STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Network Algorithms**		Code **1010804181010820865**
Field of study **Electronics and Telecommunications**	Profile of study (general academic, practical) **general academic**	Year /Semester **4 / 8**
Elective path/specialty **-**	Subject offered in: **Polish**	Course (compulsory, elective) **elective**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time) **part-time**	
No. of hours Lecture: **20** Classes: **20** Laboratory: **-** Project/seminars: **-**		No. of credits **4**
Status of the course in the study program (Basic, major, other) **other**	(university-wide, from another field) **university-wide**	
Education areas and fields of science and art **technical sciences** **Technical sciences**		ECTS distribution (number and %) **4 100%** **4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic C/C++ programming skils. K1_W09
2	**Skills**	Is able to find information in literature, as well as other reference sources; is able to integrate and interpret obtained information, draws conclusions and justifies opinions. K1_U01
3	**Social competencies**	Knows the limitations of her/his own knowledge and skills, understands the need for further education and cooperation. K1_K01

Assumptions and objectives of the course:

To get a systematic knowledge, together with necessary mathematical background, of network algorithms. To get a systematic knowledge reuquired for selection of the appropriate network algorithm for solving optimization problems.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Has a systematic knowledge, together with necessary mathematical background, of network algorithms - [K1_W22]
2. Has a systematic knowledge reuquired for selection of the appropriate network algorithm for solving optimization problems - [K1_W22]
3. Knows the principles of construction of computer programs - [K1_W09]

Skills:

1. Is able to determine the complexity of applied solution to optimization problem. Is able to select an appropriate algorithm for solving a network optimization problem. - [K1_U25]
2. Is able to solve typical problem related to telecommunication network optimization. - [K1_U25]

Social competencies:

1. Is aware of the limitations of his/her current knowledge and skills; is committed to further self-study. - [K1_K01]

Assessment methods of study outcomes

Forming assessment:

Lectures: Written exam; exam is passed when student receives at least 50% points. Exam can be taken after the completion of excercises.

Exercises: on the basis of short questions after each of exercises.

Course description

- Graph search algorithms.
- Minimum spanning tree algorithms.
- Shortest path algorthms
- All-pair shortest path algorithms
- k-shortest path algorithms
- Topological sorting
- Maximum flows algoritms
- Minimum cost flows algorithms
- Admission control algorithm
- Scheduling algorithms
- Buffer management algoirthms
- Flow and congestion control algorithms
- Multi-criteria routing

Basic bibliography:

1. Network flows, R. Ahuja, T. Magnanti, J. Orlin, Prentice Hall, New Jersey, 1993
2. Network optimization, D. Bertsekas, Athena Scientific, Belmont, 1998

Additional bibliography:

1. Algorytmy w C++, R. Sedgewick, Wydawnictwo RM, Warszawa , 1999

Result of average student's workload

Activity	Time (working hours)
1. Lectures	20
2. Exercices	20
3. Preparation for lectures	20
4. Preparation for excercises	20
5. Exam	2
6. Discussion of exam otucomes	2

Student’s workload

Source of workload	hours	ECTS
Total workload	100	4
Contact hours	45	2
Practical activities	25	1