GDAŃSK UNIVERSITY OF TECHNOLOGY

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