



## Subject card

Subject name and code	Contemporary Construction Materials, E:41048W0						
Field of study	Space and Satellite Technologies						
Date of commencement of studies	February 2024	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	1	Language of instruction			English		
Semester of study	1	ECTS credits			3.0		
Learning 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		dr inż. Krzysztof Krzysztofowicz				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	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		0.0		0.0	45
Subject objectives	Obtain basic knowledge about modern materials and its response to environment						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_U08	Student is able to design a device compliant with the specifications using a design aid system, selecting the appropriate model, performing critical analysis with the proper selection of tools and technologies.			[SU1] Assessment of task fulfilment		
	K7_W06	Student has the knowledge about design, structure, properties and testing of structural materials used in space industry.			[SW1] Assessment of factual knowledge		
	[K7_K01] is aware of the constant necessity of improving and broadening their knowledge; can inspire and organise the teaching and learning process.	Student is aware of the need to supplement and expand the knowledge on contemporary construction materials used in space industry.			[SK2] Assessment of progress of work		
Subject contents	LECTURE: Rules and criteria for metallic materials selection. Weldable increased and high strength steels. Maraging 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. Materials with intermetallic phases. LABORATORY: Weldable increased and high strength steels. High alloying corrosion resistant steels. Materials for high temperature applications. Metallic materials for power generation.						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	exam	50.0%			25.0%		
	laboratory	50.0%			50.0%		
	essay	50.0%			25.0%		

Recommended reading	Basic literature	<p>1. Adamczyk J., Szkaradek K.: Materiały metalowe dla energetyki jądrowej. Wyd. Politechniki Śląskiej, Gliwice 1992.</p> <p>2. Ashby M., Jones D.: Materiały inżynierskie. Tom I właściwości i zastosowanie. WNT, W-wa 1995.</p> <p>3. Ashby M., Jones D.: Materiały inżynierskie. Tom II Kształtowanie struktury i właściwości, dobór materiałów. WNT, W-wa 1996.</p> <p>4. Baczkowska A. i in.: Kompozyty. Oficyna Wydawnicza Politechniki Warszawskiej, W-wa 2000.</p> <p>5. Blicharski M.: Wstęp do inżynierii materiałowej. WNT, Warszawa 2003.</p> <p>6. Blicharski M.: Inżynieria materiałowa. Stal. WNT, Warszawa 2004.</p> <p>7. Chodorowski J., Ciszewski A., Radomski T.: Materiałoznawstwo lotnicze. Oficyna Wydawnicza Politechniki Warszawskiej, W-wa 1996.</p> <p>8. Ciszewski B., Przetakiewicz W.: Nowoczesne materiały w technice. Wyd. Bellona, W-wa 1993.</p> <p>9. Cantor B., Assender H., Grant P.: Aerospace Materials. IoP, Bristol and Philadelphia 2001</p>
	Supplementary literature	<p>1. Mikułowski B.: Stopy żaroodporne i żarowytrzymałe. Wyd. Akademii Górniczo-Hutniczej, Kraków 1997.</p> <p>2. Oczko K.: Kształtowanie ceramicznych materiałów technicznych. Oficyna Wydawnicza Politechniki Rzeszowskiej, Rzeszów 1995.</p> <p>3. Pampuch R.: Siedem wykładów o ceramice. Wyd. Akademii Górniczo-Hutniczej, Kraków 2001.</p> <p>4. Śledziona J.: Podstawy technologii kompozytów. Wyd. Politechniki Śląskiej, Gliwice 1998.</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>1. Materials for Aerospace</p> <p>2. Materials for Power generation</p> <p>3. MEMS</p> <p>4. High Strength Weldable steels</p>	
Work placement	Not applicable	