SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	Babeş-Bolyai University of Cluj-Napoca
1.2 Faculty	Faculty of Mathematics and Computer Science
1.3 Department	Department of Computer Science
1.4 Field of study	Computer Science
1.5 Study cycle	Master
1.6 Study programme / Qualification	Data Science

2. Information regarding the discipline

2.1 Name of the discipl	ine	(en)	Computational Thinking				
(ro)							
2.2 Course coordinator			Conf. Dr. Camelia Şerban				
2.3 Seminar coordinato	r		Conf. Dr. Camelia Şerban				
2.4. Year of study	1	2.5 Semester	1	2.6. Type of evaluation	Е	2.7 Type of discipline	Compulso
							ry
2.8 Code of the discipline MME8181							

3. Total estimated time (hours/semester of didactic activities)

3.1 Hours per week	3	Of which: 3.2 course	2	3.3 seminar/laboratory	1
3.4 Total hours in the	42	Of which: 3.5 course	28	3.6 seminar/laboratory	14
curriculum					
Time allotment:					
Learning using manual, course support, bibliography, course notes					40
Additional documentation (in libraries, on electronic platforms, field documentation)					40
Preparation for seminars/labs, homework, papers, portfolios and essays					40
Tutorship					5
Evaluations					8
Other activities:					-

3.7 Total individual study hours	133
3.8 Total hours per semester	175
3.9 Number of ECTS credits	7

4. Prerequisites (if necessary)

4.1. curriculum	-
4.2. competencies	-

5. Conditions (if necessary)

5.1. for the course	•	Video projector
5.2. for the seminar /lab activities	•	Computers, specific development environment

6. Specific competencies acquired

Professional competencies

- C1.1 Description of programming paradigms and of language specific mechanisms, as well as identification of syntactic and semantic differences.
- C1.3 Elaboration of adequate source code and testing of components in a given programming language, based on given specifications.
- C1.4 Testing applications based on testing plans.
- C1.5 Developing units of programs and corresponding documentation.

Transversal competencies

- CT1 Application of efficient and rigorous working rules, manifest responsible attitudes towards the scientific and didactic fields, respecting professional and ethical principles.
- CT2 Use of efficient methods and techniques for learning, information, research and development of abilities for knowledge exploitation, for adapting to the needs of a dynamic society and for communication in a widely used foreign language.

7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	To develop the foundations of Computational Thinking, concepts, methods and techniques
7.2 Specific objective of the	To understand how Computational Thinking can be used by data scientists in
discipline	order to organize structured and unstructured data for addressing business
-	problems.

8. Content

o. Content		
8.1 Course	Teaching methods	Remarks
1. Introduction to Computational Thinking:	Interactive	
2. Functions	exposure	
3. Testing.	Live coding	
4. Compound types: list, tuple, dictionary	Explanation	
5. Searching & Sorting	Practical	
6. Modular programming	examples	
7. User defined types	Case-study	
8. Lambda functions	discussions	
9. Introduction to Data Science in		
Python: Pandas data-frames; Matplotlib plotting		
10-11 Statistical Thinking in Python		
12-14 Intermediate Python for Data Science		

Bibliography

- 1. Kleinberg and Tardos Algorithm Design. Pearson Educational, 2014
- 2. (http://www.cs.princeton.edu/~wayne/kleinberg-tardos/)
- 3. *The Python language reference*. (https://docs.python.org/3/reference/index.html)
- 4. *The Python standard library*. (https://docs.python.org/3/library/index.html)
- 5. *The Python tutorial*. (https://docs.python.org/3/tutorial/index.html)
- 6. Kent Beck Test Driven Development: By Example. Addison-Wesley Longman, 2002.

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Simple Applications	• Interactive	
2. Simple Applications	exposure	
3. Simple Applications	 Explanation 	
4. Modular Programming. User defined types	 Conversation 	
5. Lambda	Didactical	
6. Introduction to Python libraries for Data	demonstration	
Science		
7. Statistical Thinking		

Bibliography

- 1. Kleinberg and Tardos Algorithm Design. Pearson Educational, 2014
- 2. (http://www.cs.princeton.edu/~wayne/kleinberg-tardos/)
- 3. *The Python language reference*. (https://docs.python.org/3/reference/index.html)
- 4. *The Python standard library*. (https://docs.python.org/3/library/index.html)
- 5. *The Python tutorial*. (https://docs.python.org/3/tutorial/index.html)
- 6. Kent Beck Test Driven Development: By Example. Addison-Wesley Longman, 2002.

9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

The course respects the IEEE and ACM Curricula Recommendations for Computer Science studies.

The course exists in the studying program of all major universities in Romania and abroad.

The content of the course is considered the software companies as important for average programming skills

10. Evaluation

10. L'aluation				
Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the	
			grade (%)	
10.4 Course	Know concepts and	Project development for a	50%	
	methods from the	specific domain		
	domain of Computationl			
	Thinking			
10.5 Seminar/lab activities	Apply the concepts and	Project verification and	50%	
	methods learnt for	presentation		
	solving problems to a			
	from a specific domain			
10.6Minimum performance standards – minim 5 grade				

Date	Signature of course coordinator	r Signature of seminar coordinator
12.05.2023	Conf. Dr. Camelia Şerban	Conf. Dr. Camelia Şerban
Date of approval	Siş	gnature of the head of department
••••••		of. Dr. Laura Dioșan