University of Gdańsk

Subject card

Subject name and code	Distributed Applications Development, PG_00178062						
Field of study	Informatics and Econometrics						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Bachelor's studies		Subject group		Obligatory subject group in the field of study 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	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		7.0		
Learning profile	academic		Assessment form		credit		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		mgr Piotr Porzuczek				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	60.0	0.0	0.0	75
	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	75		4.0		96.0	175
Subject objectives	1. Ensuring understanding of the concept and role of distributed application design technology. 2. Familiarizing students with the principles of controller design using the REST approach. 3. Practical experience related to the implementation and management of distributed infrastructure.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[IiEL3_W06] To an advanced degree, the student knows and understands the processes and methods of creating, developing, and providing appropriate conditions for using informatics or statistics tools, particularly those that improve human and organizational functioning.	The student has an advanced knowledge and understanding of the processes and methods of creating, developing, and ensuring appropriate conditions for the use of distributed applications, including microservice architecture, communication protocols (REST), containerization technologies (Docker), and orchestration, in particular those that improve the functioning of IT systems in organizations.	[SW4] test/exam - oral or written
[IiEL3_U02] Students can select or construct econometrics, informatics or statistics tools and apply them to describe and solve economic and social problems.	The student is able to select or construct IT tools for building distributed applications (version control systems, container platforms, monitoring systems) and use them to describe and solve problems related to the scalability, reliability, and performance of distributed systems.	[SU2] presentation/project/paper/ report [SU4] test/exam - oral or written
[IiEL3_U12] The student can design and implement IT systems to enhance business operations and effectively utilize modern ICT technologies for management and business communication.	The student is able to design and implement distributed IT systems supporting business operations, using modern ICT technologies such as microservices, Docker containers, cloud platforms, and apply them in management and business communication between different system components.	[SU2] presentation/project/paper/ report

Subject contents

Lectures:

The concept of distributed application design.
Routing, CORS, GraphQL.
The REST approach and binary communication (gRPC).
Authentication and authorization.
Exercises:
Implementing REST in applications.
Configuring API Gateway.
Implementation of containers and serverless infrastructure.
Data storage in objects and files.

Prerequisites and co-requisites

Operating systems, Scripting languages, Non-relational database solutions, Software engineering.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Laboratory: project with presentation	51.0%	50.0%
Lecture: final test	51.0%	50.0%

Recommended reading

Basic literature	• Newman S. (2021), *Building Microservices*, O'Reilly Media. • Richardson L. (2013), *RESTful Web APIs*, O'Reilly Media
Supplementary literature	• Burns B. (2018), *Designing Distributed Systems*, O'Reilly Media. • Ruby S. (2008), *RESTful Web Services*, O'Reilly Media.
eResources addresses	

Example issues/ example questions/ tasks being completed

Implementation of controllers in the REST approach, taking into account routing and CORS.
Creating and managing tables in distributed systems.
Using API communication in a distributed application.
User authentication and authorization in a distributed system.
Implementation of containers for encapsulating services in a serverless infrastructure.
Optimization of distributed services using APIs.
Data version management in objects and files.
Application of snapshot techniques in instance hosting.
Designing binary functions.
Implementation of task queuing in a distributed infrastructure.

Work placement	Not applicable

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