



Subject card

Subject name and code	Numerical methods, PG_00045296						
Field of study	Data Engineering						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2020/2021		
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	1	Language of instruction			English		
Semester of study	2	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Microwave and Antenna Engineering -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Grzegorz Fotyga				
	Teachers		dr hab. inż. Grzegorz Fotyga				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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		4.0		16.0	50
Subject objectives	A general aim of the course is to give the student the understanding of the theory and application of the basic numerical techniques and the knowledge how to implement them using high-level programming languages.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U03] analyses problems and creates appropriate models, data structures and algorithms (including heuristic and numerical ones), assesses their computational complexity, estimates errors of the received solutions		Student is able to create numerical models describing simple phenomena and solves problems using numerical algorithms for root-finding of functions, systems of linear equations, interpolation and approximation, integration and numerical differentiation, using high-level programming languages such as C++ and packages such as Matlab.		[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
	[K6_W01] has basic knowledge in the field of mathematics, including mathematical analysis, algebra, geometry, probability calculus, statistics and numerical methods, necessary to formulate and solve simple tasks in the field of IT		Participant analyzes problems, creates basic numerical algorithms and estimates numerical errors of received solutions, is able to apply appropriate numerical techniques to solve computational problems.		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		

Subject contents	1 System of equations 2 Roots of Functions 3 Numerical errors 4 Interpolation 5 Approximation 6 Numerical integration			
Prerequisites and co-requisites	Participants should be familiar with the mathematical analysis and the programming basics.			
Assessment methods and criteria	Subject passing criteria		Passing threshold	Percentage of the final grade
	Laboratory		50.0%	40.0%
	Test		50.0%	60.0%
Recommended reading	Basic literature		[1] Fortuna, Zenon, Bohdan Macukow, and Janusz Wasowski. <i>Metody numeryczne</i> . Wydawnictwa Naukowo-Techniczne, 2002. [2] Trefethen, Lloyd N., and David Bau III. <i>Numerical linear algebra</i> . Vol. 50. Siam, 1997.	
	Supplementary literature		[1] Solomon, Justin. Numerical Algorithms . AK Peters/CRC Press, 2015 https://people.csail.mit.edu/jsolomon/share/book/numerical_book.pdf	
	eResources addresses			
Example issues/ example questions/ tasks being completed				
Work placement	Not applicable			