GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Introduction to modern polymer technologies, PG_00060885		
Field of study	Chemical Technology		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	Optional 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	3	Language of instruction	Polish
Semester of study	5	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Polymer Technology -> Faculty of Chemistry -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Justyna Kucińska-Lipka	
	Teachers	dr hab. inż. Justyna Kucińska-Lipka dr inż. Paulina Parcheta-Szwindowska dr inż. Maciej Sienkiewicz mgr inż. Przemysław Gnatowski dr hab. inż. Łukasz Piszczyk dr inż. Ewa Głowińska prof. dr hab. inż. Janusz Datta dr inż. Krzysztof Formela dr hab. inż. Michał Strankowski	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	0.0	0.0	30

E-learning hours included: 0.0

eNauczanie source addresses:
Moodle ID: 1568 2025/2026 - Wstęp do nowoczesnych technologii polimerów - WYKŁAD / LABORATORIUM
https://enauczanie.pg.edu.pl/2025/course/view.php?id=1568

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	5.0	40.0	75

Subject objectives

The course aims to familiarize students with modern polymer technologies. The course will cover the basic groups of polymers, including their properties, processing technologies, and applications. In addition to conventional processing technologies such as injection molding and extrusion, significant emphasis will be placed on technologies such as 3D printing.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U02] is able to operate typical laboratory apparatus and conduct analyses related to materials testing	The student knows the principles of using laboratory and industrial apparatus, devices and machines used in chemistry and polymer technology.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
[K6_W09] has knowledge of the technological and functional properties of polymers, the physical basis and processing methods of polymers and rubber	The student has knowledge of the technological and functional properties of polymers and methods of processing polymers and rubber.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_W05] has knowledge of chemical technology based on mineral or energy resources and modern energy sources, understands the concept of sustainable development, knows the principles of green chemistry and environmentally friendly process engineering, has knowledge of occupational safety in the chemical industry	The student has knowledge of the raw materials used in the plastics industry and is able to indicate the use of the concept of sustainable development and the principles of green chemistry and technology in the plastics industry.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents

LECTURE:

- Introduction to Polymer Technology
- Polymers and Plastics.
- Technological and Functional Properties of Polymers
- Overview of General Purpose Polymers
- Special Purpose Engineering Polymers
- Thermoplastic Processing Technologies: Injection Molding
- Thermoplastic Processing Technologies: Extrusion
- Thermoplastic Processing Technologies: 3D Printing
- Biobased and Biodegradable Polymer Technologies
- Thermoset Technologies: Polyester, Epoxy, Phenolic, and Urea Resins
- Rubber Processing Technologies
- Rubber Recycling Technologies
- Plastic Recycling Technologies

LABORATORY:

- Polymer and plastic identification methods: flame testing, calcination, instrumental techniques
- Thermoplastic melt flow index and 3D printing
- Thermoplastic processing technologies: injection molding and extrusion
- Cast and foamed polyurethane technologies

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
lecture: written test	60.0%	60.0%
laboratory: attendance and work during classes, reports	100.0%	40.0%

Recommended reading

Basic literature	• K. Wilczyński: *Przetwórstwo tworzyw sztucznych*, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2020 • M. Strankowski, J. Gołąbek J., J. Datta, K. Formela: *Podstawy technologii przetwórstwa materiałów polimerowych*, Wydawnictwo Politechniki Gdańskiej, Gdańsk 2024
Supplementary literature	• M. Chanda: *Plastics Technology Handbook*, CRC Press, 2019 • E. Baur, T.A. Osswald, N. Rudolph: *Plastics Handbook. The Resource for Plastics Engineers*, Hanser Publications, 2019
eResources addresses	

Example issues/ example questions/ tasks being completed

- Explain the difference between polymers and plastics.
- Describe and provide examples of thermoplastics, elastomers, and thermosets.
- List and describe thermoplastic processing technologies.
- Discuss plastics recycling technologies.

Work placement

Not applicable