GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Production Processes - Methods of Decision Making, PG_00031755						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	February 2024		Academic year of realisation of subject		2024/2025		
Education level	second-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	3		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Robert Piotrowski				
	Teachers		dr hab. inż. Robert Piotrowski				

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60	5.0	35.0	100

Subject objectives	The aim of the course is for students to master selected issues of optimisation and decision support in manufacturing processes.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K7_U04	Finds a research article in the subject area.	[SU1] Assessment of task fulfilment
	K7_U03	Finds a presentation on the subject matter.	[SU5] Assessment of ability to present the results of task
	K7_W06	Defines optimisation tasks for decision support in industrial processes.	[SW3] Assessment of knowledge contained in written work and projects
	K7_W11	Implements optimisation methods for discrete, binary and network problems in a computer environment, e.g. Matlab	[SW3] Assessment of knowledge contained in written work and projects
	K7_U07	Solves optimisation tasks (discrete, binary and network).	[SU3] Assessment of ability to use knowledge gained from the subject

Subject contents	**Lecture:**
	1. General information
	2. Decision models for discrete processes
	3. Discrete integer programming
	4. Discrete-time binary programming
	5. Network programming
	6. Transport issues and the traveling salesman problem
	7. Summary
	Laboratory:
	1. Discrete manufacturing processes - examples and modelling
	2. Integer programming - branch and bound algorithm
	3. Binary programming - Balas algorithm
	4. Decision support methods - network issues
	5 Transport issues and the travelling salesman problem
Prerequisites and co-requisites	None

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Colloquium 2	50.0%	35.0%
	50.0%	30.0%
Colloquium 1	50.0%	35.0%

Recommended reading	Basic literature	Cormen T.H., Leiserson Ch.,E. Rivest R., Stein C. *Wprowadzenie do algorytmów*. Wydanie 7. PWN, Warszawa 2012 (tłumaczenie).
		Deo N. *Teoria grafów i jej zastosowania w technice i informatyce*. PWN, Warszawa 1980 (tłumaczenie).
		Praca zbiorowa (red. Sikora W.). *Badania operacyjne*. PWE, Warszawa 2008.
		Sysło M.M., Deo N., Kowalik J.S. *Algorytmy optymalizacji dyskretnej*. PWN, 1999.
		Trzaskalik T. *Wprowadzenie do badań operacyjnych z komputerem*. Wydanie 2. PWE, Warszawa 2008.
		Zorychta K., Ogryczak W. *Programowanie liniowe i całkowitoliczbowe*. WNT, 1981.

	Supplementary literature	Chen D.-S., Batson R.G., Dang Y. *Applied Integer Programming: Modeling and Solution.* John Wiley&Sons, 2010. Williams H.P. *Model Building in Mathematical Programming.* 4th edition. John Wiley&Sons, 1999. Williams H.P. *Model Solving in Mathematical Programming.* John Wiley&Sons, 1993.
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	What is the difference between the Euler cycle and the Hamilton cycle in a graph ?	
Work placement	Not applicable	

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