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	**Bachelor**
1.6 Study programme / Qualification	**Computer Science, Information Engineering**

2. Information regarding the discipline

2.1 Name of the discipline	**Knowledge Processing**						
2.2 Course coordinator	**Lect. Christian Sacarea, PhD**						
2.3 Seminar coordinator	**Lect. Christian Sacarea, PhD**						
2.4. Year of study	**3**	2.5 Semester	**6**	2.6. Type of evaluation	**E**	2.7 Type of discipline	**Optional**

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 lab
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					20
Additional documentation (in libraries, on electronic platforms, field documentation)					20
Preparation for seminars/labs, homework, papers, portfolios and essays					50
Tutorship					10
Evaluations					8
Other activities:					-

3.7 Total individual study hours	108
3.8 Total hours per semester	150
3.9 Number of ECTS credits	6

4. Prerequisites (if necessary)

4.1. curriculum	•
4.2. competencies	• Programming skills

5. Conditions (if necessary)

5.1. for the course	•
5.2. for the seminar /lab activities	• Laboratory with computers

6. Specific competencies acquired

Professional competencies	• Knowledge, understanding and use of basic concepts of theoretical Computer Science • Understanding of basic concepts of mathematics and use them to problem-solving activities. • Knowledge, understanding and use of the fundamental methods, processes and tools of software engineering . • Ability to permanently learn, understand and apply the most recent scientific results in the field of Computer Science. • Ability to understand and approach problems of modelling nature from other sciences Ability to work independently and/or in a team in order to solve problems in defined professional contexts.
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	• This course aims to give students a basic understanding about the fundamental principles, concepts and challenges underlying knowledge processing and management . At the end of this course, students will have a thorough theoretical understanding of these issues, and the ability to relate and apply knowledge processing and management theories in the light of simple examples.
7.2 Specific objective of the discipline	• Selected case studies are used to illustrate the utility of knowledge processing and management theories in specific situations, but also to highlight current gaps between knowledge processing and management theory and practice.

8. Content

8.1 Course	Teaching methods	Remarks
1. **Overview and Motivation (Week 1):** Basic motivation and introduction to this course.	Lectures, presentations, conversations	
2. **Knowledge Types. Can Knowledge Be Processed? (Week 2):** What is knowledge? What forms of knowledge can we identify? We will discuss some basic distinctions and characterizations.	Lectures, presentations, conversations	
3. **From Knowledge Processing to Knowledge Management. (Week 3):** What is Knowledge Processing. How can knowledge be processed? We	Lectures, presentations, conversations	

will discuss a series of knowledge management perspectives and their implications.		
4. **Knowledge Organization (Week 4):** How can knowledge be organized? We will discuss some basic principles of knowledge organization, such as categorization, taxonomies and concept systems.	Lectures, presentations, conversations	
5. **Knowledge Bases (Week 5):** What kinds of broad knowledge bases exist? We will discuss different forms of knowledge bases and representations, such as metadata, wordnet, framenet, cyc, openmind and others.	Lectures, presentations, conversations	
6. **Formal Concept Analysis (Week 6):** An introduction to the basic model of FCA. We discuss the main representation of a data set as a formal concept and the knowledge clustering called concept hierarchy and its importance to knowledge processing.	Lectures, presentations, conversations	
7. **Formal Concept Analysis (Week 7):** Many valued contexts, conceptual scaling, logical scaling. Examples.	Lectures, presentations, conversations	
8. **Formal Concept Analysis (Week 8):** The conceptual hierarchy as a knowledge map.	Lectures, presentations, conversations	
9. **Knowledge Acquisition (Week 9):** How can knowledge be acquired in a way that is amenable to computation and/or analysis? We also discuss implications in data sets and algorithm to determine the stem base.	Lectures, presentations, conversations	
10. **Knowledge Transfer (Week 10):** How can knowledge transfer be characterized and what factors can influence knowledge transfer?	Lectures, presentations, conversations	
11. **Knowledge Repositories (Week 11):** How can knowledge repositories be designed and deployed? We will discuss concepts such as knowledge reuse, discretionary databases, experience factories and selected concepts from case based reasoning.	Lectures, presentations, conversations	
12. **Bussiness Oriented Knowledge Management (Week 12):** In this class, we will discuss different approaches aimed at integrating knowledge management into an organization's business processes.	Lectures, presentations, conversations	
13. **Knowledge Based Analysis (Week 13-14):** How can socio-technological systems be organized from a knowledge perspective? We will discuss an agent-oriented modeling approach for analyzing knowledge transfer instruments.	Lectures, presentations, conversations	
14. **Knowledge Based Analysis (Week 13-14):** How can socio-technological systems be organized from a knowledge perspective? We will discuss an agent-oriented modeling approach for analyzing knowledge transfer instruments.	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. R. Maier, Knowledge Management Systems, Springer 2007.

4. H. Rollett, Knowledge Management, Processes and Technologies, Kluwer Academic Publishing, 2003.

8.2 Seminar / laboratory	Teaching methods	Remarks
1. Data – Information - Knowledge	projects, exercises, individual study, homework assignments.	
2. Knowledge clustering.	projects, exercises, individual study, homework assignments.	
3. From context to concept.	projects, exercises, individual study, homework assignments.	
4. Constructing knowledge maps using Toscana.	projects, exercises, individual study, homework assignments.	
5. Conceptual and logical scaling.	projects, exercises, individual study, homework assignments.	
6. Conceptual Knowledge Processing in Bussiness	projects, exercises, individual study, homework assignments.	
7. Knowledge Management tools.	projects, exercises, individual study, homework assignments.	

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. R. Maier, Knowledge Management Systems, Springer 2007.

4. H. Rollett, Knowledge Management, Processes and Technologies, Kluwer Academic Publishing, 2003.

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 processing 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