GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Concurrent and distributed processing, PG_00061802		
Field of study	Data Engineering		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
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 -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Mariusz Matuszek	
	Teachers	dr inż. Tadeusz Matuszek	

Lesson types

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_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.	WTF?	[SW1] Assessment of factual knowledge
[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
[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

<table>
<tr><td>Subject contents</td><td>Course content – lecture
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</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of programming in C is helpful.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<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>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>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.</td></tr>
<tr><td>Supplementary literature</td><td>1. Lister A., Eager R.: Introduction to Operating Systems, Wydawnictwa Naukowo Techniczne, Warszwa.
2. Silberschatz A., Gavlin P.: Operating Systems Basics, Wydawnictwa Naukowo Techniczne, Warszwa.
3. Stevens R.: Unix Network Programming, Prentice Hall.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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