GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Challenge Based Learning - team project, PG_00064045		
Field of study	Technical Physics		
Date of commencement of studies	October 2026	Academic year of realisation of subject	2028/2029
Education level	first-cycle studies	Subject group	Optional subject group
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	1.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Theoretical Physics and Quantum Informaton -> Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Paweł Syty	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	0.0	0.0	0.0	15.0	0.0	15

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	15	5.0	5.0	25

Subject objectives

The aim of the course is to teach students the complete process of solving real-life, interdisciplinary design tasks from problem identification, through research, solution generation and prototyping, to testing and creating an implementation plan.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W01] demonstrates an understanding of the civilisational significance of physics and its applications.	The student understands the civilizational significance of science and its applications in the context of the project being carried out.	[SW1] Assessment of factual knowledge
[K6_U07] is able to solve problems within a team, including interdisciplinary teams, appropriately planning its work.	The student is able to present the objectives of an interdisciplinary project and the plan for its implementation in accessible terms.	[SU5] Assessment of ability to present the results of task
[K6_U08] communicates effectively using specialist terminology in physics and related disciplines, enabling the preparation of reports, publications or presentations, as well as participation in discussion and expression of opinions.	The student is able to convey and obtain the information necessary to carry out and present the results of a project, using specialist terminology.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU5] Assessment of ability to present the results of task
[K6_K02] demonstrates readiness to use competences creatively for the benefit of society, including in an entrepreneurial manner.	The student is ready to carry out projects in such a way that they benefit society as a whole.	[SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work

Subject contents	Course content – project 1. Introduction to the Challenge Based Learning methodology. Discussion of the CBL concept (Big Idea Essential Question Challenge). Examples of applications in IT education. Project work rules and assessment criteria. Division of students into teams. 2. Identification of challenges (Big Idea). Teams select a problem area (e.g. sustainable development, health, IT security, education, AI in everyday life). Formulation of a key question and a specific project challenge. 3. Research phase (Guiding Questions & Activities). Analysis of needs, stakeholders, market or technological research. Problem mapping. Selection of applicable information technologies (e.g. web application, IoT solution, AI, decision support system). 4. Solution design (Solution Concept). Brainstorming, preliminary prototyping. Development of a solution concept, system architecture, technology and implementation plan. Preparation of conceptual documentation. 5. Prototype implementation and testing. Building a minimum viable product (MVP). Examples: web application, dashboard, automation script, ML model. Limited testing. Preparation of results presentation. 6. Project presentation and evaluation. Public presentation of challenges, solutions and results. Discussion, reflection on the CBL process, conclusions and recommendations.
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Activity in project work	50.0%	30.0%
Presentation and defence of the project	50.0%	30.0%
Project documentation and solution prototype	50.0%	40.0%

Recommended reading	Basic literature	A Practical Guide to Understanding and Implementing ChallengeBased Learning (Kenan Dikilitaş, Tim Marshall, Masoumeh Shahverdi; Palgrave Macmillan Cham, 2025) Challenge Based Learning: Engaging with Students Through Interactivity (Scott Beattie; Springer, 2024)
	Supplementary literature	ChallengeBased Learning, Research, and Innovation: Leveraging Industry, Government, and Society (Arturo Molina, Rajagopal; Palgrave Macmillan Cham, 2023)
	eResources addresses	
Example issues/ example questions/ tasks being completed	Examples of challenges: - How can we reduce energy waste in university buildings? - How can we improve the security of students' personal data?	
Practical activites within the subject	Not applicable	

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