



Subject card

Subject name and code	Concurrent and distributed processing, PG_00061802						
Field of study	Data Engineering						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2027/2028		
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. Mariusz Matuszek				
	Teachers		dr inż. Tadeusz Matuszek				
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_U04] formulates logical solutions to complex or unstructured problems		Student prepares a non-trivial distributed application focused on concurrent data processing and global state protection and synchronisation		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		
	[K6_W01] identifies conditioning of the processes occurring in the analyzed systems and selects methods for solving them, using the accumulated knowledge and taking into account the mutual relations between the analyzed phenomena		Student understands how the race condition occurs and can apply correct protection measures against occurrence of race conditions		[SW3] Assessment of knowledge contained in written work and projects		
	[K6_W06] classifies the acquired information, assessing its usefulness in solving the formulated problems		Student understand the major concurrency patterns and can describe them		[SW1] Assessment of factual knowledge		
Subject contents	<div>1. Introduction to the course. Completion rules</div> <div>2. Abstraction of concurrent processing</div> <div>3. Parallel processing in examples</div> <div>4. Critical section - introduction</div> <div>5. Classical problems of concurrent processing: producers - consumers, readers writers, five philosophers</div> <div>6. Semaphores detailed classification with descriptions</div> <div>7. Concurrent and multi-entry procedures</div> <div>8. Solutions for classic topics of concurrent processing with use of semaphores</div> <div>9. Binary and general semaphores in Unix system</div> <div>10. Multi- thread programming</div> <div>11. Access and execution synchronization for threads or processes</div> <div>12. Libraries of concurrent functions for Unix systems</div> <div>13. Monitor introduction and description of the mechanism</div> <div>14. Monitors in solving of concurrent processing problems practical examples</div> <div>15. Conditional variables in Unix systems, practical implementation of monitor procedures</div> <div>16. Comparison of semaphores and monitor mechanisms - theoretical approach</div>						

Prerequisites and co-requisites	Knowledge of programming in C is helpful.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Term-long design	50.0%	20.0%
	Practical laboratories	50.0%	40.0%
	Midterm colloquium	50.0%	40.0%
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	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

Document generated electronically. Does not require a seal or signature.