

## 。 GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

Subject name and code	Distributed processing, PG_00045387								
Field of study	Data 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	6		ECTS credits			5.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Department Of Computer Architecture -> Faculty Of Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej								
Name and surname	Subject supervisor	dr hab. inż. Emilia Lubecka							
of lecturer (lecturers)	Teachers		dr hab. inż. Emilia Lubecka Michał Kassjański mgr inż. Tomasz Bieliński						
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	15.0		0.0	60	
	E-learning hours included: 0.0								
Learning activity and number of study hours	Learning activity	Participation in classes includ plan	n didactic led in study	Participation in consultation hours		Self-study		SUM	
	Number of study hours	60		10.0		55.0		125	
Subject objectives	Teaching foundations and rules of distributed and parallel processing in networked computer systems.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K6_W04] Knows the architecture of computers, operating system processes, file systems, text processing programs, disk and ram memories management rules. Knows the problems of sharing the state, presentation and transformation of information in a distributed system, hypermedia technologies and related services, the architecture of interactive distributed simulation and agent interaction methods.		Student: - knows the problems of sharing state - knows the processes of the operating system - analyzes the essence of distributed processing and synchronization - identifies basic synchronization mechanisms - differentiates classical synchronization issues in practice			[SW1] Assessment of factual knowledge			
	[K6_U06] Independently solves complex engineering tasks using literature, materials and devices, prepares extensive documentation of the developed solution using appropriate description techniques.		Student: - uses system libraries in distributed processing.			[SU4] Assessment of ability to use methods and tools			
	[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: - designs own distributed application, - presents practical distributed programming skills.			[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject			

Subject contents	<ol> <li>Introduction to the course. Completion rules</li> <li>Abstraction of concurrent processing</li> <li>Parallel processing in examples</li> <li>Critical section - introduction</li> <li>Classical problems of concurrent processing: producers - consumers, readers writers, five philosophers</li> <li>Semaphores detailed classification with descriptions</li> <li>Concurrent and multi-entry procedures</li> <li>Solutions for classic topics of concurrent processing with use of semaphores</li> <li>Binary and general semaphores in Unix system</li> <li>Multi- thread programming</li> <li>Access and execution synchronization for threads or processes</li> <li>Libraries of concurrent functions for Unix systems</li> <li>Monitor introduction and description of the mechanism</li> <li>Monitors in solving of concurrent processing problems practical examples</li> <li>Conditional variables in Unix systems, practical implementation of monitor procedures</li> </ol>					
Prerequisites and co-requisites	Knowledge of programming in C is h	elpful.				
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade			
	Practical laboratories	60.0%	40.0%			
	Term-long design	60.0%	20.0%			
	Midterm colloquium	60.0%	40.0%			
Recommended reading	Basic literature	<ol> <li>Ben-Ari M.: Podstawy programowania współbieżnego, Wydawnictwa Naukowo Techniczne, Warszawa.</li> <li>Colouris G., Dollimore J., Kindberg G.: Distributed Systems, Concepts and Design, second edition, Addison-Wesley.</li> <li>Coulouris G., Dollimore J, Kindberg T.: Systemy rozproszone Podstawy i projektowanie, Wydawnictwa Naukowo Techniczne, Warszawa.</li> <li>Hwang K., Briggs F.: Computer Architecture and Parallel Processing, McGraw - Hill.</li> </ol>				
	Supplementary literature	<ol> <li>Lister A., Eager R.: Introduction to Operating Systems, Wydawnictwa Naukowo Techniczne, Warszwa.</li> <li>Silberschatz A., Gavlin P.: Operating Systems Basics, Wydawnictwa Naukowo Techniczne, Warszwa.</li> <li>Stevens R.: Unix Network Programming, Prentice Hall.</li> </ol>				
	eResources addresses	Adresy na platformie eNauczanie: Distributed processing 2025 - Moodle ID: 44484 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=44484				
Example issues/ example questions/ tasks being completed						
Work placement	Not applicable					

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