

SDAŃSK UNIVERSITY 的 OF TECHNOLOGY

Subject card

Subject name and code	Concurrent and parallel programming, PG_00037344							
Field of study	Technical Physics							
Date of commencement of studies	October 2021		Academic year of realisation of subject			2023/2024		
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 Część wykładów i laboratoriów będzie prowadzona w języku angielskim.		
Semester of study	5		ECTS credits			4.0		
Learning profile	general academic profile		Assessment form			assessment		
Conducting unit	Instytut Fizyki i Inform	nej -> Faculty of Applied Physics and Mathematics						
Name and surname	Subject supervisor	dr hab. Jan Franz						
of lecturer (lecturers)	Teachers		dr hab. Jan Franz					
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	:t	Seminar	SUM
of instruction	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 classes include plan		I didactic Participation in consultation hours		Self-study SU		SUM	
	Number of study 45 hours		10.0			45.0		100
Subject objectives	The goal of the course is to introduce students into the area of design and programming concurrent and parallel programs. In particular will be shown how to design, implement and evaluate the quality of programs.							
Learning outcomes	Course outcome		Subject outcome			Method of verification		
	K6_U03		The student practices Java programming			[SU1] Assessment of task fulfilment		
	K6_W05		The student learns how to solve the classical concurrency problems		[SW1] Assessment of factual knowledge			
	K6_K01		The student knows the scenarios where the use of concurrent or parallel programming is necessary to solve the problem			[SK5] Assessment of ability to solve problems that arise in practice		
Subject contents	 Basic Concepts 1.1 Basic Introduction 1.2 Thread Concept in Java 1.3 Elementary Mechanisms for Synchronization 1.4 Basic Control of Threads Advanced Concepts 1.4 Measures for Parallelization 2.7 Thread Pools 2.3 Lock Objects 2.4 Thread-safe Collections 2.5 Additional Mechanisms for Synchronization 3. Frameworks for Parallelization 3. Frameworks for Parallelization 4. Example Applications 4. Example Applications 4. Example Application The Gamma Mathematical Application 							
Prerequisites and co-requisites								

Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade			
and criteria	Written test (10 points) and laboratory (30 points). Total 40 points.	0.0%	25.0%			
	Lab (30 points)	0.0%	75.0%			
Recommended reading	Basic literature	1. T. Rauber, G. Rünger, Parallel Programming: for Multicore and Cluster Systems, 2nd edition, Springer, Berlin, 2013				
		 M. Ben-Ari, Principles of Concurrent and Distributed Programming, 2nd edition, Addison-Wesley, Upper Saddle River, NJ, 2005. 				
		3. RG. Urma, M. Fusco, A. Mycroft, Modern Java in Action, Manning Publications, 2018				
		4. B. Goetz, T. Peierls, J. Bloch, J. Bowbeer, D. Holmes, D. Lea, Java Concurrency in Practice. Addison-Wesley, Upper Saddle River, NJ, 2006				
	Supplementary literature	1. P. Butcher, Seven Concurrency N Pragmatic Bookshelf, Dallas, 2014	Nodels in Seven Weeks, The			
		2. B. J. Evans, J. Clark, M. Verburg, The Well-Grounded Java Developer, Second Edition, Manning Publications, 2023 5.				
	eResources addresses	Podstawowe				
		https://docs.oracle.com/javase/tutorial/essential/concurrency/ index.html - Tutorials about concurrent programming in Java.				
		Adresy na platformie eNauczanie:				
		Programowanie wspołbiezne i rownoległe - laboratorium - 2023/24 - Moodle ID: 30988 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=30988				
Example issues/ example questions/ tasks being completed	1. Calculate the Speedup of a concurrent program.					
	2. Convert a sequential program in a concurrent program.					
Work placement	Not applicable					