GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	MATERIAL AND ENERGY RECYCLING, PG_00064338		
Field of study	Chemical Technology		
Date of commencement of studies	February 2025	Academic year of realisation of subject	2025/2026
Education level	second-cycle studies	Subject group	Optional subject group Specialty subject group 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	Polish
Semester of study	2	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Energy Conversion and Storage -> Faculty of Chemistry		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Ewa Klugmann-Radziemska	
	Teachers		

Lesson types and methods of instruction

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	3.0	17.0	50

Subject objectives

The aim of the course is to familiarize students with issues related to waste management: principles of waste classification, segregation and management, basics of recycling technology for individual waste groups, environmental and economic aspects.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K7_U09] prepares documentation of experiments and technological processes using professional terminology	The student prepares documentation of technological processes using professional terminology.	[SU4] Assessment of ability to use methods and tools
[K7_W02] selects appropriate apparatus and materials for the manufacture and processing of consumer goods	The student selects appropriate equipment for waste processing.	[SW1] Assessment of factual knowledge
[K7_K01] critically evaluates the content of cognitive and practical problems	The student critically evaluates content relating to practical problems.	[SK5] Assessment of ability to solve problems that arise in practice

Subject contents	LECTURE: 1. Waste. Waste management 2. EU directives and national regulations on waste management 3. Basics of proper functioning of the recycling system. 4. Material, raw material and energy recycling 5. Life cycle analysis of products (LCA) 6. 3/4R principle 7. Sustainable development principle 8. Practical aspects of waste management 9. Selective waste collection and its efficiency 10. Recycling and environmental protection 11. Selected recycling technologies: glass, vehicles, car tires, electronic equipment and photovoltaic modules 12. Product fee for packaging INDIVIDUAL PROJECT: Students work on topics (to choose from) carried out in teams of 2 persons: 1. Paper recycling 2. Plastic recycling 3. Metal recycling 4. Hazardous waste recycling 5. Battery recycling 6. Glass recycling 7. Aluminum recycling.
Prerequisites and co-requisites	NA
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Written test	60.0%	100.0%

Recommended reading	Basic literature	1. Ustawa o odpadach z dnia 14 grudnia 2012 (Dz.U.2022.699) https://sip.lex.pl/akty-prawne/dzu-dziennik-ustaw/odpady-17940659 2. DYREKTYWA RADY 1999/31/WE z dnia 26 kwietnia 1999 r. w sprawie składowania odpadów https://sip.lex.pl/akty-prawne/dzienniki-UE/dyrektywa-1999-31-we-w-sprawie-skladowania-odpadow-67427597 3. Dyrektywa 2000/53/WE Parlamentu Europejskiego i Rady z dnia 18 września 2000 r. w sprawie pojazdów wycofanych z eksploatacji https://sip.lex.pl/akty-prawne/dzienniki-UE/dyrektywa-2000-53-we-w-sprawie-pojazdow-wycofanych-z-eksploatacji-67427581 4. Ustawa o recyklingu pojazdów wycofanych z eksploatacji (Dz.U. 2020 poz. 2056) https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20200002056 5. KOMUNIKAT KOMISJI Europejski Zielony Ład https://eur-lex.europa.eu/legal-content/PL/TXT/HTML/?uri=CELEX:52019DC0640&from=EN 6. Ustawa z dnia 13 czerwca 2013 r. o gospodarce opakowaniami i odpadami opakowaniowym https://sip.lex.pl/akty-prawne/dzu-dziennik-ustaw/gospodarka-opakowaniami-i-odpadami-opakowaniowymi-18015362
	Supplementary literature	1. Błędzki A.K., Recykling materiałów polimerowych, Wyd. Naukowo-Techniczne, Warszawa 1997 2. Wilczyński K. Reologia w przetwórstwie tworzyw sztucznych, Wyd. Naukowo-Techniczne, Warszawa 2001 3. Oprzędkiewicz J., Technologie i systemy recyklingu samochodów, WNT Warszawa 2003 4. Czerwinski A., Akumulatory, baterie, ogniwa, Wydawnictwa Komunikacji i Łączności, Warszawa, 2005
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	• Discuss the 3R and 4R principles. • What are some ways you can manage paper? • Principles for calculating the product fee. • Recycling glass packaging.	
Work placement	Not applicable	

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