



Subject card

Subject name and code	Modern Technologies in Construction, PG_00067116						
Field of study	Architecture						
Date of commencement of studies	October 2026		Academic year of realisation of subject			2026/2027	
Education level	second-cycle studies		Subject group			Obligatory subject group in the field of study Subject group related to scientific research in the field of study	
Mode of study	Full-time studies		Mode of delivery			blended-learning	
Year of study	1		Language of instruction			Polish	
Semester of study	1		ECTS credits			2.0	
Learning profile	general academic profile		Assessment form			assessment	
Conducting unit	Department of Technical Fundamentals of Architectural Design -> Faculty of Architecture -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. arch. Marek Szafrowski				
	Teachers		dr inż. arch. Marek Szafrowski dr inż. arch. Joanna Kabrońska				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	0.0	0.0	0.0	30
	E-learning hours included: 15.0						
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	30		3.0		17.0	50
Subject objectives	Acquiring the ability to apply innovative technologies in the design of the built environment						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K7_W01] knows and understands construction, building and engineering issues related to building design; principles, solutions, constructions and building materials used in performing complex engineering tasks in the field of architectural and urban design		knows and understands advanced issues of construction, building technology and installations, structure and building physics, covering key, complex issues in architectural, urban and planning design; knows innovative building materials and technologies and has knowledge about their application in architectural design process			[SW2] Assessment of knowledge contained in presentation	
	[K7_W02] knows and understands the rules of gathering information and their interpretation as a part of project concept preparation; detailed issues related to architecture and urban planning in the field of complex design problems solving		Student knows the legal provisions, standards and regulations in relation to his project; knows technical and construction regulations;			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects	

Subject contents	Course content – lecture The content covers the latest technological solutions and innovations used in the construction industry. The program emphasizes the understanding and effective use of prefabrication technologies, energy management systems, and building materials with enhanced functional and ecological parameters. Students also learn about aspects of construction process automation, robotics, sustainable development, and eco-technologies. Course content – exercises New technologies in architecture: introduction, concept and role of technology, social aspects of technological innovations, Actor-Network Theory Building materials - new applications of traditional materials: concrete in architecture, modern insulation systems, foundation slabs, wooden structures Smartmaterials: nanomaterials, phase change materials, high-performance materials Building materials development in an environmental aspect: low-processed materials, recycled and susceptible to recycling Intelligent components and systems in architecture, intelligent environments. Scenarios for the future		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	completion of the tasks	100.0%	100.0%
Recommended reading	Basic literature Addington D. M., Schodek D. L.: Smart Materials and New Technologies. For the architecture and design professions, Elsevier, 2005 Aksamija A. Integrating Innovation in Architecture. Design, Methods and Technology for Progressive Practice and Research (2016) Braham W.W., Hale J. A., (red.) Rethinking Technology: A Reader in Architectural Theory, 2006 Kieran, S., & Timberlake, J. (2004). Refabricating Architecture: How Manufacturing Methodologies Will Transform Building Construction. McGraw-Hill. Neville, A.M. (2011). Properties of Concrete (5th ed.). Pearson Education. Mehta, P.K., Monteiro, P.J.M. (2013): Concrete: Microstructure, Properties and Materials Zalba, B., Marín, J.M., Cabeza, L.F., & Mehling, H. (2003). "Review on Thermal Energy Storage with Phase Change: Materials and Applications." Applied Thermal Engineering, 23(3), 251283. König, H., & Cristofaro, M. (Eds.). (2017). Material Design: Informing Architecture by Materiality. Birkhäuser. Collepardi, M. (2003): Admixtures for Concrete		

	Supplementary literature	Kabrońska J., Szafrowski M.: Innowacyjne technologie w architekturze jako narzędzie polepszenia jakości energetycznej budynków [in:] Wybrane problemy przebudowy obiektów budowlanych, ed. Rafał Janowicz, Jarosław Przewłócki Gdańsk: Wydawnictwo Politechniki Gdańskiej, pp.99-108, 2016 Konarzewska B., Szafrowski M.: Environmentally friendly materials in architecture modern trends and development directions, 5th SGEM International Multidisciplinary Scientific Conferences on SOCIAL SCIENCES and ARTS; SGEM, Albena Bułgaria 2018 Wysocki M., Kabrońska J.: Nowe technologie w architekturze. Społeczna rola technologii [in:] Wybrane problemy przebudowy obiektów budowlanych, ed. Rafał Janowicz, Jarosław Przewłócki Gdańsk: Wydawnictwo Politechniki Gdańskiej, pp.127-136, 2016 Latour B., Yaneva A., Give Me a Gun and I Will Make All Buildings Move: An Ants View of Architecture, 2008 Loonen, R.C., Trčka, M., Cóstola, D., & Hensen, J.L. (2013). "Climate Adaptive Building Shells: State-of-the-Art and Future Challenges." Renewable and Sustainable Energy Reviews, 25, 483493. Van Tittelboom, K., & De Belie, N. (2013). "Self-Healing in Cementitious Materials Review." Materials Today, 16(5), 196202. Ngo, T.D., Kashani, A., Imbalzano, G., Nguyen, K.T., & Hui, D. (2018). "Additive Manufacturing (3D Printing): A Review of Materials, Methods, Applications and Challenges." Composite Part B: Engineering, 143, 172196.
	eResources addresses	
Example issues/ example questions/ tasks being completed	Multimedia presentation concerning the use of the innovative technologies in architectural design Analysis of the impact of the construction technology used on the building's architectural form. Group discussion on the appropriateness of using a specific material solution.	
Practical activities within the subject	Not applicable	

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