

**Subject card**

<b>Subject name and code</b>	Polymer materials and composites – production technologies and application, PG_00080801						
<b>Field of study</b>	Chemical Business						
<b>Date of commencement of studies</b>	October 2023	<b>Academic year of realisation of subject</b>				2026/2027	
<b>Education level</b>	Bachelor's studies	<b>Subject group</b>				Optional subject group	
<b>Mode of study</b>	full-time studies	<b>Mode of delivery</b>				at the university	
<b>Year of study</b>	4	<b>Language of instruction</b>				Polish	
<b>Semester of study</b>	7	<b>ECTS credits</b>				1.0	
<b>Learning profile</b>	academic	<b>Assessment form</b>				credit	
<b>Conducting unit</b>	Laboratory of Advanced Oxidation Processes -> Department of General and Inorganic Chemistry -> Faculty of Chemistry -> Rector						
<b>Name and surname of lecturer (lecturers)</b>	<b>Subject supervisor</b>		prof. dr hab. Ewa Siedlecka				
	<b>Teachers</b>						
<b>Lesson types</b>	<b>Lesson type</b>	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	<b>Number of study hours</b>	0.0	15.0	0.0	0.0	0.0	15
	E-learning hours included: 0.0						
<b>Learning activity and number of study hours</b>	<b>Learning activity</b>	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	<b>Number of study hours</b>	15		2.0		8.0	25
<b>Subject objectives</b>	Familiarization with the division of polymer materials and nanocomposites Familiarization with the properties of polymer materials and nanocomposites Familiarization with the reactions and methods of producing polymer materials and their composites Familiarization with the use of polymer materials and their composites in various industries						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[BCHINŻ_W05] Describes the life cycle of devices, facilities and technical systems as well as modern environment-friendly technical solutions.	Discusses selected applications of polymers (in medicine, pharmacy, packaging, construction, automotive, etc.) Lists and characterizes the most important polymers and composites Defines concepts related to the types and synthesis of polymers and composites	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
	[BCHINŻ_W07] Describes the construction and operating principles of basic scientific, technological and control-measuring apparatus.	recognizes laboratory equipment and uses it to conduct chemical experiments, plans and conducts easy and medium-difficult chemical and technological experiments,	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
	[BCHINŻ_K02] Works individually demonstrating initiative and independence in actions, and effectively cooperates in a team, performing various roles in it.	predicts, verifies and criticizes the results of conducted experiments, independently searches for information in the literature	[SK8] observation of student's independent or team work
	[BCHINŻ_W06] Enumerates basic unit processes and describes issues in the field of technology and chemical engineering.	Lists polymerization reactions Characterizes selected polymer and composite production technologies	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
	[BCHINŻ_U05] Evaluates the usefulness and functioning of existing engineering and technical solutions as well as research and measurement methods in the chemical industry.	Discusses the advantages and disadvantages of individual polymer materials and composites	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report
	[BCHINŻ_W01] Describes the relationship between the economy and the functioning of the chemical industry.	discusses the problem of microplastics	[SW1] oral statement/ conversation/discussion [SW2] presentation/project/paper/ report
	[BCHINŻ_K03] Independently sets or implements a set action plan specifying priorities for its implementation; critically assesses its progress.	recognizes laboratory equipment and uses it to conduct chemical experiments	[SK8] observation of student's independent or team work
	[BCHINŻ_U08] Uses the chemical nomenclature and engineering terminology properly.	presents correct chemical and technological reasoning understandably, both orally and in writing	[SU1] oral statement/conversation/ discussion [SU2] presentation/project/paper/ report
[BCHINŻ_K04] Demonstrates responsibility for the safety of her/his own and others' work.	follows established research procedures	[SK1] oral statement/conversation/ discussion [SK8] observation of student's independent or team work	
Subject contents	Polymerization reactions and methods, "living" polymerization, polymer properties, thermoplastic polymers (PE, PP, PVC, polyamides, polycarbonates, polyurethanes), thermosetting resins (chemically and thermosetting resins), elastomers, foamed polymers, natural polymers (cellulose and its derivatives, rubber, starch, and others), Self-healing polymer materials, application of nanomaterials in polymer composites, polymer composites - laminates, bulletproof composites, carbon nanotubes and fibres; special purpose polymers - graphene, Kevlar, intelligent polymers, polymer nanomaterials, dental materials, materials used in medicine and cosmetics, artificial skin, hydrogels, conducting polymers, dendrimers. Laboratory: Exercises on the synthesis and testing of properties of polymer materials and nanocomposites discussed during exercises		
Prerequisites and co-requisites	non		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	activity during classes	51.0%	30.0%
	performing assigned tasks	51.0%	70.0%
Recommended reading	Basic literature	literature provided by the teacher during classes	
	Supplementary literature	independently searched by the student	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		