



## 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	<p><b>Lecture:</b></p> <ol style="list-style-type: none"> <li>1. General information</li> <li>2. Decision models for discrete processes</li> <li>3. Discrete integer programming</li> <li>4. Discrete-time binary programming</li> <li>5. Network programming</li> <li>6. Transport issues and the traveling salesman problem</li> <li>7. Summary</li> </ol> <p><b>Laboratory:</b></p> <ol style="list-style-type: none"> <li>1. Discrete manufacturing processes - examples and modelling</li> <li>2. Integer programming - branch and bound algorithm</li> <li>3. Binary programming - Balas algorithm</li> <li>4. Decision support methods - network issues</li> <li>5. Transport issues and the travelling salesman problem</li> </ol>														
Prerequisites and co-requisites	None														
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Colloquium 2</td> <td>50.0%</td> <td>35.0%</td> </tr> <tr> <td></td> <td>50.0%</td> <td>30.0%</td> </tr> <tr> <td>Colloquium 1</td> <td>50.0%</td> <td>35.0%</td> </tr> </tbody> </table>			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%
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	<p>Cormen T.H., Leiserson Ch., E. Rivest R., Stein C. <i>Wprowadzenie do algorytmów</i>. Wydanie 7. PWN, Warszawa 2012 (tłumaczenie).</p> <p>Deo N. <i>Teoria grafów i jej zastosowania w technice i informatyce</i>. PWN, Warszawa 1980 (tłumaczenie).</p> <p>Praca zbiorowa (red. Sikora W.). <i>Badania operacyjne</i>. PWE, Warszawa 2008.</p> <p>Systo M.M., Deo N., Kowalik J.S. <i>Algorytmy optymalizacji dyskretnej</i>. PWN, 1999.</p> <p>Trzaskalik T. <i>Wprowadzenie do badań operacyjnych z komputerem</i>. Wydanie 2. PWE, Warszawa 2008.</p> <p>Zorychta K., Ogryczak W. <i>Programowanie liniowe i całkowitoliczbowe</i>. WNT, 1981.</p>													

	Supplementary literature	Chen D.-S., Batson R.G., Dang Y. <i>Applied Integer Programming: Modeling and Solution</i> . John Wiley&Sons, 2010.  Williams H.P. <i>Model Building in Mathematical Programming</i> . 4th edition. John Wiley&Sons, 1999.  Williams H.P. <i>Model Solving in Mathematical Programming</i> . 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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