SYLLABUS

1. Data about the program of study

1.1 Institution	The Technical University of Cluj-Napoca
1.2 Faculty	Faculty of Automation and Computer Science
1.3 Department	Computer Science
1.4 Field of study	Computer Science and Information Technology
1.5 Cycle of study	Bachelor of Science
1.6 Program of study / Qualification	Computer science / Engineer
1.7 Form of education	Full time
1.8 Subject code	37.00

2. Data about the subject

2.1 Subject name				***Logic programming***	
2.2 Course responsible / lecturer				Prof. dr. eng. Rodica Potolea - Rodica.Potolea@cs.utcluj.ro	
2.3 Teachers in charge of seminars / laboratory / project				Assoc. prof. dr. eng. Camelia Lemnaru - Camelia.Lemnaru@cs.utcluj.ro	
2.4 Year of study	III	2.5 Semester	2	2.6 Type of assessment (E - exam, C - colloquium, V - verification)	E
2.7 Subject category	*DF – fundamentală, DD – în domeniu, DS – de specialitate, DC – complementară*				DD
	DI – Impusă, DOp – opțională, DFac – facultativă				DI

3. Estimated total time

3.1 Number of hours per week	5	of which:	Course	2	Seminars	1	Laboratory	2	Project	
3.2 Number of hours per semester	70	of which:	Course	28	Seminars	14	Laboratory	28	Project	
3.3 Individual study:										
(a) Manual, lecture material and notes, bibliography										10
(b) Supplementary study in the library, online and in the field										5
(c) Preparation for seminars/laboratory works, homework, reports, portfolios, essays										7
(d) Tutoring										3
(e) Exams and tests										5
(f) Other activities:										0

3.4 Total hours of individual study (suma (3.3(a)...3.3(f)))	30
3.5 Total hours per semester (3.2+3.4)	100
3.6 Number of credit points	4

4. Pre-requisites (where appropriate)

4.1 Curriculum	Fundamental Algorithms, Programming
4.2 Competence	Logic

5. Requirements (where appropriate)

5.1. For the course	Whiteboard, projector, computer
5.2. For the applications	Computers, specific software (SICStus Prolog). Mandatory attendance of seminars and laboratory works.

6. Specific competence

6.1 Professional competences	**C2** Designing hardware, software and communication components (5 credit points) • **C2.1** Describing the structure and functioning of computational, communication and software components and systems • **C2.2** Explaining the role, interaction and functioning of hardware, software and communication components • **C2.3** Building the hardware and software components of some computing systems using algorithms, design methods, protocols, languages, data structures, and technologies • **C2.4** Evaluating the functional and non-functional characteristics of the computing systems using specific metrics • **C2.5** Implementing hardware, software and communication systems
6.2 Cross competences	N/A

7. Discipline objective (as results from the *key competences gained*)

7.1 General objective	The main goal of the topic is getting the ability of symbolic processing in general, and logic processing in particular; moreover, acquiring abilities for providing specifications in logic, executable form. Estimating the performance of the solutions designed and implemented in logic formalism.
7.2 Specific objectives	Declarative and procedural semantics Extra-logic operators Meta-programming Data Structures in logic programming. techniques associated with efficiency estimation Incomplete structures, difference lists Types of recursions with advantages and limitations Development of complex applications

8. Contents

8.1 Lectures	Hours	Teaching methods	Notes
Introduction, first order logic declarative and procedural semantics	2	Interactive Course. Teaching relying on examples, questions and discussions. Continuous evaluation of knowledge aquisition.	
First order logic declarative and procedural semantics (continued)	2		
Negation as failure; Backtracking and cut	2		
Prolog programming techniques	2		
Prolog programming techniques (continued)	2		
Prolog programming techniques (continued)	2		
Prolog programming techniques (continued)	2		
Metalogic predicates	2		
Extra-logic predicates	2		
Nondeterministic Programming	2		
Incomplete data structures; difference lists	2		
Search techniques	2		
Search techniques (continued)	2		
Search techniques (continued)	2		

Bibliography

1. L. Sterling, E. Shapiro, *The Art of Prolog*, MIT Press, 1994.
2. W.F. Clocksin, C.S. Mellish , *Programming în Prolog*, Springer-Verlag Telos, 1994.
3. R. Potolea, *Programare Logică,* vol 1,U.T.Pres, 2007.

8.2 Applications – Seminars/Laboratory	Hours	Teaching methods	Notes
Prolog language	3		
Sets, sorting	3		

Lists	3	Seminars and hands on laboratory works with specific topics. Problem solving with tracing and performance evaluation. Hands on evaluation	Seminars – design solutions to problem, implementation on board. Laboratory - computer work. (individual) mandatory
Basic operations on lists	3		
Incomplete lists; difference lists	3		
Trees	3		
Searching in trees	3		
Incomplete trees	3		
Modeling control structures in Prolog	3		
Graphs	3		
Searching in graphs	3		
Basic graphs algorithms	3		
Metaprogramming	3		
ands on evaluation	3		

Bibliography

1. Rodica Potolea, Programare Logica, UT Pres, 2007
2. T.Muresan, R. Potolea, C. Lemnaru, Resources for the laboratory sessions http://users.utcluj.ro/~cameliav/lp.php
3. T. Mureşan, R. Potolea, E. Todoran, A.D. Suciu, *Programare Logică - Indrumător de Laborator*, Romsver, 1998.

**Se vor preciza, după caz: tematica seminariilor, lucrările de laborator, tematica și etapele proiectului.*

9. Bridging course contents with the expectations of the representatives of the community, professional associations and employers in the field

Classical topic of the Computer Science and Information Technology domain, which develops the ability to express executable specifications in a logic language (standard Prolog, Sictus Prolog). The topic enables the assimilation of knowledge and builds necessary skills to other disciplines (AI family), and useful in fundamental / applied research. Ability to analyze specifications and solutions in a unified manner, following partial and total correctness and efficiency at the same time.

10. Evaluation

Activity type	Assessment criteria	Assessment methods	Weight in the final grade
Course	Problem solving using specific techniques	Final Exam (FE) (oral/ written/Moodle)	50%
		2-3 Course Quizzes (written/Moodle)	20%
Seminar	Problem solving	Practical test (Lab) (PC)	30%
Laboratory			
Project	N/A	N/A	N/A

Minimum standard of performance:
Final Grade (FG) calculus: 30% Laboratory (L) + 20% course Quizzes (Q) + 50% Final Exam (FE) Conditions for participating in the FE: $L \geq 5$
Conditions for promotion: $FE \geq 5$, $FG \geq 5$
The laboratory examination can be taken at most twice during one academic year (during the semester and in the re-examination session).
FE format: Quiz (Moodle) for $FE \leq 7$; Oral problem solving for $7<FE \leq 10$ (subscription-based; conditions apply);
Re-Examination format: Quiz (Moodle) max grade 5; for better grade Oral Examination

Date of filling in: 05.06.2024	**Titulari**	**Titlu Prenume NUME**	**Semnătura**
	Course	Prof.dr.eng. Rodica Potolea	
	Applications	Assoc.prof.dr.eng. Camelia Lemnaru	

Date of approval in the department 20.02.2024	Head of department, Prof.dr.eng. Rodica Potolea
Date of approval in the Faculty Council 22.02.2024	Dean, Prof.dr.eng. Mihaela Dînșoreanu