SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	**Babes-Bolyai University**
1.2 Faculty	**Faculty of 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	**High Performance Computing**

2. Information regarding the discipline

2.1 Name of the discipline	**Knowledge Discovery in Wide Area Networks**						
2.2 Course coordinator	**Assist. Prof. Christian Sacarea, PhD**						
2.3 Seminar coordinator	**Assist. Prof. Christian Sacarea, PhD**						
2.4. Year of study	**1**	2.5 Semester	**4**	2.6. Type of evaluation	**E**	2.7 Type of discipline	**compulsory**

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 curriculum	42	Of which: 3.5 course	28	3.6 seminar/laboratory	14
Time allotment:					hours
Learning using manual, course support, bibliography, course notes					30
Additional documentation (in libraries, on electronic platforms, field documentation)					30
Preparation for seminars/labs, homework, papers, portfolios and essays					30
Tutorship					20
Evaluations					23
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	• Good skills in understanding, analyzing, modelling real life problems • Programming skills • Social and communication skills

5. Conditions (if necessary)

5.1. for the course	•

5.2. for the seminar /lab activities	•

6. Specific competencies acquired

I competencies	• to offer the main conceptual and computational tools of Artificial Intelligence develop skills for coping with real world problems develop research abilities
Transversal competencies	• Ability to analyze a large amount of information Ability to communicate with non-experts and to find altogether solutions for real-life problems

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

7.1 General objective of the discipline	• To introduce the student to a broad range of information representation models drawn from the fields of information science, computer science, semiotics, philosophy, cognitive psychology, and artificial intelligence. • To introduce a formal method of qualitative data analysis. • To provide practical experience with basic data analysis techniques, such as selection, grouping and scaling of features.
7.2 Specific objective of the discipline	• To develop the student's ability to understand the problems involved in the formalization of *informal* data. • To teach practical skills of using the computer software DIAGRAM, ANACONDA, and TOSCANA. • To provide practical experience with techniques of structuring graphical representations. • To provide insights into the formal structure of classification systems.

8. Content

8.1 Course	Teaching methods	Remarks
1. **Introduction: Data, Information, and Knowledge.** What is data? Information? Knowledge? How are they represented? Information access and information usage, The interdisciplinarity of information science.	Lectures, presentations, conversations	
2. Introduction in Knowledge Management. Acquisition, representation and computing of knowledge. Knowledge bases for constructions.	Lectures, presentations, conversations	
3. Formal Concept Analysis (FCA). The pragmatic approach.	Lectures, presentations, conversations	
4. FCA. Context, concept, diagrams	Lectures, presentations, conversations	

5. Order relations	Lectures, presentations, conversations	
6. Many-valued contexts. Scaling	Lectures, presentations, conversations	
7. Conceptual hierarchies. Diagram. How to draw a nice diagram ?	Lectures, presentations, conversations	
8. Implications.	Lectures, presentations, conversations	
9. Association rules.	Lectures, presentations, conversations	
10. Conceptual Knowledge Processing.	Lectures, presentations, conversations	
11. Factor analysis	Lectures, presentations, conversations	
12. Ordinal factor analysis	Lectures, presentations, conversations	
13. Knowledge Management Systems	Lectures, presentations, conversations	
14. Conceptual Knowledge Acquisition	Lectures, presentations, conversations	

Bibliography

1. Bernhard Ganter, Rudolf Wille, Formal Concept Analysis, Springer Verlag, 2000
2. Aldo de Moord, Wilfried Lex, Bernhard Ganter, eds., Conceptual Structures for Knowledge Creation and Communication, Springer LNAI 2746, 2003.
3. Bernhard Ganter, Aldo de Moord, eds., Using Conceptual Structures, Shaker Verlag, 2003.
4. Frank Vogt, Formal Concept Analysis with C++, Springer, 1996

Rokia Missaoui, Jürg Schmid, eds., Formal Concept Analysis, Springer LNAI 3874, 2006.

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Working with small data sets	projects, exercises, individual study, homework assignments.	
2. Diagram drawing. What is a nice diagram?	projects, exercises, individual study, homework assignments.	
3. ConExp, Toscana Suite	projects, exercises, individual study, homework assignments.	
4. Nested line diagrams	projects, exercises, individual study, homework assignments.	
5. My first knowledge management system	projects, exercises, individual study, homework assignments.	
6. Mining associations	projects, exercises, individual study, homework assignments.	
7. Attribute exploration	projects, exercises, individual study, homework assignments.	

Bibliography

1. B. Ganter, G. Stumme, R. Wille, eds. Formal Concept Analysis: foundations and applications, Springer LNAI 3626, 2005
2. P. Becker, J. Hereth Correia: The ToscanaJ Suite for implementing conceptual information systems, in 1, pp. 324 - 348

3. C. Carpineto, G. Romano, Concept data analysis: theory and applications, Wiley, 2004.

4. C. Carpineto, G. Romano, Using concept lattices for text retrieval and mining, in 1, pp. 161-179

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

- Knowledge discovery is an interdisciplinary area which is broadly needed by all actors from science, economy, industry or research.

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	Fundamental principles	Project	50%
	Applying the methods for problem solving		
10.5 Seminar/lab activities	Implementing concepts and algorithms		50%
	Innovation, initiative, team work		
10.6 Minimum performance standards			
➢ At least grade 5 (from 1 to 10).			

Date Signature of course coordinator Signature of seminar coordinator

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Date of approval Signature of the head of department

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