GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Mathematical software, PG_00036611		
Field of study	Mathematics		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2023/2024
Education level	first-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	2	Language of instruction	Polish
Semester of study	3	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Nonlinear Analysis and Statistics -> Faculty of Applied Physics and Mathematics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Magdalena Chmara	
	Teachers	dr inż. Magdalena Chmara dr Adrian Myszkowski	

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

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	50.0	100

Subject objectives

The aim of the course is to acquaint the student with the Mathematica, Matlab and R environments . Develop basic skills development in these environments. Presentation of the possibility of applying learned skills in solving mathematical problems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_W09	The student uses such programs as Mathematica, Matlab, R.	[SW1] Assessment of factual knowledge
K6_U07	The student learns a number of computational procedures provided with the programs and creates its own procedures. Resolves mathematical problems and issues using programming skills.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment

Subject contents

Introduction to Mathematica: a description of the work environment, the kernel of the program, data entry. Numbers and variables: types of numbers, the approximate number systems, mathematical constants, arithmetic operations, defining variables, the accuracy of the calculations, logical operators, comparison operators. Lists and tables: create lists and basic operations on lists, modification tables with the help of built-in functions. Elements of Programming: conditional statements, iterative loops, defining procedures. Vectors and Matrices: Basic operations on vectors and matrices, solving systems of linear equations. Elements of mathematical analysis: action on polynomials, the definition of functions, solving equations and systems of nonlinear equations, differentiation and integration of functions.

Introduction to Matlab environment: a description of the work environment, the kernel of the program, the use of assistance, data entry, the M- script files. Elements of Programming: conditional statements, iterative loops, defining procedures, M- files function, pointers to functions, anonymous functions. Presentation of data: data types, variables display format, write data to the screen and to a file, reading data from a file, graphical presentation. Issues of linear algebra. The package for symbolic computation .Short introduction to R: a description of the work environment, the use of assistance, basic data types, packages

Prerequisites and co-requisites

There are no prerequisites, the student learns the programs from scratch.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Individual tasks in the classroom (laboratory)</td><td>0.0%</td><td>10.0%</td></tr>
<tr><td>2 Semestral tests (Mathematica, MATLAB)</td><td>50.0%</td><td>60.0%</td></tr>
<tr><td>Lecture Activity</td><td>0.0%</td><td>10.0%</td></tr>
<tr><td>R Project</td><td>50.0%</td><td>20.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. Mathematica documentation https://reference.wolfram.com/language/

2. Matlab documentation https://www.mathworks.com/help/matlab/

3. R documentation https://www.rdocumentation.org/</td></tr>
<tr><td>Supplementary literature</td><td>none</td></tr>
<tr><td>eResources addresses</td><td>Podstawowe
https://reference.wolfram.com/language/ - 1. Mathematica documentation
https://www.mathworks.com/help/matlab/ - Matlab documentation
https://www.rdocumentation.org/ - R documentation
Adresy na platformie eNauczanie:
Pakiety Matematyczne WFTiMS 2023/24 - Moodle ID: 32164
https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32164</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">The task of the student will be writing programs solving mathematical problems, such as

1 Write a program defining the Fibonacci sequence;

2 Write a program resolving the differential problem.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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