



Subject card

Subject name and code	Design Patterns, PG_00060229								
Field of study	Technical Physics								
Date of commencement of studies	October 2024	Academic year of realisation of subject		2026/2027					
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		assessment				
Conducting unit	Department of Theoretical Physics and Quantum Computing -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology								
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Bartosz Reichel						
	Teachers								
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM		
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45		
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	45		5.0		25.0	75		
Subject objectives	The student will know the selected object design patterns, and some connected programming techniques. Will be able to use them in programs.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K6_U02] analyzes and solves simple scientific and technical problems, based on possessed knowledge, using analytical, numerical, simulation and experimental methods		Implements simple issues using patterns			[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools			
	[K6_U03] knows programming languages and can use basic software packages		Can implement selected issues			[SU1] Assessment of task fulfilment			
	[K6_W05] has knowledge of programming methodology and techniques, and the use of selected IT tools in physics and technology		Can model physics problems in the form of code using object-oriented patterns (e.g. numerical methods)			[SW1] Assessment of factual knowledge			

Subject contents	<p>Course content – lecture Discussed in lectures are creative patterns: Singleton, Factory Method, Prototype, Abstract Factory, Builder, Structural patterns: Proxy, Adapter, Facade, Bridge, Composite, Decorator, Flyweight, and functional patterns: Template Method, Memento, Command, Iterator, Observer, Strategy, State, Visitor. In addition, be submitted to the library collections of the standard C++ and Java, and input / output operations in C++ and Java. The present model is a design pattern Model - View - Coordinator.</p> <p>During the laboratory exercises, students develop software using these techniques.</p> <p>Course content – laboratory Implementation:</p> <p>Task #1 (Binary Search) Task #2 (Observer, Singleton) Task #3 (Decorator) Task #4 (Strategy) Task #5 (Substitute) Task #6 (Command, Souvenir) - 2 weeks Task #7 (Substring Generation - Abstract Factory) Task #8 (Chain of Responsibility) Task #9 - DI/IOC Task #10 - Thread Pool Task #11 - Barrier</p>						
Prerequisites and co-requisites	Basic knowledge of programming in C++ and Java. Knowledge of basic algorithms and data structures.						
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="446 754 806 788">Subject passing criteria</th><th data-bbox="806 754 1152 788">Passing threshold</th><th data-bbox="1152 754 1489 788">Percentage of the final grade</th></tr> </thead> <tbody> <tr> <td data-bbox="446 788 806 833">Project</td><td data-bbox="806 788 1152 833">50.0%</td><td data-bbox="1152 788 1489 833">100.0%</td></tr> </tbody> </table>	Subject passing criteria	Passing threshold	Percentage of the final grade	Project	50.0%	100.0%
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Recommended reading	<p>Basic literature E. Gamma, R. Helm, R. Johnson, J. Vlissides (the Gang of Four) "Design Patterns", Addison-Wesley, 1994</p> <p>B. Eckel "Thinking in Patterns", dostępna za darmo w Internecie</p> <p>Supplementary literature None</p> <p>eResources addresses</p>						
Example issues/ example questions/ tasks being completed	The project utilizing design patterns						
Practical activites within the subject	Not applicable						

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