STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Optimization methods		**1010832121010821741**

Field of study	Profile of study (general academic, practical)	Year /Semester
Electronics and Telecommunications	**general academic**	**1 / 2**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Telecommunication Systems	**Polish**	**obligatory**

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

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

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

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**2 100%**
Technical sciences	**2 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Has extended, in-depth knowledge of those branches of mathematics which are used in formulating and solving problems in electronic and telecommunications (K2_W00).
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 basic mathematical methods used in optimization process.

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

Knowledge:

1. Have systematic knowledge necessary to understand basic optimization methods and it application in solving engineering problems. - [K2_W03]

Skills:

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

Social competencies:

1. 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:
- test exam on the Moodle e-learning platform

Laboratory execises:
- finish note of the project

Course description

Main topics:

1 - Introduction to the Opimization Methods

2 - Direct search metods

3 - Linear programming

4 - Heuristic methods

5 - Multi-dimensional optimisation

6 - Gradient methods

7 - Appplication of the optimisation methods

Basic bibliography:

1. J. Kusiak, A. Danielewsk-Tułecka, P. Oprocha, Optymalizacja. Wybrane metody z przykładami zastosowań, Wydawnictwo Naukowe PWN, Warszawa 2009 (dostępne również w ibuk.pl)

2. A. Stachurski, Wprowadzenie do optymalizacji, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2009

3. K. Amborski, Podstawy metod optymalizacji, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2009

Additional bibliography:

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

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

3. P. Siarry, Z. Michalewicz, Advences in Metaheuristics for Hard Optimization, Springer, 2008

Result of average student's workload

Activity	Time (working hours)
1. Lecture	15
2. Laboratory execises	15
3. Preparation to laboratory execises	15

Student's workload

Source of workload	hours	ECTS
Total workload	50	2
Contact hours	35	1
Practical activities	30	1