

Cracow University of Technology

Course syllabus

binding for the doctoral students of the CUT Doctoral School commencing their studies
in the academic year 2022/2023

Information on the course

Name of the course in Polish	Zagospodarowanie odpadów z tworzyw
Name of the course in English	Plastic waste management
Number of the ECTS points	1
Language of instruction	Polish
Category of the course	Mandatory / Choosable
Field of education	Engineering and technology
Discipline of education	Materials engineering
Person responsible for the course Contact	Prof. Agnieszka Sobczak-Kupiec, <i>doctor habilitatus</i> agnieszka.sobczak-kupiec@pk.edu.pl

Type of course, number of hours in the study programme curriculum

Semester	Credit type (G / NG)*	Lecture	Practical classes	Laboratory	Computer Lab	Project Class	Seminar
2, 3, 4, 5	G	15	0	0	0	0	0

*G – graded credit, NG – non-graded credit

Course objectives

Code	Objective description
Objective 1	Introduction to plastic waste management and basic recycling methods.
Objective 2	Expanding knowledge in the field of testing methods for materials containing recycle.
Objective 3	Acquiring the ability to select the appropriate recycling methods

Learning outcomes

Code	Description of the learning outcome adjusted to the specific characteristics of the discipline	Learning outcome symbol in the CUD DS	Methods of verification
OUTCOMES RELATED TO KNOWLEDGE			
EUW1	The doctoral student has structured, theoretically founded knowledge covering key issues in the field of plastics recycling;	E_W01, E_W02	Involvement in class activities, a paper

EUW2	The doctoral student has detailed knowledge related to material and raw material recycling of plastics; knows the basic methods, techniques, tools and materials used to solve simple engineering tasks related to the recycling of plastics;	E_W01, E_W02	Involvement in class activities, a paper
OUTCOMES RELATED TO SKILLS			
EUU1	The doctoral student is able to obtain information from literature, databases and other properly selected sources on the recycling of plastics; is able to integrate the obtained information, interpret it, as well as draw conclusions and formulate and justify opinions;	E_U01	A paper, a presentation
EUU2	The doctoral student is able to prepare a well-documented study of problems in the field of plastics recycling	E_U01	A paper, a presentation
OUTCOMES RELATED TO SOCIAL COMPETENCES			
EUK1	The doctoral student understands the need to formulate and provide the society with information and opinions on technological achievements and other aspects of engineering activities, that is environmental education at various levels of education; makes efforts to provide such information and opinions in a commonly understandable way.	E_K01, E_K03	Discussion

Course outline

No.	Contents	Learning outcomes for the course	No. of hours
LECTURE			
W1	Review of plastics recycling technologies used in Poland and in other European Union countries. Production, application and consumption of plastics. The problem of plastic waste, its origin and size.	EUW1, EUW2, EUU1	5
W2	Identification and marking of polymers. Segregation and treatment of polymer waste. Methods of utilization of plastics, classification and general characteristics. Materials recycling Energy recycling - advantages and disadvantages. Chemical recycling. Degradation of plastics - thermodegradation, chemodegradation, photodegradation and biodegradation. Resistance of polymers to environmental conditions - atmospheric ageing of polymers, test methods.	EUW1, EUW2, EUU1	5
W3	Methods of utilization of selected materials of general use. Ways of managing the main groups of plastics, recycling multilayer films, and packaging. Changes in the functional properties of materials after recycling. Plastics waste processing. Non-standard recycling technologies	EUW2, EUU2, EUK1	5

The ECTS points statement

WORKING HOURS SETTLEMENT	
Type of activity	Average number of hours (45 min.) dedicated to the completion of an activity type
SCHEDULED CONTACT HOURS WITH AN ACADEMIC TEACHER	
Hours allotted in the syllabus	15
Consultations	1
Examination / course credit assignment	2
HOURS WITHOUT THE PARTICIPATION OF AN ACADEMIC TEACHER	
Independent study of the course contents	8
Preparation of a paper, a report, a project, a presentation, a discussion	4
ECTS POINTS STATEMENT	
Total number of hours	30
The ECTS points number	1

Preliminary requirements

No.	Requirements
1	Not specified

Course credit assignment conditions / method of the final grade calculation

No.	Description
COURSE CREDIT ASSIGNMENT CONDITIONS	
1	80% attendance in class. Presentation of a paper.
METHOD OF THE FINAL GRADE CALCULATION	
Weighted average grade for the presentation.	

Additional information

Not specified

The course reading list

1	Jacek Kijenski, Andrzej K. Bledzki, Regina Jeziorska — Odzysk i recykling materiałów polimerowych Warszawa, 2011, Wydawnictwo Naukowe PWN
2	Saechtling H. — Tworzywa sztuczne. Poradnik, Warszawa, 2007, Wydawnictwa Naukowo-Techniczne WNT