



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</p> <p>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	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	50.0%	100.0%
Recommended reading	Basic literature		<p>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>
	Supplementary literature		None
	eResources addresses		
Example issues/ example questions/ tasks being completed	The project utilizing design patterns		
Practical activities within the subject	Not applicable		

Document generated electronically. Does not require a seal or signature.