



Subject card

Subject name and code	, PG_00057243						
Field of study	Ocean Engineering						
Date of commencement of studies	February 2022	Academic year of realisation of subject			2021/2022		
Education level	second-cycle studies	Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Faculty of Ocean Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr Marek Zellma				
	Teachers		dr inż. Marta Drośnińska-Komor dr Marek Zellma				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	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	Getting knowledge and skills to define, classify and solve optimization problems in technology						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W01] has a deepened and widened knowledge on certain fields of maths, used to formulate, solve and verify complex problems in ocean-technology	.The student knows the basic concepts and theorems of linear programming, dynamic programming, non-linear programming. He knows the elements of multi-criteria optimization.			[SW1] Assessment of factual knowledge		
	[K7_W02] has a widened knowledge in the range of modelling technological processes, including knowledge necessary to describe and assess the functioning of selected elements of ocean technology objects and systems	The student knows the classifications of problems and decision models and the possibilities of solving them			[SW1] Assessment of factual knowledge		
	[K7_U02] can plan and conduct research experiments on selected problems in ocean technology using various research methods	He/She is able to use mathematical methods for the description of decision processes in selected problems in the field of ocean engineering			[SU2] Assessment of ability to analyse information		

Subject contents	<p>1. Classification of problems and decision models. Ways of solving decision problems</p> <p>2. Basic concepts of linear programming. Simplex method. Application of linear programming to solve simple optimization problems</p> <p>3. Dynamic programming. Bellman's principle of optimality</p> <p>4. Nonlinear optimization problems. Decision optimization in the case of functions of one variable and multi variables without restrictions and with restrictions</p> <p>5. Multi-criteria optimization6. Probabilistic methods in decision making.</p> <p>6. Probabilistic methods in decision making.</p> <p>7. Numerical methods of solving optimization problems</p>								
Prerequisites and co-requisites	Knowledge of mathematics at the level of the first degree. Field of study : Ocean Engineering								
Assessment methods and criteria	<table border="1" data-bbox="450 824 1489 900"> <thead> <tr> <th data-bbox="450 824 794 864">Subject passing criteria</th> <th data-bbox="794 824 1139 864">Passing threshold</th> <th data-bbox="1139 824 1489 864">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="450 864 794 900">colloquy</td> <td data-bbox="794 864 1139 900">56.0%</td> <td data-bbox="1139 864 1489 900">100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	colloquy	56.0%	100.0%
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Recommended reading	Basic literature	<p>1. Amborski, K., Podstawy metod optymalizacji, Oficyna Wydawnicza Politechniki Warszawskiej, 2009.</p> <p>2. Stachurski, A. Wprowadzenie do optymalizacji, Oficyna Wydawnicza Politechniki Warszawskiej, 2009.</p>							
	Supplementary literature	<p>1. 1.D"Azzo J.J., Houpis C.H., Linear control system analysis and design- conventional and modern, MCGraw Hill Co.,1988</p> <p>2. D'Souza A.F., Design of control systems, Prentice Hall, 1988</p> <p>3. 2 Kukuła K., Badania operacyjne w przykładach i zadaniach, PWN, Warszawa 2011</p> <p>4. Milkiewicz F., Podstawy optymalizacji, Wydawnictwo PG, 1995</p> <p>5. Stengel R. F., Optimal control and estimation, Dover Publications Inc., New York, 1994.</p>							
	eResources addresses								
Example issues/ example questions/ tasks being completed	<p>1. Provide a necessary and sufficient condition for the existence of an extreme of the function of multi variables</p> <p>2. Give basic theorems of linear programming</p> <p>3. Give the method of indeterminate Lagrange multipliers</p>								
Work placement	Not applicable								