STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Algorithm in Network Optimization**	Code **1010822131010822691**

Field of study **Electronics and Telecommunications**	Profile of study (general academic, practical) **general academic**	Year /Semester **2 / 3**

Elective path/specialty **Computer Networks and Internet**	Subject offered in: **Polish**	Course (compulsory, elective) **elective**

Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **full-time**

No. of hours	No. of credits **3**
Lecture: **2** Classes: **-** Laboratory: **1** Project/seminars: **-**	

Status of the course in the study program (Basic, major, other) **other**	(university-wide, from another field) **from field**

Education areas and fields of science and art **technical sciences** **Technical sciences**	ECTS distribution (number and %**)** **3 100%** **3 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Has a systematic knowledge, with the necessary theoretical background, of optimization methods used in solving engineering problems (K2_W03).
		Has a wide, systematic knowledge, with necessary mathematical background, of ICT networks and signal transmission methods (K2_W13).
2	**Skills**	Is able to communicate freely in English. Is able to discuss professional matters in English; is able to use knowledgeably English language sources (K2_U01).
3	**Social competencies**	Is aware of the limitations of his/her current knowledge and skills; is committed to lifelong learning (K2_K04).

Assumptions and objectives of the course:

The goal of the subject is presentation of the algorithms used in the network optimization process.

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

Knowledge:

1. Have systematic knowledge on teletraffic engineering and theory, designing and dimensioning of networks - [K2_W11]

Skills:

1. Can prepare presentation (in Polish or in English) on the subject of the network project. Is able to discuss on the presented solution.   - [K2_U02]

2. Is able to used optimisation methods to solve typical problems found in electioncs and telecommunication - [K2_U05]

Social competencies:

1. Have the ability to work in a team of several people; are able to prepare and present a report on the results of the work performed - [K2_K01]

2. Is aware of limitations of its own knowledge and skills and understand the need for further education - [K2_K04]

Assessment methods of study outcomes

Lecture
- written exam
Project:
- finish note of the project

Course description

Main topics:

1. Design Modeling and Methods
2. Network Design Problem Modeling
3. General Optimization Methods for Network Design
4. Location and Topological Design
5. Networks With Shortest-Path Routing
6. Fair Networks
7. Restoration and Protection Design of Resilient Networks
8. Application of Optimization Techniques for Protection and Restoration Design
9. Multi-Layer Networks: Modeling and Design
10. Restoration Design of Single- and Multi-Layer Fair Networks

Basic bibliography:

1. M. Pioro, D. Medhi, Routing, Flow, and Capacity Design in Communication and Computer Networks, Mogran Kaufman Publishers, 2004

Additional bibliography:

1. Z. Michalewicz and D. Fogel, How to Solve It: Modern Heurystics, Springer, 2004

Result of average student's workload

Activity	Time (working hours)
1. Lecture	30
2. Project	15
3. Prepartion of the project	15
4. Exam	2
5. Discussion of exam results	2

Student's workload

Source of workload	hours	ECTS
Total workload	90	3
Contact hours	50	2
Practical activities	35	1