

## 。 GDAŃSK UNIVERSITY OF TECHNOLOGY

## Subject card

Subject name and code	Building Automation, PG_00047616								
Field of study	Automatic Control, Cybernetics and Robotics								
Date of commencement of studies	October 2022		Academic year of realisation of subject			2024/2025			
Education level	first-cycle studies		Subject group			Optional subject group			
						Subje resear	ct group relate rch in the field	ed to scientific 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			4.0			
Learning profile	general academic profile		Assessment form			exam			
Conducting unit	Department of Automatic Control -> Faculty of Electronics, Telecommunications and Informatics								
Name and surname	Subject supervisor		dr inż. Piotr Kaczmarek						
of lecturer (lecturers)	Teachers		mgr inż. Piotr Darski						
			dr inż. Piotr K	aczmarek					
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	Seminar	SUM	
of instruction	Number of study hours	30.0	0.0	15.0	15.0		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		4.0		36.0		100	
Subject objectives	Introduction to building management systems: heating, ventilation, air conditioning and access control.								

Learning outcomes	Course outcome	Subject outcome	Method of verification				
	[K6_K03] is ready to meet social obligations, co-organise activities for the social environment, initiate actions for the public interest, think and act in an entrepreneurial way	Student is able to design automation systems that minimize building energy consumption	[SK5] Assessment of ability to solve problems that arise in practice				
	[K6_K01] is ready to cultivate and disseminate models of proper behaviour in and outside the work environment; make independent decisions; critically evaluate actions of their own, teams they lead and organisations they are part of; take responsibility for results of these actions; responsibly perform professional roles, including:n - observing rules of professional ethics and require it from others,n - care for the achievements and traditions of the professionn	Student can use the literature in the field of buildings systems	ISU1] Assessment of task fulfilment				
	[K6_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study and perform tasks, in an innovative way, in not entirely predictable conditions, by:n- appropriate selection of sources and information obtained from them, assessment, critical analysis and synthesis of this information,n- selection and application of appropriate methods and toolsn	Student can use the documentation in the field of buildings systems - also in English	[SK5] Assessment of ability to solve problems that arise in practice				
Subject contents	1. Building as a dynamic system 2. Standards concerning building systems 3. Economical aspects of building control systems 4. Building power consumption 5. Introduction to air conditioning systems 6. Air heating process 7. Air cooling process 8. Air humidifying process 9. Air drying process 10. Heat recovery process 11. Water heaters 12. Water heater fluid flow control 13. Water heater anti-freeze protection 14. Direct exp. coolers 15. Refrigeneration unit control 16. Cross flow heat exchangers 17. Rotary heat exchangers 18. Mixing chambers 19. Heat recovery control 20. Heat recovery anti-freeze protection 21. Steam humidifiers 22. Air humidifying and drying process control 23. Air flow and pressure control 24. Sensor selection for air conditioning systems 25. Actuator selection for air conditioning systems 26. Air quality control 27. Cascade temperature control 28. Air conditioning control systems examples 31. Przykłady realizacji systemów automatyki dla potrzeb klimatyzacji i wentylacji mechanicznej w domach jednorodzinnych 32. Central heating systems 33. Heat sources in heating systems 34. Thermal center control 35. Boiler control 36. Central and decentralized temperature control 37. Sensor and actuator control in heating systems 38. Natural power sources in heating systems 42. Sensor selection in anti-intrusion systems 43. Anti-intrusion controller functions 44. Anti-fire systems 45. Sensor selection in anti-intrusion systems 43. Anti-intrusion advantages 47. Open communication protocols in building management systems 48. EIB and LONWORKS as examples of open protocol systems 49. EIB information media 50. EIB system topology						
Prerequisites and co-requisites	No requirements						
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade				
	Practical exercise	55.0%	50.0%				
	Written exam	55.0%	50.0%				
Recommended reading	Basic literature	A. Szkarowski, L. Łatowski, "Ciepłownictwo", Warszawa 2008 J. I. Levenhagen, "HVAC control system design diagrams", 1999					
	Supplementary literature No requirements						
	eResources addresses	Adresy na platformie eNauczanie:					
Example issues/ example questions/ tasks being completed							
Work placement	Not applicable						

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