

Subject card

Subject name and code	Design Patterns, PG_00210603						
Field of study	Informatics						
Date of commencement of studies	October 2026		Academic year of realisation of subject		2026/2027		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study Optional subject group		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		6.0		
Learning profile	academic		Assessment form		exam		
Conducting unit							
Name and surname of lecturer (lecturers)	Subject supervisor		dr Tomasz Borzyszkowski				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	30.0	0.0	0.0	60
	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	60		0.0		0.0	60
Subject objectives	The subject is intended to provide students with an overview of the most commonly used design patterns related to object-oriented programming.As part of the course, students will learn the practical use of selected design patterns to solve typical programming problems.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[INFMU2_W04] knows complex data structures and advanced methods of algorithmic solution of computationally difficult problems (exponential algorithms, approximation, heuristics)	The student defines and explains how architectural and design patterns (e.g. Visitor pattern for separating operations on complex data structures) support the implementation, maintenance and testing of heuristics and approximation algorithms used to solve computationally difficult problems.	[SW2] presentation/project/paper/report
	[INFMU2_U03] designs, analyzes for correctness and computational complexity, and builds algorithms using advanced programming techniques and data structures	The student designs and implements advanced, non-standard data structures based on structural design patterns (e.g. Composite for building tree structures, Pollen for memory optimisation, Proxy for lazy initialisation), analysing their correctness and their impact on the memory complexity of the entire system.	[SU2] presentation/project/paper/report
	[INFMU2_U03] can design and analyze computational complexity and build algorithms	The student is able to design algorithmic solutions using behavioural design patterns (e.g. Strategy, Template Method) and to analyse how the use of specific patterns and the associated object-oriented overhead (e.g. polymorphism) affects the overall time complexity of the algorithms being developed.	[SU2] presentation/project/paper/report
Subject contents	The history behind design patterns Overview of structural design patterns Overview of structural design patterns An overview of behavioural design patterns Selected architectural patterns		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	project presentation	51.0%	100.0%
Recommended reading	Basic literature	Gamma E., Helm R., Johnson R., Vlissides J. Wzorce projektowe. Elementy oprogramowania obiektowego wielokrotnego użytku.Freeman E&E, Bates B., Sierra K. Rusz głową ! Wzorce projektowe.	
	Supplementary literature	Adrian Ostrowski, Piotr Gaczkowski, Architektura oprogramowania bez tajemnic. Wykorzystaj język C++ do tworzenia wydajnych aplikacji i systemów, Helion 2022.	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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