POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Optimization methods [S2EiT1>MO]

Course

Field of study	Year/Semester
Electronics and Telecommunications	1/2
Area of study (specialization)	Profile of study
Mobile and Wireless Technologies	general academic
Level of study	Course offered in
second-cycle	polish
Form of study	Requirements
full-time	compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	0
Tutorials	Projects/seminars	
0	0	

Number of credit points

2,00

Coordinators	Lecturers
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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

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 higher than 2.75.

Programme content

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

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