GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Distributed Processing in Medical Applications, PG_00068236		
Field of study	Biomedical 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	3.0
Learning profile	general academic profile	Assessment form	exam
Conducting unit	Department of Biomedical Engineering -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Jacek Rumiński	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	15.0	0.0	30

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	30	3.0	42.0	75

Subject objectives

The aim of the course is to prepare students to independently design and implement tasks related to data processing in a distributed environment for biomedical purposes using reliable data sources and frameworks.

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	The student has knowledge of: - properties of distributed systems and basic architectures of distributed systems, - principles of creating and designing a distributed processing system for biomedical solutions, - distributed processing techniques, - techniques for building software packages that implement the process of handling network services (Web services).	[SW1] Assessment of factual knowledge
[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study	The student has acquired the skills of: - designing a distributed processing system and selecting the appropriate architecture, - building a distributed processing system, - designing network services dedicated to distributed processing, - using information technologies in the field of designing and implementing distributed processing systems for biomedical engineering problems, - using Java, Python and container environments.	[SU1] Assessment of task fulfilment

Subject contents	Course content – lecture Introduction. Basic definitions, objectives of distributed systems. GRID-type systems and cloud systems. Basic architectures of distributed systems. RPC and XML-RPC models Web services: basic technologies, including SOAP and WSDL, REST. Object-oriented distributed systems (e.g. RMI). Distributed processing using JavaScript technology. Introduction to DEVOps and MLOps. Distributed computing environments (e.g. Dask). Creating and using containers (e.g. Docker). Methods of using distributed AI model repositories in your own code (e.g. Hugging Face). Project: Requirements analysis and distributed application design. Defining use cases (in the context of biomedical applications). Designing client-server architecture using the RESTful pattern. Designing and working with the database. Implementing the designed application. Testing and verifying the operation of the distributed application.
Prerequisites and co-requisites	ability of structural and object-oriented programming basic knowledge of Java, Python, HTML, XML and databases

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Tests	20.0%	40.0%
Project	51.0%	60.0%

Recommended reading

Basic literature	Slides and Lecture's resources. Selvaraj, Sivaraj, Mastering REST APIs: Boosting Your Web Development Journey with Advanced API Techniques, 2024 | Berkeley, CA: Apress L. P Relan, Kunal, Building REST APIs with flask : create python web services with MySQL / by Kunal Relan, 2019 | Berkeley, CA : Apress : Imprint: Apress Goniwada, Shivakumar R., Cloud native architecture and design : a handbook for modern day architecture and design with enterprise-grade examples, 2022 | Berkeley, CA : Apress Clapa Konrad, Gerrard Brian, Professional cloud architect - Google cloud certification guide : a handy guide to designing, developing, and managing enterprise-grade GCP cloud solutions, 2019 | Birmingham, England ; Mumbai : Packt
Supplementary literature	No requirements
eResources addresses	
Example issues/ example questions/ tasks being completed	
Practical activites within the subject	Not applicable

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