University of Gdańsk

Subject card

Subject name and code	Polymer materials and composites – production technologies and application, PG_00080802						
Field of study	Chemical Business						
Date of commencement of studies	October 2023		Academic year of realisation of subject	2026/2027			
Education level	Bachelor's studies		Subject group	Optional subject group			
Mode of study	full-time studies		Mode of delivery	at the university			
Year of study	4		Language of instruction	Polish			
Semester of study	7		ECTS credits	1.0			
Learning profile	academic		Assessment form	credit			
Conducting unit	Laboratory of Advanced Oxidation Processes -> Department of General and Inorganic Chemistry -> Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Ewa Siedlecka					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	15.0	0.0	0.0	15
	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	15		2.0	8.0	25	
Subject objectives	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_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_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_W06] Enumerates basic unit processes and describes issues in the field of technology and chemical engineering.	Lists polymerization reactions. Characterizes selected technologies for the production of polymers and composites.	[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_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_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
[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_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_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

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
assessment of task completion, tests and reports	51.0%	80.0%
activity during classes	51.0%	20.0%

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