



## Subject card

Subject name and code	Materials Selection and Sustainable Development, PG_00061837						
Field of study	Management and Production Engineering						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024		
Education level	second-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		English		
Semester of study	3		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Zakład Materiałoznawstwa I Technologii Materiałowych -> Institute of Manufacturing and Materials Technology -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Dionizy Czekaj				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	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 introduce students to the structure and framework for analyzing sustainability and the role of materials.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_U82] is able to proficiently obtain and process information related to field of study and academic environment in foreign language at B2+ level of the Common European Framework of Reference for Languages (CEFR)	The student has the ability to efficiently acquire and process information in English.	[SU2] Assessment of ability to analyse information
	[K7_K82] is equipped to participate actively in lectures, seminars and laboratory classes conducted in foreign language	Student has sufficient knowledge of the English language to participate in the classes.	[SK4] Assessment of communication skills, including language correctness
	[K7_W81] has knowledge of complex grammatical structures and diverse lexical resources needed to communicate in foreign language in terms of general and specialist language related to field of study	The student has a sufficient knowledge of the English language to communicate in the field of the specialist language.	[SW1] Assessment of factual knowledge
	[K7_W01] knows and understands to a greater extent selected issues in the field of management and quality sciences and mechanical engineering, their location in the field of social sciences and engineering and technical sciences, as well as relationships with related disciplines, and sees the possibility of applying the knowledge in practice.	The student knows and understands selected issues in the field of management and quality science as well as mechanical engineering.	[SW1] Assessment of factual knowledge
	[K7_W01] knows and understands to a greater extent selected issues in the field of management and quality sciences and mechanical engineering, their location in the field of social sciences and engineering and technical sciences, as well as relationships with related disciplines, and sees the possibility of applying the knowledge in practice.	The student sees the possibility of practical application of his knowledge.	[SW1] Assessment of factual knowledge
Subject contents	[K7_K81] is able to cooperate in international team at her/his own university, during work placement and during study abroad	The student is able to cooperate in an international team.	[SK1] Assessment of group work skills
	Background: Materials, Energy and Sustainability; What is a Sustainable Development?; Assessing Sustainable Developments; Engineering Materials and Their Properties; Material Property Charts; Materials SelectionThe Basics; Case Studies: Materials Selection (e.g. Materials for Oars, Mirrors for Large Telescopes); Materials Supply-Chain Risk; Case Studies: sustainable development (e.g. Wind Farms, Electric Cars); A Circular Materials Economy		
	Prerequisites and co-requisites		
	Assessment methods and criteria		
	Subject passing criteria	Passing threshold	Percentage of the final grade
	Final test	51.0%	100.0%
Recommended reading	Basic literature	M.F. Ashby, Materials Selection in Mechanical Design, Butterworth-Heinemann (Elsevier), 2011 M.F. Ashby, Materials and Sustainable Development, Butterworth-Heinemann (Elsevier), 2016 M. F. Ashby, P.J. Ferreira, D. L. Schodek; Nanomaterials, Nanotechnologies and Design; Elsevier, 2009 DeGarmos Materials and Processes in Manufacturing by J. T. Black, R. A. Kohser, Wiley, Fundamentals of Modern Manufacturing Materials, Processes, and Systems by M. P. Groover, Wiley, 2013 W.D. Callister, Jr., Materials Science And Engineering, An Introduction, 7th ed., Wiley, 2007, ISBN 0-471-73696-1. M.F. Ashby, H.R. Shercliff, D. Cebon, Materials: Engineering, Science, Processing And Design, Butterworth Heinemann, 2007 W. Bolton, Materials for Engineering, Routledge, Taylor & Francis Group, NY, 2011.	
	Supplementary literature	M.F. Ashby and D. R. H. Jones, Engineering Materials 1, 3rd ed., Elsevier Butterworth Heinemann, 2006 A.J. Moulson, J.M. Herbert, Electroceramics, Materials Properties and Applications, Chapman and Hall, 1990 Aloke Paul, Tomi Laurila, Vesa Vuorinen, Sergiy V. Divinski, Thermodynamics, Diffusion and the Kirkendall Effect in Solids Springer, Switzerland, 2014	
	eResources addresses	Adresy na platformie eNauzanie:	

Example issues/ example questions/ tasks being completed	Sustainable development - a brief history What does "sustainability" mean? Materials - a brief history The selection strategy Computer -aided selection The structural Index "Critical" material
Work placement	Not applicable