SYLLABUS

ARTIFICIAL INTELLIGENCE

1. **Information on academic programme**

1.1. University	**„1 Decembrie 1918" University of Alba Iulia**
1.2. Faculty	**Faculty of Exact Sciences and Engineering**
1.3. Department	**Informatics, Mathematics and Electronics**
1.4. Field of Study	**Computer Science**
1.5. Cycle of Study	**Undergraduate**
1.6. Academic programme / Qualification	**Computer Science**

2. **Information of Course Matter**

2.1. **Course**		Artificial intelligence			2.2. **Code**		**CSE 301**
2.3. **Course Leader**			Muntean Maria-Viorela				
2.4. **Seminar Tutor**			Muntean Maria-Viorela				
2.5. Academic Year	**II**	2.6. Semester	**I**	2.7. Type of Evaluation (E – final exam/ CE - colloquy examination / CA -continuous assessment)	**CE**	2.8. Type of course (**C**– Compulsory, **Op** – optional, **F** - Facultative)	**C**

3. Course Structure (Weekly number of hours)

3.1. Weekly number of hours	*4*	3.2. course	***2***	3.3. seminar, laboratory	***2***
3.4. Total number of hours in the curriculum	*56*	3.5. course	***28***	3.6. seminar, laboratory	***28***

Allocation of time:	Hours
Individual study of readers	***40***
Documentation (library)	***20***
Home assignments, Essays, Portfolios	***30***
Tutorials	***2***
Assessment (examinations)	***2***
Other activities	**-**

3.7 Total number of hours for individual study	**94**
3.8 Total number of hours in the curriculum	**56**
3.9 Total number of hours per semester	**150**
3.10umber of ECTS	**6**

4. Prerequisites (*where applicable*)

4.1. curriculum-based	*1. Algorithms and data structures*
4.2. competence-based	-

5. **Requisites** (*where applicable*)

5.1. course-related	Room equipped with video projector / board / Microsoft Teams Platform
5.2. laboratory-based	*Laboratory – computers, Internet access.* / Microsoft Teams Platform

6. **Specific competences to be aquired (chosen by the course leader from the programme general competences grid)**

Professional competences	
Transversal competences	

7. Course objectives (as per the programme specific competences grid)

7.1 General objectives of the course	*- To support Course slides, information* *- For students: course support in editable format* *- Technical equipment: laptop, video projector*
7.2 Specific objectives of the course	*- To support the seminar: informative* *- Technical equipment: laptop, projector*

8. Course contents

8.1 Course (learning units)	**Teaching methods**	**Remarks**
1. INTRODUCTION	***Lecture, conversation, exemplification***	2h
2. SOLVING IA PROBLEMS. SEARCH METHODS. ALGORITHMS	***Lecture, conversation, exemplification***	2h
3. PROBLEM SOLVING STRATEGIES	***Lecture, conversation, exemplification***	2h
4. KNOWLEDGE REPRESENTATION MODELS. FIRST-ORDER LOGIC.	***Lecture, conversation, exemplification***	2h
5. DECISION RULES MODEL	***Lecture, conversation, exemplification***	2h
6. THE STRUCTURED KNOWLEDGE MODEL	***Lecture, conversation, exemplification***	2h
7. APPROXIMATE REASONING. NOTIONS OF FUZZY SET THEORY	***Lecture, conversation, exemplification***	2h
8. PLANNING AND MACHINE LEARNING	***Lecture, conversation, exemplification***	2h
9. THEORETICAL FUNDAMENTALS OF ARTIFICIAL NEURONAL NETWORKS	***Lecture, conversation, exemplification***	2h
10. RECURRENT NEURONAL NETWORKS. SELF-ORGANIZING MAPS. UNSUPERVISED LEARNING	***Lecture, conversation, exemplification***	2h
11. SELF-ORGANIZING NEURAL NETWORKS (KOHONEN). DEEP-LEARNING	***Lecture, conversation, exemplification***	2h
12. EXPERT SYSTEMS	***Lecture, conversation, exemplification***	2h

13. NEURAL NETWORKS APPLICATIONS	***Lecture, conversation, exemplification***	4h

1. Russell, Stuart J., Norvig, Peter, Artificial Intelligence: A Modern Approach , 1995.
2. Paolo Benanti, Artificial Intelligence, Robots, Bio-engineering and Cyborgs: New Challenges for Theology?, 2019
3. Mark Last, Piotr S. Szczepaniak, Zeev Volkovich, Abraham Kandel (Eds.): Advances in Web Intelligence and Data Mining. Studies in Computational Intelligence Vol. 23 Springer 2006.
4. Hillol Kargupta, Jiawei Han, Philip S. Yu, Rajeev Motwani, Vipin Kumar, Next Generation of Data Mining, Taylor and Francis Group, Chapman & Hall, 2009.

Laboratories	**Teaching methods**	
1. Search trees. Heuristic search. Classic examples of smart games.	***Project-work, computer-based activities, laboratory activities***	2h
2. First-order logic examples.	***Project-work, computer-based activities, laboratory activities***	2h
3. Prolog programming language. Prolog facts and rules.	***Project-work, computer-based activities, laboratory activities***	2h
4. Queries. Control strategy in Prolog. Variables and composed sentences. Sections of a Prolog program.	***Project-work, computer-based activities, laboratory activities***	2h
5. Prologue language syntax. Constants, variables, structures, operators, lists.	***Project-work, computer-based activities, laboratory activities***	2h
6. Prolog and first-order logic. The control structure of the Prolog language. Backtracking. Predicates fail and! (cut). The predicate "not".	***Project-work, computer-based activities, laboratory activities***	2h
7. Lisp programming language. Symbols, functions, structures. Syntactic and semantic rules. Primitive functions in Lisp.	***Project-work, computer-based activities, laboratory activities***	2h
8. Basic predicates in Lisp. Predicates for lists; predicates for numbers. Logical and arithmetic functions. Defining user functions.	***Project-work, computer-based activities, laboratory activities***	2h
9. Linking variables, recursive algorithms. Evolved mechanisms: EVAL form. Functional forms: FUNCALL and APPLY functions. LAMBDA expressions. Generators, functional arguments.	***Project-work, computer-based activities, laboratory activities***	2h
10. MAP functions. Iterative forms. Input and output operations. Data structures. Macro-definitions. Optional arguments.	***Project-work, computer-based activities, laboratory activities***	2h
11. Software applications in the field of Artificial Intelligence. Neural network simulators. Matlab	***Project-work, computer-based activities, laboratory activities***	2h
12. Software applications in the field of Artificial Intelligence. Intelligent agent systems.	***Project-work, computer-based activities, laboratory activities***	4h
13. Project presentation and evaluation	***Project-work, computer-based activities, laboratory activities***	2h

References

1. https://www.swi-prolog.org/pldoc/doc_for?object=manual
2. https://sicstus.sics.se/sicstus/docs/latest4/html/sicstus.html/
3. https://www2.cs.sfu.ca/CourseCentral/310/pwfong/Lisp/

4. https://common-lisp.net/tutorials

1. **Corroboration of course contents with the expectations of the epistemic community's significant representatives, professional associations and employers in the field of the academic programme**

2. **Assessment**

Activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Percentage of final grade
10.4 Course	*Final evaluation*	*Written evaluation*	50%
10.5 Seminar/laboratory	*Laboratory activities portfolio*	*Practical evaluation*	50%
10.6 Minimum performance standard: minimum 5 at written evaluation and minimum 5 at practical evaluation			

Submission date Course leader signature Seminar tutor signature

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Date of approval by Department members Department director signature

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