GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Application of Mathematics in Technology, PG_00042010		
Field of study	Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2021/2022
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study
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	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Control and Power Engineering -> Faculty of Ocean Engineering and Ship Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Klaudia Wrzask	
	Teachers	dr inż. Paweł Ziółkowski dr inż. Klaudia Wrzask	

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

Adresy na platformie eNauczanie:
Zastosowanie matematyki w technice (PG_00042010) - Moodle ID: 17428
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17428

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	3.0	42.0	75

Subject objectives

Aibility of mathematical methods application in engineering

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W01	Student has basic knowledge of mathematics necessary to describe the phenomena related to the processes of energy conversion and transfer; when solving mathematical problems, he uses information technologies, including Mathematica packages	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation
K6_U02	The student is able to apply mathematical methods and tools to design elements, systems and energy systems.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment

Subject contents

Signal approximation and processing, Fourier series, Fourier transform, Fourier analysis, solving differential equations, Laplace transform, basic concepts and application of the theory of random processes, fuzzy set theory and its application, genetic algorithms and their applications.

Prerequisites and co-requisites

knowledge of mathematics fundamentals

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
midterm colloqia	50.0%	50.0%
test	50.0%	50.0%

Recommended reading	Basic literature	[1] Cooper G.R., Mc Gillem C.D.: Probabilistic Methods of Signal and Systems Analysis. New York-Oxford University Press,1999, [2] Jordan D.W., Smith P.: Mathematical Techniques. Oxford University Press, 1998, [3] Lathi B.P.: Signal Processing and Linear Systems. Berkeley Cambridge Press, 1998, [4] Fausett L.: Fundamentals of Neural Networks. Prentice Hall, 1994, [5] Hassoun M. H.: Fundamentals of Artificial Neural Networks. MIT Press, 1995, [6] Cox E.: The Fuzzy Systems Handbook. Academic Press, London 1994
	Supplementary literature	No requirements
	eResources addresses	Zastosowanie matematyki w technice (PG_00042010) - Moodle ID: 17428 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=17428
Example issues/ example questions/ tasks being completed	purpose of signal modelling using Fourier series, reason of applying both trigonometrical and exponential Fourier series, state space role in mathematical modelling of engineering processes, impulse response role in particular solution of vectorial differential equations, random process analysis using statistical characteristics, fuzzy logic and fuzzy set notion, engineering process analysis using fuzzy set method, analysis of engineering process dynamics using artifitial neural network method, genetic algorithm application in design and control optimisation	
Work placement	Not applicable	