

Faculty of Fundamental Problems of Technology						
COURSE CARD						
Name in polish	:	Technologia więzów				
Name in english	:	Constraints technology				
Field of study	:	Computer Science				
Specialty (if applicable)	:					
Undergraduate degree and form of	:	masters, stationary				
Type of course	:	optional				
Course code	:	E2_W07				
Group rate	:	Yes				
		Lectures	Exercides	Laboratory	Project	Seminar
Number of classes held in schools (ZZU)		30		30		
The total number of hours of student workload (CNPS)		90		90		
Assesment		pass				
For a group of courses final course mark		X				
Number of ECTS credits		3		3		
including the number of points corresponding to the classes of practical (P)				3		
including the number of points corresponding occupations requiring direct contact (BK)		3		3		
PREREQUISITES FOR KNOWLEDGE, SKILLS AND OTHER POWERS						
The prerequisites are not defined for this module.						
Modules „Approximation algorithms” and „Discrete Optimization” are recommended.						
COURSE OBJECTIVES						
C1 Getting to know the constraint technology as programming methodology						
C2 Learning to develop computer programs using constraint technology						

COURSE LEARNING OUTCOMES

The scope of the student's knowledge:

W1 Student knows the applications of constraint technology

W2 Student know constraint technology as the method for solving complex optimization problems

W3 Student knows algorithms for consistency enforcing

The student skills:

U1 Student is able to apply constraint technology to solve problems

U2 Student is able to compare constraints technology to other programming paradigms

U3 Student is able to reformulate model to increase effectiveness of solving

U4 Student is able to justify correctness of proposed models

U5 Student is able to experimentally choose proper search strategies

The student's social competence:

K1 Student is able to practically apply new technologies in scheduling with resources

COURSE CONTENT

Type of classes - lectures

Wy1	Introduction	2h
Wy2	Constraint networks	2h
Wy3	Consistency-enforcing and constraint propagation	2h
Wy4	Directional consistency	2h
Wy5	Search strategies: „look-ahead”	2h
Wy6	Search strategies: „look-back”	2h
Wy7	Stochastic greedy local search	2h
Wy8	Advanced consistency methods	2h
Wy9	Tree decomposition methods	2h
Wy10	Hybrids of search and inference	2h
Wy11	Tractable constraint languages	2h
Wy12	Temporal constraint networks	2h
Wy13	Constraint optimization	2h
Wy14	Probabilistic networks	2h
Wy15	Constraint logic programming	2h

Type of classes - laboratory

Lab1	Programming environment	2h
Lab2	Foundations of modeling	2h
Lab3	Advanced modeling for integer programming	6h
Lab4	Search strategies	6h
Lab5	Optimization	4h
Lab6	Local search	4h
Lab7	Temporal constraints	6h

Applied learning tools		
<ol style="list-style-type: none"> 1. Traditional lecture 2. Multimedia lecture 3. Solving programming tasks 4. Consultation 5. Self-study students 		
EVALUATION OF THE EFFECTS OF EDUCATION ACHIEVEMENTS		
Value	Number of training effect	Way to evaluate the effect of education
F1	W1-W3, K1-K1	Test
F2	U1-U5, K1-K1	Realization of exercises
$P=60\%*F1+40\%*F2$		
BASIC AND ADDITIONAL READING		
<ol style="list-style-type: none"> 1. R. Dechter. Constraint Processing, Morgan Kaufmann, 2003. 2. T. Fruhwirth, S. Abdennadher. Essentials of Constraint Programming, Springer-Verlag, 2003. 3. P. Van Hentenryck, L. Michel. Constraints-Based Local Search, The MIT Press, 2005. 4. K. Apt. Principles of Constraint Programming, Cambridge University Press, 2003. 5. K. Marriott, P.J. Stuckey. Programming with Constraints: An Introduction, The MIT Press, 1998. 		
SUPERVISOR OF COURSE		
dr Przemysław Kobyłański		

RELATIONSHIP MATRIX EFFECTS OF EDUCATION FOR THE COURSE

Constraints technology

WITH EFFECTS OF EDUCATION ON THE DIRECTION OF COMPUTER SCIENCE

Course training effect	Reference to the effect of the learning outcomes defined for the field of study and specialization (if applicable)	Objectives of the course**	The contents of the course**	Number of teaching tools**
W1	K2_W05	C1	Wy1-Wy15	1 2 4 5
W2	K2_W02 K2_W03_A	C1	Wy1-Wy15	1 2 4 5
W3	K2_W04_A	C1	Wy1-Wy15	1 2 4 5
U1	K2_U12_A	C1	Lab1-Lab7	3 4 5
U2	K2_U15	C1	Lab1-Lab7	3 4 5
U3	K2_U09_A	C1	Lab1-Lab7	3 4 5
U4	K2_U09_A	C1	Lab1-Lab7	3 4 5
U5	K2_U08_A	C1	Lab1-Lab7	3 4 5
K1	K2_K08	C1 C2	Wy1-Wy15 Lab1-Lab7	1 2 3 4 5