



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						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Emilia Lubecka				
	Teachers		dr inż. Emilia Lubecka				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	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 didactic classes included in study plan		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_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.		[SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment		
	[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.						

Subject contents	<ol style="list-style-type: none"> 1. Introduction to the course. Completion rules 2. Abstraction of concurrent processing 3. Parallel processing in examples 4. Critical section - introduction 5. Classical problems of concurrent processing: producers - consumers, readers writers, five philosophers 6. Semaphores detailed classification with descriptions 7. Concurrent and multi-entry procedures 8. Solutions for classic topics of concurrent processing with use of semaphores 9. Binary and general semaphores in Unix system 10. Multi- thread programming 11. Access and execution synchronization for threads or processes 12. Libraries of concurrent functions for Unix systems 13. Monitor introduction and description of the mechanism 14. Monitors in solving of concurrent processing problems practical examples 15. Conditional variables in Unix systems, practical implementation of monitor procedures 16. Comparison of semaphores and monitor mechanisms - theoretical approach 														
Prerequisites and co-requisites	Knowledge of programming in C is helpful.														
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Term-long design</td> <td>50.0%</td> <td>20.0%</td> </tr> <tr> <td>Midterm colloquium</td> <td>50.0%</td> <td>40.0%</td> </tr> <tr> <td>Practical laboratories</td> <td>50.0%</td> <td>40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Term-long design	50.0%	20.0%	Midterm colloquium	50.0%	40.0%	Practical laboratories	50.0%	40.0%
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Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Ben-Ari M.: Podstawy programowania współbieżnego, Wydawnictwa Naukowo Techniczne, Warszawa. 2. Colouris G., Dollimore J., Kindberg G.: Distributed Systems, Concepts and Design, second edition, Addison-Wesley. 3. Coulouris G., Dollimore J, Kindberg T.: Systemy rozproszone Podstawy i projektowanie, Wydawnictwa Naukowo Techniczne, Warszawa. 4. Hwang K., Briggs F.: Computer Architecture and Parallel Processing, McGraw - Hill. 													
	Supplementary literature	<ol style="list-style-type: none"> 1. Lister A., Eager R.: Introduction to Operating Systems, Wydawnictwa Naukowo Techniczne, Warszawa. 2. Silberschatz A., Gavlin P.: Operating Systems Basics, Wydawnictwa Naukowo Techniczne, Warszawa. 3. Stevens R.: Unix Network Programming, Prentice Hall. 													
	eResources addresses														
Example issues/ example questions/ tasks being completed															
Work placement	Not applicable														