GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Programming in Matlab, PG_00047928
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering

Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025
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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Zakład Fizyki Teoretycznej i Informatyki Kwantowej -> Instytut Fizyki i Informatyki Stosowanej -> Faculty of Applied Physics and Mathematics

Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Patryk Jasik
	Teachers	

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	15.0	0.0	0.0	15
	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	15	1.0	9.0	25

Subject objectives	The main aim of the course is to show students functionalities and capabilities of the Matlab environment. The specific aim of the course is to develop practical programming skills in this environment, based on the programming knowledge acquired previously by students and using the knowledge of linear algebra and mathematical analysis.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W04] knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	The student knows and understands the principles, methods, and techniques of programming in the Matlab environment.	[SW3] Assessment of knowledge contained in written work and projects
	[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study	The student is able to use his knowledge of programming methods and techniques to create scripts in the Matlab environment.	[SU1] Assessment of task fulfilment

Subject contents	Introduction to Matlab environment. Basic features: arithmetic operations, variables, mathematical functions, vectors, graphs. Scripts and functions: creation of the scripts, creation of the functions, control blocks. Matrix Operations. Integration: symbolic integration and numerical integration. Differential Equations: symbolic solution of differential equations, numerical solution of differential equations.
Prerequisites and co-requisites	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Reports of the three laboratory classes	50.0%	100.0%

Recommended reading	Basic literature	1. Dokumentacja programu Matlab, http://www.mathworks.com/help/matlab/ 2. S. R. Otto, J. P. Denier, "An introduction to programming and numerical methods in Matlab", Springer
	Supplementary literature	1. S. Attaway, "Matlab: A Practical Introduction to Programming and Problem Solving. Third Edition" Butterworth-Heinemann
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	**Task:** Calculate the area of the figure enclosed by the curves. Plot the graphs of the curves to show the figure formed. Calculate the volume of the solid formed by rotating the curve around the x-axis. Plot the graph of the curve within the given interval. Calculate the required integrals symbolically and then numerically using three methods. Which integration method is the most accurate? **Task:** Consider the following differential equation with an initial condition. a) Solve the equation symbolically. b) Solve the equation numerically using the second-order (RK2) and fourth-order (RK4) Runge-Kutta methods. Compare the results obtained in parts a) and b) within a selected interval and calculate the error resulting from using the numerical methods.
Work placement	Not applicable

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