GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Selected methods of decision support in industrial processes, PG_00053426		
Field of study	Automation, Robotics and Control Systems		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	4	Language of instruction	Polish
Semester of study	7	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Robert Piotrowski	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	0.0	0.0	30

E-learning hours included: 0.0

Learning activity and number of study hours

Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours	Self-study	SUM
Number of study hours	30	5.0	40.0	75

Subject objectives

The aim of the course will be to familiarize students with selected issues of decision support in industrial processes.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W06] knows the structure of computers and microprocessors and the tasks of operating systems, has basic knowledge of the basics of computer software, drivers, microprocessor technology, design of simple algorithms and the operation of information networks	Writing a computer program to solve an engineering task with a specific algorithm.	[SW3] Assessment of knowledge contained in written work and projects
[K6_U03] can prepare and present a presentation on the problems and results of an engineering task	Solving an engineering task related to the subject matter of the course.	[SU3] Assessment of ability to use knowledge gained from the subject
[K6_W10] has basic knowledge related to mechatronics and robotics systems	Choosing an algorithm to solve a specific engineering task.	[SW3] Assessment of knowledge contained in written work and projects
[K6_U01] can obtain information from literature, databases and other sources; integrate the information obtained, interpret it and draw conclusions, formulate and justify opinions	Selects from the literature, including articles from databases, algorithms to solve an engineering task. Implements these algorithms in a computer program.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information

Subject contents	Course content – lecture Organization of the subject. Basic knowledge. Discrete industrial processes examples and modeling. Decision support methods for discrete processes (integer and binary) by the branch and bound algorithm. Decision support methods for binary processes. Fundamentals of graph theory. Characteristics of selected network processes. Course content – laboratory Discrete manufacturing processes examples and modelling. Integer programming branch and bound algorithm. Binary programming Balas's algorithm with filter. Decision support methods network issues. Transport issues and the travelling salesman problem.
Prerequisites and co-requisites	No requirements

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Written exam	50.0%	70.0%
Laboratory	50.0%	30.0%

Recommended reading

Basic literature	1. Cormen T.H., Leiserson Ch.,E. Rivest R., Stein C. Wprowadzenie do algorytmów. Wydanie 7. PWN, Warszawa 2022 (tłumaczenie). 2. Praca zbiorowa (red. Sikora W.). Badania operacyjne. PWE, Warszawa 2008. 3. Trzaskalik T. Wprowadzenie do badań operacyjnych z komputerem. Wydanie 3 zmienione. PWE, Warszawa 2024. 4. Deo N. Teoria grafów i jej zastosowania w technice i informatyce. PWN, Warszawa 1980 (tłumaczenie).
Supplementary literature	1. Gawlik J., Plichta J., Świć A. Procesy produkcyjne. PWE, Warszawa 2013. 2. Wilson R.J. Wprowadzenie do teorii grafów. PWN, Warszawa 2005 (tłumaczenie).
eResources addresses	

Example issues/ example questions/ tasks being completed	1. Find a solution for the decision-making model using the Balassa algorithm with filter. 2 The binary variable y and the non-negative continuous variable x are given. Bring a non-linear x*y expression to linear form.
Practical activites within the subject	Not applicable