SYLLABUS

1. Information regarding the programme

1.1 Higher education institution	**Babes-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	**Intelligent Systems**

2. Information regarding the discipline

2.1 Name of the discipline	**Knowledge Discovery and WEB Semantics**						
2.2 Course coordinator	**Lect. Christian Sacarea, PhD**						
2.3 Seminar coordinator	**Lect. Christian Sacarea, PhD**						
2.4. Year of study	**1**	2.5 Semester	**2**	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 sem
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	• Knowledge Discovery in Wide Area Networks
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	• Making available a broad range of methods for Knowledge Representation and Processing, and Knowledge Engineering. • To discover the underlying formal structure of knowledge, to derive knowledge. • Knowledge landscape paradigm.
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 for representing knowledge by computers. • To provide practical experience with techniques of structuring graphical representations. • To provide techniques for preprocessing data sets, including the concept of a Data Warehouse • To provide models for automatically learning methods.

8. Content

8.1 Course	Teaching methods	Remarks
1. **Triadic FCA. Introduction, general data structure, Examples and triadic concepts.**	Lectures, presentations, conversations	
2. **Triadic FCA. Representation of triadic concepts, Applications to Social Networking**	Lectures, presentations, conversations	
3. Triadic FCA. Implications and Logic.	Lectures, presentations, conversations	
4. Triadic FCA. Association rules	Lectures, presentations, conversations	
5. **Triadic FCA. Factor Analysis**	Lectures, presentations, conversations	
6. Conceptual Logic. The Peircean Approach. Conceptual Knowledge Processing revisited	Lectures, presentations, conversations	

7. Conceptual Graphs. Introduction, examples, basic rules.	Lectures, presentations, conversations	
8. Conceptual Graphs. Concept boxes	Lectures, presentations, conversations	
9. Conceptual Graphs. Relations	Lectures, presentations, conversations	
10. Conceptual Graphs and FCA.	Lectures, presentations, conversations	
11. **Power Context Families** . Contextual Judgement Logic, Semantics of Conceptual Graphs, Concept Graph of a Power Context Family, Conceptual Contents.	Lectures, presentations, conversations	
12. **Ontologies**, Common sense knowledge and language, CYC and Ontolingua , Ontologies in E-commerce, Applications.	Lectures, presentations, conversations	
13. **Semantic Web.** Semantic Web Impact, Knowledge Management.	Lectures, presentations, conversations	
14. **Semantic Web.** Semantic Web technologies, OWL.	Lectures, presentations, conversations	

Bibliography

1. M. Ester und J. Sander: Knowledge Discovery in Databases: Springer-Verlag, 2000.
2. U. M. Fayyad, G. Piatetsky-Shapiro, P. Smyth and R. Uthurasamy: Advances in Knowledge Discovery and Data Mining. Cambridge , London . MIT Press, 1996.
3. Frank Vogt, Formal Concept Analysis with C++, Springer, 1996
4. Rokia Missaoui, Jürg Schmid, eds., Formal Concept Analysis, Springer LNAI 3874, 2006.
5. B. Ganter, R. Wille, Formal Concept Analysis, Mathematical Foundations, Springer 2000.
6. G. Antoniou, F. van Harmelen: A Semantic Web Primer. MIT Press, Cambridge 2004.
7. Online Course in Knowledge Representation using Conceptual Graphs, Aalborg University, Department of Communication.
8. J. Sowa: Knowledge Representation, Logical, Philosophical, and Computational Foundations. Brooks/Cole, Pacific Grove 2000.

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Triadic FCA. Working on data	projects, exercises, individual study, homework assignments.	
2. Triadic FCA. Building own examples	projects, exercises, individual study, homework assignments.	
3. Triadic FCA. Constructing concepts	projects, exercises, individual study, homework assignments.	
4. Triadic FCA. Implications and associations	projects, exercises, individual	

	study, homework assignments.	
5. Conceptual Graphs. Syntax	projects, exercises, individual study, homework assignments.	
6. Conceptual Graphs. Usage with FCA	projects, exercises, individual study, homework assignments.	
7. Ontologies	projects, exercises, individual study, homework assignments.	

Bibliography

1. M. Ester und J. Sander: Knowledge Discovery in Databases: Springer-Verlag, 2000.
2. U. M. Fayyad, G. Piatetsky-Shapiro, P. Smyth and R. Uthurasamy: Advances in Knowledge Discovery and Data Mining. Cambridge , London . MIT Press, 1996.
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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
.....	Lect. Christian Sacarea, PhD	Lect. Christian Sacarea, PhD

Date of approval	Signature of the head of department
.....	Univ. Prof. Bazil Parv, PhD.