3.3 Project	0
3.4 Total hours in the curriculum	42	of which	3.5 Course	28	3.6 Seminar	0	3.6 Laboratory	14	3.6 Project	0

3.7 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

3.8 Total hours of individual study (sum (3.7(a)…3.7(f)))	58
3.9 Total hours per semester (3.4+3.8)	100
3.10 Number of credit points	4.0

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 competences

Professional competences	C1.1 Using the concepts, theories and methods of the fundamental sciences of systems engineering in professional communication C5.1 Identification of the concepts and methods for project management and of specific languages for application development C6.1 Identification of the methods and techniques of analysis and evaluation for products and design elements as well as of the principles of management, marketing and quality engineering, applicable in engineering activities
Cross competences	CT1 Application, in the context of law compliance, of the intellectual property rights (including technology transfer), product certification methodology, principles, norms and values of professional ethics code for the own rigorous, effective and accountable work strategy. CT3 Identify opportunities for continuing professional development and effective utilization of learning resources and techniques for own professional development

7. Discipline objectives (as results from the *key competences gained*)

7.1	General objective	This course introduces the students to research methods and their application across liberal and professional studies as preparation for lifelong inquiry.
7.2	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

8. Contents

8.1. Lecture (syllabus)	Number of 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 1. https://www.sokogskriv.no/en/ 2. https://subjectguides.york.ac.uk/academic-writing/academic-style			

3. 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
4. https://pitt.libguides.com/citationhelp
5. Glasman-Deal, Hilary Science research writing for non-native speakers of English
6. London : Imperial College Press, cop. 2010 - xiii, 257 s. ISBN:9781848163096

8.2. Seminars /Laboratory/Project	Number of 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

1. www.GoogleScholar.com
2. ScienceDirect (www.sciencedirect.com)
3. https://www.webofknowledge.com/

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	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final grade
10.4 Course	Evaluation of the acquired skills and activity within lectures	Written exam	50%
10.5 Seminars /Laboratory/Project	Evaluation of the final project	Oral exam	50%
10.6 Minimum standard of performance			
Exam grade >= 5 and lab assessment grade >= 5			

Date of filling in:		Title Surname Name	Signature
14.03.2023	Lecturer	Prof. Habil. Dr. Eng. DULF Eva-H.	
	Teachers in charge of application	Prof. Habil. Dr. Eng. DULF Eva-H.	

Date of approval in the Department of Automation

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Head of department
Prof.dr.ing. Honoriu Valean

Date of approval in the Faculty of Automation and Computer Science

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Dean
Prof.dr.ing. Liviu Miclea