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Subject card

Subject name and code	Distributed Processing, PG_00047662						
Field of study	Informatics						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2022/2023		
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	2		Language of instruction		Polish		
Semester of study	4		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. Jarosław Kuchta				
			dr inż. Tomasz Boiński				
			dr inż. Mariusz Matuszek				
			mgr Anna Domagalska				
			dr inż. Jan Cychnerski				

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		4.0	61.0		125

Subject objectives	Teaching and upskilling foundations and rules of distributed and parallel processing in networked computer systems

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W04] Knows and understands, to an advanced extent, the principles, methods and techniques of programming and the principles of computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, and organisation of systems using computers or such devices	Student: - knows issues in state sharing, - knows OS processes, - analyses synchronisation issues in distributed computing, - identifies the core synchronisation methods, - can differentiate practical synchronisation issues.	[SW1] Assessment of factual knowledge
	[K6_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	Student: - uses system libraries in distributed pocessing, - designs own distributed application, - presents practical distributed programming skills.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
	[K6_W08] Knows and understands the fundamental dilemmas of modern civilisation and basic economic, legal and other conditions of various types of activities related to the field of study, including the basic concepts and principles in the field of industrial property and copyright protection.	Student: - can analyse dependencies and relations between chosen processing model and underlying hardware platform.	[SW1] Assessment of factual knowledge

Subject contents	
	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	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Practical laboratories	50.0%	40.0%
	Term-long design	50.0%	20.0%
	Midterm colloquium	50.0%	40.0%

Recommended reading	Basic literature	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	1. Lister A., Eager R.: Wprowadzenie do systemów operacyjnych, Wydawnictwa Naukowo Techniczne, Warszwa. 2. Silberschatz A., Gavlin P.: Podstawy systemów operacyjnych, Wydawnictwa Naukowo Techniczne, Warszwa. 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