

SYLLABUS

DECLARATIVE PROGRAMMING IN MACHINE LEARNING

University year *2025/2026*

1. Information regarding the programme

1.1. Higher education institution	Babeş-Bolyai University
1.2. Faculty	Mathematics and Computer Science
1.3. Department	Computer Science
1.4. Field of study	Computer Science
1.5. Study cycle	Master
1.6. Study programme/Qualification	Applied Computational Intelligence
1.7. Form of education	Full time studies

2. Information regarding the discipline

2.1. Name of the discipline		Declarative Programming in Machine Learning				Discipline code		MME8060			
2.2. Course coordinator					Prof. dr. Horia F. Pop						
2.3. Seminar coordinator					Prof. dr. Horia F. Pop						
2.4. Year of study		2	2.5. Semester		3	2.6. Type of evaluation		E	2.7. Discipline regime		Compulsory

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

3.1. Hours per week	4	of which: 3.2 course	2	3.3 seminar/laboratory/project	2
3.4. Total hours in the curriculum	56	of which: 3.5 course	28	3.6 seminar/laboratory/project	28
Time allotment for individual study (ID) and self-study activities (SA)					hours
Learning using manual, course support, bibliography, course notes (SA)					40
Additional documentation (in libraries, on electronic platforms, field documentation)					42
Preparation for seminars/labs, homework, papers, portfolios and essays					50
Tutorship					4
Evaluations					8
Other activities					-
3.7. Total individual study hours	144				
3.8. Total hours per semester	200				
3.9. Number of ECTS credits	8				

4. Prerequisites (if necessary)

4.1. curriculum	Algorithmics, data structures, statistics	
4.2. competencies	Ability to write computer programs in a high level programming language	

5. Conditions (if necessary)

5.1. for the course	Students will attend the course with their mobile phones shut down
5.2. for the seminar /lab activities	Students will attend the seminar with their mobile phones shut down Room with computers as needed; high level programming language environment

6.1. Specific competencies acquired ¹

¹ One can choose either competences or learning outcomes, or both. If only one option is chosen, the row related to the other option will be deleted, and the kept one will be numbered 6.

Professional/essential competencies	• <i>understanding and working with basic concepts in computational intelligence;</i> • <i>ability to approach and solve complex problems using various techniques of computational intelligence;</i>
Transversal competencies	• <i>capability of information analysis and synthesis;</i> • <i>etic and fair behaviour, commitment to professional deontology;</i> • <i>good English communication skills.</i>

6.2. Learning outcomes

Knowledge	• <i>The graduate has the necessary knowledge to devise, model and design of complex software applications in the field of computational intelligence</i> • <i>The graduate possesses the fundamental knowledge for modelling, being able to analyse real life problems and to translate them in concrete requirements and to design a corresponding software model</i>
Skills	• <i>The graduate can use specific language and terminology for the field of computational intelligence being able to communicate and interact with members of a team</i> • <i>The graduate proves the capacity to reflect over own learning resources</i>
Responsibility and autonomy:	• <i>The graduate proves knowledge related to specifying the requirements of research activities in the domain of computer science in general and computational intelligence in particular and he/she understands the role of research in promoting progress</i> • <i>The graduate knows and respects the ethical and legal principles and rules in scientific research</i>

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

7.1 General objective of the discipline	<i>To introduce the student in CSP and declarative programming frameworks</i>
7.2 Specific objective of the discipline	<i>To present the field of CSP as a novel research and application domain.</i> <i>To induce the necessity of CSP methods and techniques by studying some relevant practical applications</i> <i>To offer the student the instruments that will allow him/her to develop different CSP based applications.</i>

8. Content

8.1 Course	Teaching methods	Remarks
<i>Week 1: Administration and Organization</i>	• <i>Interactive exposure</i>	
<i>Week 2: Logic Programming in Problem Solving; Fundamental issues of Graph theory</i>	• <i>Explanation</i> • <i>Conversation</i>	

Week 3: Introduction and Overview	• Didactical demonstration	
Week 4-6: Fundamentals of CSP		
Week 7-8: Intelligent Techniques in CSP		
Week 9-10: Soft Computing Techniques in CSP		
Week 11-12: Overview of CSP Frameworks		
Week 13-14: Delivery of CSP Projects		
Bibliography		
[1] Edward P.K. Tsang, <i>Foundations of Constraint Satisfaction</i> , Academic Press, London and San Diego, 1993, ISBN 0-12-701610-4		
[2] Roman Bartak, <i>On-line Guide to Constraint Programming</i> , http://ktiml.mff.cuni.cz/~bartak/constraints/index.html		
[3] Grzegorz Kondrak, <i>A Theoretical Evaluation of Selected Backtracking Algorithms</i> , M.Sc. Thesis, University of Alberta, Edmonton, 1994		
[4] ShapeLogic, http://www.shapellogic.org		
8.2 Seminar / laboratory	Teaching methods	Remarks
Week 1: Survey of available information sources. Choose paper topics and schedule presentations.	• Interactive exposure • Explanation • Conversation	
Week 2-3: Work on CSP techniques		
Week 4-5: Work on CSP research		
Week 6-7: Delivery of CSP projects		
Bibliography		
[1] Edward P.K. Tsang, <i>Foundations of Constraint Satisfaction</i> , Academic Press, London and San Diego, 1993, ISBN 0-12-701610-4		
[2] Roman Bartak, <i>On-line Guide to Constraint Programming</i> , http://ktiml.mff.cuni.cz/~bartak/constraints/index.html		
[3] Grzegorz Kondrak, <i>A Theoretical Evaluation of Selected Backtracking Algorithms</i> , M.Sc. Thesis, University of Alberta, Edmonton, 1994		
[4] ShapeLogic, http://www.shapellogic.org		

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 content of the discipline is consistent with the similar disciplines from other Romanian universities and universities from abroad, as well as with the requirements that potential employers would have in the field of the discipline.

10. Evaluation

Activity type	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Course	The correctness and completeness of the accumulated knowledge.	Written exam (in the regular session)	40%
10.5 Seminar/laboratory	One software project and one research reports, on experiments performed by the student, with given requirements, should be prepared and presented	Evaluation of the software project (source code, documentation and presentation) and research reports (written paper of about 10 pages and oral presentation)	2x20%
	Class attendance and activity		20%
10.6 Minimum standard of performance			
Each student has to prove that (s)he acquired an acceptable level of knowledge and understanding of the domain, that (s)he is capable of stating this knowledge in a coherent form, that (s)he has the ability to establish certain connections and to use the knowledge in solving different problems.			

Penalty points are awarded for delays in submission of proposed topic choices and final reports.

Successful passing of the exam is conditioned by the final grade that has to be at least 5; the written exam grade has to be at least 5; the semester projects overall grade has to be at least 5. No reports may be submitted after the end of the 14-th school week

11. Labels ODD (Sustainable Development Goals)²

Not applicable.

*Date:
10/4/2025*

Signature of course coordinator

Prof. dr. Horia F. Pop

Signature of seminar coordinator

Prof. dr. Horia F. Pop

Date of approval:

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Signature of the head of department

Assoc.prof.phd. Adrian STERCA

² *Keep only the labels that, according to the [Procedure for applying ODD labels in the academic process](#), suit the discipline and delete the others, including the general one for Sustainable Development – if not applicable. If no label describes the discipline, delete them all and write „Not applicable.“.*