



## Subject card

Subject name and code	Modern Technologies and Materials - team project, PG_00053167						
Field of study	Chemistry in Construction Engineering						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024		
Education level	second-cycle studies		Subject group		Obligatory subject group in the field of study		
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	general academic profile		Assessment form		assessment		
Conducting unit	Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Anna Zielińska-Jurek				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	75.0	0.0	75
	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	75		15.0		60.0	150
Subject objectives	Knowledge in the field of modern technologies and materials used in construction. The ability to search for information both in world literature, as well as the database of patents, the ability to design new materials and processes						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K7_U05		The ability to search for information in world literature and patent databases, the use of methods and tools necessary to present a solution to a given technological issue		[SU5] Assessment of ability to present the results of task [SU1] Assessment of task fulfilment		
	K7_K02		Student is able to work in a group, solves problems together		[SK1] Assessment of group work skills		
	K7_K03		The student makes reflections on the ethical, scientific and social aspects related to the work performed		[SK4] Assessment of communication skills, including language correctness		
	K7_W04		Is able to perform advanced design solutions for devices and facilities, in particular devices, facilities, systems, processes, construction chemistry services		[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		
	K7_U14		Student has a detailed, ordered and theoretically founded knowledge in the field of materials, in particular classification and properties of ceramic, polymeric, metallic, composite and glassy materials for construction and installation applications, knows development trends in the field of new materials		[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment		

Subject contents	1. Energy-efficient construction 2. Solar energy in passive construction 3. Renewable energy sources in low-energy building 4. New technologies in thermal insulation of buildings 5. Modern technologies of cementing of exploratory and operational drilling wells 6. Composing and quality of cements and concretes 7. Modern construction technologies in the protection of building facades 8. Application of nanoparticles in construction 9. Innovative solutions and patented technologies in construction 10. Elements of design thinking and group work 11. Non-destructive test methods in material strength. Ultrasound defectoscopy - construction and operation of defectoscopes. Detection of material defects on the pattern. Impact of measurement parameters on the ability to detect defects. Specifying the thickness of samples. 12. Acoustic emission methods in materials diagnostics. Construction and operation of the measuring system. Diagnostics of microcracks and structural defects. 13. Computed tomography (CT) - construction and operation of the tomograph. Non-destructive testing. Mapping of material structures		
Prerequisites and co-requisites	Completed bechelor studies		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	project	60.0%	40.0%
	presentation	60.0%	60.0%
Recommended reading	Basic literature	M. Blicharski, Wstęp do inżynierii materiałowej, Wydawnictwa Naukowo- Techniczne, Wwa 2003  A. Oleś "Metody doświadczalne fizyki ciała stałego", WNT, Warszawa 1999  Kelsall R.W., Hamley I.W., Geoghegan M., Nanotechnologie, PWN Warszawa 2008  A. Nurek, J. Najbar, Fotochemia i spektroskopia optyczna, PWN 2009  A. Szummer, A. Ciszewski, T. Radomski; Badania własności i mikrostruktury materiałów Oficyna Wydawnicza PW, Warszawa 2000  Lewińska- Romicka A.: Badania nieniszczące. WNT Warszawa 2001.  Leszek Stoch, Przegląd metod analizy termicznej, II Szkoła Analizy Termicznej, Zakopane, 1998  Śliwiński A. „Ultradźwięki i ich zastosowania”; WNT, Warszawa 1993	
	Supplementary literature	Scientific articles from the Elsevier database and patent databases	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Patent search, patent purity, application preparation in Poland and in the world  Modern building materials, environmental, economic and technological aspects  Special-purpose materials, environmental, economic and technological aspects  Modern construction, environmental, economic and technological aspects  Alternative construction, environmental, economic and technological aspects		
Work placement	Not applicable		