GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fundamentals of new material technologies, PG_00053712		
Field of study	Mechanical Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	3	Language of instruction	English
Semester of study	6	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Dionizy Czekaj	
	Teachers		

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

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	0.0	0.0	30

Subject objectives

To explain students some key issues in the field of Materials Science and Engineering

Learning outcomes

Course outcome	Subject outcome	Method of verification
K6_U10	The student is able to make a general selection of the material intended for use in the solution of a specific engineering project.	[SU2] Assessment of ability to analyse information
K6_U01	Student can find source information with the use of library catalogs - analog and digital. Student is able to critically analyze the usefulness of the obtained data for the implementation of a selected engineering problem.	[SU2] Assessment of ability to analyse information
K6_W03	The student has knowledge on structural materials as well as methods of investigation their properties	[SW1] Assessment of factual knowledge
[K6_W12] possesses basic knowledge necessary to understand the ex-technical conditions of engineering activity, possesses basic knowledge on management, including quality management and running commercial enterprise, within the range of protection of intellectual property and patent law; knows general principles of creating and developing forms of individual entrepreneurship and basic HSE rules applicable to machine industry	The student has general knowledge in the field of intellectual property protection.	[SW1] Assessment of factual knowledge

Subject contents

Course content – lecture
1. Ceramics and glass.
2. Modern (advanced) ceramic materials;
3. Refractory materials.
4. Ceramic abrasives;
5. Glass and glass-ceramics.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="2"></td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Project Report</td><td>100.0%</td><td>50.0%</td></tr>
<tr><td>Colloquium (written paper)</td><td>51.0%</td><td>50.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. W.D. Callister, Jr., Materials Science And Engineering, An Introduction, 7th ed., Wiley, 2007,
2. M.F. Ashby and D. R. H. Jones, Engineering Materials 1, 3rd ed., Elsevier Butterworth Heinemann, 2006,
3. M.F. Ashby, H.R. Shercliff, D. Cebon, Materials: Engineering, Science, Processing And Design, Butterworth Heinemann, 2007,
4. W. Bolton, Materials for Engineering, Routledge, Taylor & Francis Group, NY, 2011.
5. Michael F. Ashby, Paulo J. Ferreira and Daniel L. Schodek; Nanomaterials, Nanotechnologies and Design; Elsevier, 2009
6. Donglu Shi, Zizheng Guo and Nicholas Bedford; Nanomaterials and Devices; Elsevier, 2015
7. Bangwei Hang; Physical Fundamentals of Nanomaterials; Elsevier, 2018
8. Kelsall R.W., Haley J.W., Geghegan M (Eds.), Nanoscale Science and Technology, John Wiley & Sons Ltd
9. DeGarmos MATERIALS AND PROCESSES IN MANUFACTURING, J T. Black, Ronald A. Kohser, John Wiley
10. Mikell P. Groover, Fundamentals of Modern Manufacturing Materials, Processes, and Systems, Fifth Edition, John Wiley, 2013</td></tr>
<tr><td>Supplementary literature</td><td>1. A.J. Moulson, J.M. Herbert, Electroceramics, Materials Properties and Applications, Chapman and Hall, 1990
2. M. Blicharski., Wstęp do inżynierii materiałowej, Wydawnictwo Naukowo Techniczne, Warszawa 2001
3. M. Blicharski, Inżynieria materiałowa, Wydawnictwo Naukowo Techniczne, Warszawa 2014;
4. M. Blicharski, Inżynieria materiałowa. Stal, Wydawnictwo Naukowo Techniczne, Warszawa 2017;
5. M. Blicharski, Inżynieria powierzchni, Wydawnictwo Naukowo Techniczne, Warszawa 2019;
6. M. Kaczorowski, A. Krzyńska, Konstrukcyjne materiały metalowe, ceramiczne i kompozytowe, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2017
7. L.A. Dobrzański , Podstawy nauki o materiałach i metaloznawstwo. Materiały inżynierskie z podstawami projektowania materiałowego., WNT Warszawa, 2002
8. M. Ashby, H. Shercliff, D. Cebon, Inżynieria materiałowa, T1, T2, Wydawnictwo Galaktyka, Łódź, 2011
9. M. Głowacka, J. Łabanowski, Inżynieria powierzchni. Wybrane zagadnienia. Wydawnictwo PWSZ w Elblągu, Elbląg 2014
10. M. Głowacka, A. Zieliński, (Red.) Podstawy materiałoznawstwa, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2011 (skrypt).
11. M. Głowacka (Red), Metaloznawstwo, Wydawnictwo Politechniki Gdańskiej, Gdańsk 1996 (skrypt)
12. J. Hucińska (Red), Metaloznawstwo. Materiały do ćwiczeń laboratoryjnych, Wydawnictwo Politechniki Gdańskiej, Gdańsk 1995(skrypt).</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">1. Structure of advanced ceramic materials
2. Technology of advanced ceramics
3. Glass and glass-ceramics</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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