Course Syllabus

I. General Information

Course name	Optimization methods
Programme	Informatics
Level of studies (BA, BSc, MA, MSc, long-cycle MA)	BA
Form of studies (full-time, part-time)	full-time
Discipline	Mathematics, Informatics
Language of instruction	English

Course coordinator	dr Małgorzata Nowak-Kępczyk

Type of class *(use only the types mentioned below)*	Number of teaching hours	Semester	ECTS Points
lecture	15	5	3
tutorial			
classes			
laboratory classes	15	5	
workshops			
seminar			
introductory seminar			
foreign language classes			
practical placement			
field work			
diploma laboratory			
translation classes			
study visit			

Course pre-requisites	Introduction to Calculus and Integral Calculus, Linear algebra

II. Course Objectives

C1 - Familiarization of students with the basics of optimization methods and their applications for solving practical problems

III. Course learning outcomes with reference to programme learning outcomes

Symbol	Description of course learning outcome	Reference to programme learning outcome
KNOWLEDGE		
W_01	The student understands the importance of informatics and its applicationsThe student knows the basic concepts related to the optimization method	K_W01, K_W03, K_W06

W_02	The student knows selected issues of linear programming	K_W01, K_W03, K_W06
W_03	The student understands the importance of optimization methods to solve practical problems	K_W01, K_W03, K_W06
	SKILLS	
U_01	The student is able to apply the basic concepts of optimization methods	K_U20, K_U22
U_02	The student is able to use selected methods of linear programming	K_U07, K_U20, K_U22
U_03	The student is able to implement selected algorithms of optimization methods	K_U07, K_U11 K_U20, K_U22
	SOCIAL COMPETENCIES	
K_01	The student sees the need to use optimization methods in various fields of science	K_K01, K_K02
K_02	The student has the need for lifelong learning and the ability to motivate other people to expand their qualifications	K_K01, K_K02

IV. Course Content

1. Linear programming. Introduction. Practical examples. General, canonical, standard form.
2. Simplex algorithm. Dual task problem.
3. Linear programming on discrete sets.
4. Gradient methods. Newton's method
5. Transportation problem.

V. Didactic methods used and forms of assessment of learning outcomes

Symbol	Didactic methods *(choose from the list)*	Forms of assessment *(choose from the list)*	Documentation type *(choose from the list)*
	KNOWLEDGE		
W_01	Conventional lecture, guided practice	Written exam/ Test	Examination card/ Grades card
W_02	Conventional lecture, guided practice	Written exam/ Test	Examination card/ Grades card
W_03	Conventional lecture, guided practice	Written exam/ Test	Examination card/ Grades card
	SKILLS		
U_01	Practical classes design thinking	Written exam/ Test	Written test, filled and evaluated test paper
U_02	Work in Pairs (Think-Pair-Share) design thinking	Project	Printout
U_03	Group work design thinking	Project	Printout
	SOCIAL COMPETENCIES		

K_01	Discussion design thinking	Written exam/ Test	Written test, filled and evaluated test paper
K_02	PBL (Problem-Based Learning) design thinking	Project	Printout

VI. Grading criteria, weighting factors…

Passing classes – 2 tests during classes.

Written exam – for people who have passed the classes.

Detailed grading rules are given to students with each edition of the subject.

VII. Student workload

Form of activity	Number of hours
Number of contact hours (with the teacher)	60
Number of hours of individual student work	30

VIII. Literature

Basic literature
Hamdy A. Taha, Operations Research An Introduction, ISBN 10: 1-292-16554-5ISBN 13: 978-1-292-16554-7 D. Bertismas, J. Tsitsiklis, Introduction to Linear Optimization, Athena Scientific Series in Optimization and Neural Computation, 6, ISBN-13: 978-1886529199, ISBN-10: 1886529191 F. Hillier, G. Lieberman, ISE Introduction to Operations Research, ISBN-13: 978-1260575873, ISBN-10: 126057587X
Additional literature
D. Bartsekas, Nonlinear Programming, ISBN-13: 978-1886529052, ISBN-10: 1886529051