GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Engineering ceramics, PG_00061926		
Field of study	Materials Engineering, Materials Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	first-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	3	Language of instruction	Polish
Semester of study	6	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Ceramics -> Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Aleksandra Mielewczyk-Gryń	
	Teachers	dr hab. inż. Aleksandra Mielewczyk-Gryń	

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	15.0	0.0	30

E-learning hours included: 0.0

eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=4190

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	2.0	18.0	50

Subject objectives

The aim of the course is to introduce students to the fundamentals of engineering ceramics, including their properties, classification, and applications. The course covers types of ceramics (oxide, non-oxide, and composite), methods of their synthesis and processing, and the influence of technological processes on material properties. It also presents practical applications of ceramics in industry, including electronics, medicine, energy, and aerospace.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U07] Can obtain information from literature and other properly selected sources, also in English or other foreign language used for international communication in materials engineering.	The student acquires information on engineering ceramics from available sources, including English-language literature.	[SU2] Assessment of ability to analyse information [SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject
[K6_W03] Has knowledge of materials science and can relate the properties of materials with their structure and composition, knows the theoretical description of phenomena occurring in materials subjected to external factors.	The student is able to discuss the properties of engineering ceramics in a broad context, including their characteristics and applications.	[SW1] Assessment of factual knowledge [SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects

<table>
<tr><td>Subject contents</td><td>Course content – lecture
The course content covers the fundamental issues related to engineering ceramics, including their definition, classification, and physical and chemical properties. The main groups of ceramic materials are discussed, such as oxide, non-oxide, and composite ceramics, along with their characteristic features and areas of application.

The course also presents methods of synthesizing engineering ceramics, including sintering, pressing, casting, and selected chemical techniques, with particular emphasis on the influence of technological parameters on the structure and properties of materials. Issues related to ceramic processing are also addressed, including mechanical and thermal methods as well as modern shaping and surface finishing techniques.

Course content – project

The project involves preparing, based on current scientific literature, a detailed description of the production process of a selected engineering ceramic material and planning its characterization. This includes the selection of appropriate raw materials, synthesis methods (e.g., sintering, pressing, or chemical techniques), and determination of key technological parameters affecting the materials structure and properties.

Additionally, the project includes the selection of analytical methods to evaluate the physical, mechanical, and chemical properties of the produced material, as well as the analysis of results in the context of potential industrial applications.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>written test</td><td>50.0%</td><td>50.0%</td></tr>
<tr><td>presentation+report</td><td>50.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>Materials Science and Engineering AN INTRODUCTION WILLIAM D. CALLISTER, JR. DAVID G. RETHWISCH Wiley</td></tr>
<tr><td>Supplementary literature</td><td>2

Czasopismo
Journal of the American Ceramic Society.
American Ceramic Society,</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>• List examples of engineering ceramics along with their applications
• Discuss the sol-gel synthesis method
• Discuss methods of powder milling</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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