



## Subject card

Subject name and code	, PG_00051069						
Field of study	Technical Physics						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2021/2022		
Education level	first-cycle studies		Subject group		Optional subject group 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	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		5.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Atomic, Molecular and Optical Physics -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Paweł Wojda				
	Teachers		dr inż. Paweł Wojda				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	E-learning hours included: 0.0						
	Adresy na platformie eNauczanie: Obliczenia symboliczne w fizyce 2022 - Moodle ID: 19977 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=19977">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=19977</a>						
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	45		5.0		75.0	125
Subject objectives	The aim of the course is to educate the student a coherent view on the basic issues of physics / mathematics / techniques and tools to solve these problems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U02		The student refers to the knowledge gained during the studies in physics / mathematics and uses IT tools.		[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
	K6_W05		The student knows the basics of programming, computing, data reading and data processing.		[SW1] Assessment of factual knowledge		
	K6_W03		The student is able to explain the solution of a problem in physics or mathematics.		[SW1] Assessment of factual knowledge		
	K6_U03		Student uses symbolic calculations and uses basic commands, such as loops, in C ++		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		

Subject contents	<p>Introduction.Symbolic computation program (Mathematica, Maple, etc).</p> <p>Mathematical Modelling. General mathematical notions and symbols.</p> <p>Algebraic manipulations. Algorithm. Programs.</p> <p>Polynomials, intertwine relations. Integral and difference operators factorization.</p> <p>Differential operators factorization. Differential equations solution. Operation Solve. Eigenvectors.</p> <p>Algorithm for the tridiagonal matrix (Thomas algorithm).</p> <p>Numerical and analytical solution of ordinary differential equations and partial differential equations.</p> <p>Mathematical description of physical phenomena.</p>		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	passing tests	50.0%	30.0%
	passing laboratories	50.0%	70.0%
Recommended reading	Basic literature		<p>1. D. Kincaid, W. Cheney, Numerical analysis</p> <p>2. Mathematica. Wolfram Research. <a href="https://www.wolfram.com/mathematica/online/">https://www.wolfram.com/mathematica/online/</a></p>
	Supplementary literature		Journal of symbolic computations. S. Leble Skrypt.
	eResources addresses		<p>Obliczenia symboliczne w fizyce 2022 - Moodle ID: 19977</p> <p><a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19977">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=19977</a></p>
Example issues/ example questions/ tasks being completed	<p>Determine eigenvectors, eigenvalues of the matrix. Determine the solutions of the system of first order differential equations. Description of sound propagation.</p>		
Work placement	Not applicable		