Bialystok University of Technology									
Field of study	Computer Science							**Degree level and programme type**	**Engineer's degree full-time programme**
Specialization/ diploma path	---							**Study profile**	academic
Course name	**Algorithmics - Selected Issues**							**Course code**	**FCS-00098**
								Course type	obligatory
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	**Semester**	3
	30				30			**No. of ECTS credits**	**6**
Entry requirements	Algorithms and Data Structures (FCS-00020),								

Course objectives	The aim of the course is to develop the ability to construct a graph or network model for real problems. The student will be learn: methods of determining the shortest paths in graphs, methods of designing effective solutions for networ flow problems , methods of constructing effective heuristics for computationally difficult graph problems. The student will develop the skills of: designing computationally effective algorithms and data structures for graph problems, assessing the effectiveness of applied solutions, identifying computationally difficult problems and using approximate solutions for these problems. The aim of the course is also to develop the ability to communicate effectively in the field of engineering and scientific problems with representatives of other branch of life.
Course content	Lecture: Graph browsing algorithms. BFS and DFS methods and their applications. Effective path algorithms for graphs with weights. Strategies: label-setting and label-corecting. The problem of maximum flow in the network and effective methods of its determination. The problem of the cheapest flow in the network - effective algorithms and examples of application. Graph and network problems difficult to solve. Examples of approximate solutions for graph problems of the NPC class. The traveling salesman problem and its variants. Examples of applications of various types of traveling salesman problems in information systems in the field of logistics and e-tourism class systems. Effective aprokysmation algorithms for different varieties of the traveling salesman problem. The problem of routing in transport networks. Specialist workshop: A problem task that requires the development of an algorithm based on BFS and DFS graph searching methods A problem task that requires the development of an algorithm based on the use of path algorithms A problem task that requires the development of an algorithm based on the use of networkflow algorithms A problem task that requires the development of an algorithm based on the use of approximation algorithms.
Teaching methods	lecture problem, programming,
Assessment method	Lecture- test specialist workshop- projects

Symbol of learning outcome	**Learning outcomes**	**Reference to the learning outcomes for the field of study**
LO1	no English version yet !	
LO2	no English version yet !	
LO3	no English version yet !	
LO4	no English version yet !	
LO5	no English version yet !	

Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	no English version yet !	
LO2	no English version yet !	
LO3	no English version yet !	
LO4	no English version yet !	
LO5	no English version yet !	

Student workload (in hours)		**No. of hours**
Calculation	1 - no English version yet ! - 10x1h	10
	2 - no English version yet ! - 10x2h	20
	3 - no English version yet ! -	15
	4 - no English version yet ! -	20
	5 - no English version yet ! -	2
	6 - no English version yet ! -	8
	TOTAL:	**75**

Quantitative indicators	**HOURS**	**No. of ECTS credits**
Student workload – activities that require direct teacher participation	32 (2)+(1)+(5)	2.6
Student workload – practical activities	57 (2)+(3)+(5)+(4)	4.6

Basic references	1. Ravindra K Ahuja Thomas L Magnanti; James B Orlin- Network flows : theory, algorithms, and applications 1993 2. T. H. Cormen, C. E. Leiserson, R. L. Rivest, Wprowadzenie do algorytmów, WNT, Warszawa, 2004. 3.Nacima Labadie, Christian Prins, and Caroline Prodhon- Metaheuristics for Vehicle Routing Problems, 2016
Supplementary references	no English version yet !

Organisational unit conducting the course	Department of Theoretical Computer Science	**Date of issuing the programme**
Author of the programme	dr Joanna Karbowska-Chilińska	May 22, 2020

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW – field work,S – seminar