GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Advanced engineering materials, PG_00064822		
Field of study	Mechanical Engineering		
Date of commencement of studies	February 2027	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	at the university
Year of study	1	Language of instruction	English
Semester of study	1	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Division of Materials Science and Technology -> 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	dr inż. Krzysztof Krzysztofowicz	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	15.0	0.0	0.0	45

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	45	16.0	39.0	100

Subject objectives

Obtaining the basic knowledge on the advanced construction materials and its behavior in various enviroments

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U12] dvelops her/his own potential and independently plans own, lifelong learning, while also being able to guide others in this regard	student explains importance of continuous learning	[SU2] Assessment of ability to analyse information
[K7_W04] demonstrates knowledge covering selected topics of advanced specific knowledge, in particular methods, techniques, tools specific to Mechanics and Mechanical Engineering processes, systems and equipment	the student demonstrates knowledge of selected problems related to the use of materials	[SW3] Assessment of knowledge contained in written work and projects
[K7_U01] utilizes information obtained from the literature and other sources in the field of Mechanics and Mechanical Engineering and presents and analyses the results of solutions to technical problems in this field	the student demonstrates the ability to obtain and analyze information from various sources	[SU2] Assessment of ability to analyse information

<table>
<tr><td>Subject contents</td><td colspan="3">Course content – lecture

LECTUE: Rules and criteria for metallic materials selection. Weldable increased and high strength steels. Maraginig steels. Steels for automotive body sheets. Corrosion resistant and acid resistant steels: austenitic and duplex type ferritic-austenitic, corrosion resistant superalloys. Steels for elevated temperatures application.
Heat resistant and high-temperature creep resistant steels. High-temperature creep resistant iron, nickel and cobalt superalloys for power generation turbines, aviation turbines, petrochemical and chemical industry. Refractory
metals and alloys: molybdenum, niobium, rhenium, tantalum, zirconium and hafnium. Superplastic materials. MEMS and materials used in it. Materials for nuclear power generation. High entropy materials and alloys (HEM).
LABORATORY: Weldable increased and high strength steels. High alloying corrosion resistant steels. Materials for high temperature applications. Composites.</td></tr>
<tr><td>Prerequisites
and co-requisites</td><td colspan="3"></td></tr>
<tr><td>Assessment methods
and criteria</td><td colspan="3"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Laboratory</td><td>50.0%</td><td>35.0%</td></tr>
<tr><td>Preparation of essay</td><td>50.0%</td><td>35.0%</td></tr>
<tr><td>Egzamin</td><td>50.0%</td><td>30.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td>Basic literature</td><td colspan="2">1. Adamczyk J., Szkaradek K.: Materiały metalowe dla energetyki jądrowej. Wyd. Politechniki Śląskiej, Gliwice
1992.

2. Ashby M., Jones D.: Materiały inżynierskie. Tom I właściwości i zastosowanie. WNT, W-wa 1995.

3. Ashby M., Jones D.: Materiały inżynierskie. Tom II Kształtowanie struktury i właściwości, dobór materiałów.
WNT, W-wa 1996.

4. Baczkowska A. i in.: Kompozyty. Oficyna Wydawnicza Politechniki Warszawskiej, W-wa 2000.

5. Blicharski M.: Wstęp do inżynierii materiałowej. WNT, Warszawa 2003.

6. Blicharski M.: Inżynieria materiałowa. Stal. WNT, Warszawa 2017.

7. Chodorowski J., Ciszewski A., Radomski T.: Materiałoznawstwo lotnicze. Oficyna Wydawnicza Politechniki Warszawskiej, W-wa 1996.
8. Ciszewski B., Przetakiewicz W.: Nowoczesne materiały w technice. Wyd. Bellona, W-wa 1993.

9. Cantor B., Assender H., Grant P.: Aerospace Materials. IoP, Bristol and Philadelphia 2001</td></tr>
<tr><td></td><td>Supplementary literature</td><td colspan="2">1. Oczoś K.: Kształtowanie ceramicznych materiałów technicznych. Oficyna Wydawnicza Politechniki Rzeszowskiej,
Rzeszów 1995.

2.Pampuch R.: Siedem wykładów o ceramice. Wyd. Akademii Górniczo-Hutniczej, Kraków 2001.
3. Śledziona J.: Podstawy technologii kompozytów. Wyd. Politechniki Śląskiej, Gliwice 1998.</td></tr>
<tr><td></td><td>eResources addresses</td><td colspan="2"></td></tr>
<tr><td>Example issues/
example questions/
tasks being completed</td><td colspan="3">1. Aerospace materials
2. Materials for power generation
3. MEMS</td></tr>
<tr><td>Practical activites within
the subject</td><td colspan="3">Not applicable</td></tr>
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