



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Optimization methods [S2EiT1>MO]

### Course

Field of study

Electronics and Telecommunications

Year/Semester

1/2

Area of study (specialization)

Multimedia and Consumer Electronics

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

full-time

Requirements

compulsory

### Number of hours

Lecture

15

Laboratory classes

15

Other

0

Tutorials

0

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

dr hab. inż. Piotr Zwierzykowski prof. PP  
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### Lecturers

### Prerequisites

A student entering the subject should have knowledge of algorithm construction and analysis, as well as basic knowledge and skills in the Python language. He or she should also have the ability to obtain information from the indicated sources and be ready to cooperate within a team.

### Course objective

To provide students with basic knowledge of basic selected optimization methods, which will enable a better understanding of many processes occurring in telecommunications networks and systems. To develop in students the ability to select a method for the optimization problem being solved.

### Course-related learning outcomes

none

### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

The oral exam consists of answers to at least 5 questions. The questions are asked by the instructor. The

questions relate to issues from a set of 45 issues known to the students (given in the lecture). The answer to the question takes into account the scope of the answer and the depth of understanding of the issue by the student. Each answer to a question is graded on a scale of 2 to 5. The final grade for the oral exam is the average of the grades for each answer. The exam is passed when the average grade is no less than 2.75.

## Programme content

The subject areas include optimisation methods used in electronics and telecommunications.

## Course topics

The lecture topics include the following:

1. Direct search methods.
2. Linear programming.
3. Heuristic methods.
4. Multi-criteria optimization.
5. Gradient methods.
6. Examples of application of optimization methods in electronics and telecommunications.

During the laboratories the following topics are covered:

1. Unconstrained minimization of multivariate scalar functions.
2. Constrained minimization of multivariate scalar functions.
3. Global optimization.
4. Least-squares minimization.
5. Univariate function minimizers (optional)
6. Linear programming.
7. Mixed integer linear programming.
8. Root finding (optional)

## Teaching methods

Lectures: depending on the topic discussed and the interest of students, the lecture is conducted in one of three forms: traditional lecture (multimedia presentation supplemented by examples given on the blackboard), problem lecture (discussion with students on the solution of a given problem), or conversational lecture (involving students in the discussion, controlling the course of the lecture depending on the answers given, etc.).

Laboratory exercises: the exercises are conducted in a computer laboratory based on Matlab programming or libraries for the Python language.

## Bibliography

none

## Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,00
Classes requiring direct contact with the teacher	31	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	29	0,00