

Faculty of Electrical Engineering / ELECTRONICS, TELECOMMUNICATIONS AND COMPUTERS / EXPERT SYSTEMS

Course:	EXPERT SYSTEMS			
Course ID	Course status	Semester	ECTS credits	Lessons (Lessons+Exercises+Laboratory)
7770	Mandatory	2	6	3+1+0
Programs	ELECTRONICS, TELECOMMUNICATIONS AND COMPUTERS			
Prerequisites	Passed Computer Programming I and Computer Programming II			
Aims	Students learn about the modern intelligent information systems, and practical achievements of artificial intelligence, and how to create an expert systems for different purposes			
Learning outcomes	After passing this exam, a student will be able to: 1. Explain the concept, characteristics and classification of artificial intelligence, and the concept and architecture of expert systems. 2. Explain and illustrate concepts of knowledge representation and knowledge base and the inference module. 3. Define searching problems, understand the classification to the blind and informed search algorithms, and apply this kind of algorithms to solve given problems. 4. Implement simple local searching algorithms and iterative improvement of solutions. 5. Define and implement all the steps in the development of expert systems. 6. Create expert system using a programming language CLIPS/JESS.			
Lecturer / Teaching assistant	Assoc. prof. Vesna Popović-Bugarin, MSc Miloš Brajović			
Methodology	Lectures, exercises in a computer classroom. Learning and seminar paper. Consultation			
Plan and program of work				
Preparing week	Preparation and registration of the semester			
I week lectures	Basics about natural and artificial intelligence. History of artificial intelligence.			
I week exercises	Examples of expert systems implemented in CLIPS and Jess. Examples of well-known expert systems (ELIZA etc.)			
II week lectures	Architecture of expert systems (ES), the concept of ES. Knowledge representation.			
II week exercises	Selected problems which illustrate knowledge representation concepts.			
III week lectures	Searching, defining the problems that can be solved by searching, searching strategies.			
III week exercises	Solving problems which illustrate knowledge representation concepts, defining the problems that can be solved by searching and concepts of basic searching strategies.			
IV week lectures	Informed searching strategies.			
IV week exercises	Selected problems which illustrate the appliance of informed searching strategies.			
V week lectures	Heuristics from the nature (genetic algorithm, simulated annealing).			
V week exercises	Selected problems which involve informed searching strategies. Defining and selection of heuristics. Heuristics form the nature (Ant Colony Optimization).			
VI week lectures	Test I			
VI week exercises	Test II			
VII week lectures	Knowledge representation in formal logic.			
VII week exercises	Selected problems which involve knowledge representation in formal logic.			
VIII week lectures	Predicate logic			
VIII week exercises	Problems which illustrate knowledge representation in formal logic. Simple examples of predicate logic application.			
IX week lectures	Semantic networks and frames. Defining topics for seminar papers.			
IX week exercises	Solving complex problems by applying predicate logic. Resolution concepts in the process of concluding.			
X week lectures	Problem solving strategies.			
X week exercises	Problems which illustrate the application of semantic networks. Recapitulation and preparation for the Test II.			
XI week lectures	Test II			
XI week exercises	Test II			

XII week lectures	Designing of expert systems (CLIPS) - practical work.					
XII week exercises	Selected problems which illustrate the application of CLIPS programming language in the expert system design. Preparations for the seminar papers and expert systems realizations.					
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XIV week lectures	Designing of expert systems (CLIPS) - practical work.					
XIV week exercises	Selected problems which illustrate the application of CLIPS programming language in the expert system design. Preparations for the seminar papers and expert systems realizations.					
XV week lectures	Correction of tests					
XV week exercises	Correction of tests					
Student workload						
Per week	Per semester					
6 credits x 40/30=8 hours and 0 minuts 3 sat(a) theoretical classes 0 sat(a) practical classes 1 excercises 4 hour(s) i 0 minuts of independent work, including consultations	Classes and final exam: 8 hour(s) i 0 minuts x 16 =128 hour(s) i 0 minuts Necessary preparation before the beginning of the semester (administration, registration, certification): 8 hour(s) i 0 minuts x 2 =16 hour(s) i 0 minuts Total workload for the subject: 6 x 30=180 hour(s) Additional work for exam preparation in the preparing exam period, including taking the remedial exam from 0 to 30 hours (remaining time from the first two items to the total load for the item) 36 hour(s) i 0 minuts Workload structure: 128 hour(s) i 0 minuts (cources), 16 hour(s) i 0 minuts (preparation), 36 hour(s) i 0 minuts (additional work)					
Student obligations	Students have ti attend classes and write essays, which publicly exposed.					
Consultations	When needed.					
Literature						
Examination methods						
Special remarks						
Comment						
Grade:	F	E	D	C	B	A
Number of points	less than 50 points	greater than or equal to 50 points and less than 60 points	greater than or equal to 60 points and less than 70 points	greater than or equal to 70 points and less than 80 points	greater than or equal to 80 points and less than 90 points	greater than or equal to 90 points