

Polish course name	MATERIAŁY POLIMEROWE
English course name	POLYMER MATERIALS
Course code	WIP-MDL-D1-PM-04
Field of study	Materials design and logistics
Level of qualification	First degree
Form of study	Full-time
Semester	4
Number of ECTS points	3
Ways of assessment	Test

Number of hours per semester

Lecture	Seminar	Classes	Laboratory	Project
30			15	

TEACHERS:

Dr inż. Renata Caban.

COURSE OBJECTIVES:

- › **C1** To provide students with a basic knowledge of polymeric materials, their nomenclature and properties.
- › **C2** To familiarise students with the methods and techniques of manufacturing polymeric materials.
- › **C3** To familiarise students with polymer materials testing methods and the fundamentals of polymer materials processing and recycling.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES:

The student is familiar with the basics in physics, mathematics and general chemistry, is able to use mathematical operations to solve given tasks, is able to use various sources of information including instructions and technical documentation, is able to work independently and in a group, is able to interpret and present the results of own actions correctly.

COURSE CONTENT

LECTURE

- › **L1** Outline of the development of polymeric materials and basic concepts: molecular weight and degree of polymerisation.
- › **L2, 3** Polymer production, raw materials, types of polymerisation and modification, technical polymerisation methods.
- › **L4, 5** Basics of polymer classification and nomenclature.
- › **L6** Additional components of polymeric materials and their characterisation.
- › **L7** Polymer physicochemistry and crystallisation.
- › **L 8, 9, 10** Characteristics of the more important polymers.
- › **L11** Properties of polymeric materials.
- › **L12, L13** Polymer composites.
- › **L14, 15** Fundamentals of polymer materials processing and recycling.

LABORATORY

- › **Lab1, 2** Identification of polymeric materials.
- › **Lab3, 4** Determination of the degree of polymerisation - analytical tasks.
- › **Lab5, 6** Investigations of basic physical properties.
- › **Lab7, 8** Using CES software to find information on different polymers and their processing.
- › **Lab9, 10** Resins. Manufacture of a polymer matrix composite.
- › **Lab11, 12** Investigations into the mechanical properties and structure of polymeric materials.
- › **Lab13** Depolymerisation of methyl methacrylate.
- › **Lab14,15** Printing of polymer products.

BASIC REFERENCES

1. J. Koszkuł: Materiały polimerowe. Politechnika Częstochowska, 1999 r.
2. M. Ashby, H. Shercliff, D.Cebon: Inżynieria materiałowa, tom 1, 2.Wydawnictwo Galaktyka, Łódź 2011 r.
3. J. Koszkuł, R. Caban, J. Nabiałek: Narzędzia do przetwórstwa polimerów. Politechnika Częstochowska 2010 r.

4. J. F. Rabek: Współczesna wiedza o polimerach. Budowa strukturalna polimerów i metody badawcze. Tom 1, Wydawnictwo Naukowe PWN, 2019 r.

LEARNING OUTCOMES

- › **EU1** has theoretical knowledge of polymer production methods and techniques, and is familiar with polymer testing methods and processing techniques.
- › **EU2** is able to prepare a report on the implementation of the exercise.

TEACHING TOOLS

- › Multimedia presentations.
- › Laboratory equipment and guides.
- › CUT e-learning platform (possible use).
- › Computer stations with software.

WAYS OF ASSESSMENT (F – FORMATIVE, P – SUMMATIVE)

- › **F1.** Assessment of curriculum tasks.
- › **F2.** Assessment of the mastery of the learning material subject to laboratory tasks - pass/fail colloquium.
- P1.** Assessment of mastery of the lecture material - pass/fail colloquium.

STUDENT WORKLOAD

Form of activity	Number of hours	ECTS
Contact hours with the teacher		
Lectures	30	1,2
Seminar		
Classes		
Laboratory	15	0,6
Project		
Test		
Exam		
Total contact hours	45	1,8
Student's own work		
Getting acquainted with the indicated literature	12	0,48
Preparation for seminar		

Preparation for classes		
Preparation for lab	10	0,4
Project preparation		
Consultation	2	0,08
Preparation for the test	6	0,24
Total student's own work	30	1,2
Total number of hours/ ECTS points for the course	75	3,0

ADDITIONAL INFORMATION

Information about the consultation (time + place)	https://wip.pcz.pl/dla-studentow/konsultacje-dla-studentow
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MATRIX OF LEARNING OUTCOMES REALISATION

Learning outcome	Reference of given outcome to outcomes defined for whole program	Course objectives	Course content	Ways of assessment
EU 1	K_W03, K_W04, K_U03, K_U08, K_U09, K_K02,	C1 - C3	L1 - L15	P1
EU 2	K_W03, K_W05, K_U03, K_U09, K_K03,	C1 - C3	Lab1 - Lab15	F1, F2

FORM OF ASSESSMENT - DETAILS

EU1 has theoretical knowledge of polymer production methods and techniques, and is familiar with polymer testing methods and processing techniques.

- › 2,0 The student does not have basic theoretical knowledge of polymer production methods and techniques, does not know polymer testing methods and polymer processing techniques.

- › 3,0 The student is partially familiar with basic methods and techniques of polymer production and polymer testing methods as well as polymer processing techniques.
- › 3,5 The student is almost familiar with the basic methods and techniques of polymer production and polymer testing methods as well as polymer processing techniques.
- › 4,0 The student is well acquainted with the basic methods and techniques of polymer production and polymer testing methods as well as polymer processing techniques.
- › 4,5 The student has a very good understanding of the basic methods and techniques of polymer production and polymer testing methods as well as polymer processing techniques.
- › 5,0 The student is very well acquainted with basic methods and techniques of polymer production and polymer testing methods as well as polymer processing techniques.

EU2 is able to prepare a report on the implementation of the laboratory activities.

- › 2,0 Student is not able to prepare a report on the implementation of the laboratory activities.
- › 3,0 Students are partially able to prepare a report on the implementation of the laboratory activities.
- › 3,5 Students are almost able to prepare a report on the implementation of the laboratory activities.
- › 4,0 Student is well able to prepare a report on the implementation of the laboratory activities.
- › 4,5 The student is almost able to prepare a report from the realization of the laboratory activities.
- › 5,0 The student is very good at preparing a report on the implementation of the laboratory activities.