



Lodz University
of Technology

Study programme

Faculty:	Faculty of Chemistry
Major:	Chemical Product Manager
Level of study:	first-cycle programme (inżynier)
Form of study:	full-time studies
Academic year:	2026/27

Table of contents

Basic information	3
Learning outcomes (in relation to the PQF)	4
Matrix of course modules in relation to learning outcomes and curriculum content	6
ECTS - subjects	14
ECTS indicators	18
Methods of verifying and assessing learning outcomes	19
Professional internships	20
Characteristics of the course	21
Education program	24

Basic information

Name of the field of study:	Chemical Product Manager
Level of study:	first-cycle programme (inżynier)
Study profile:	general academic
Form of studies:	full-time studies
Duration of studies (number of semesters):	7
The number of ECTS points required to complete studies:	210
Total number of hours of classes:	2725
The number of ECTS points a student obtains as part of classes conducted with the direct participation of academic teachers or other persons conducting classes:	109
Professional title awarded to graduates:	inżynier
ISCED code:	0531
Language of study:	polish

Assigning the course to the disciplines to which the learning outcomes relate

Discipline	Percentage share
Chemical science	67%
Management science and quality	33%

Learning outcomes (in relation to the PQF)

No.	Learning outcome code	Learning Outcome Content	Reference to the universal characteristics of the first level of PRK	Reference to the second-level characteristics of the PRK, taking into account the second-level characteristics enabling the acquisition of engineering competences
1	1MPC1	Knows and understands to an advanced degree the interrelationship between the structure and properties of materials and their influence on the technological process and the design of finished chemical industry products, guided by the principles of environmental protection and sustainable development.	P6U_W	P6S_WG, P6S_WG_inż
2	1MPC2	Knows and understands to an advanced degree the methods of analysis of raw materials and chemical products, their quality control, attestation and certification, and is able to apply them taking into account the specific nature of the industry and the needs of customers, using knowledge from the basic disciplines: mathematics, physics, chemistry and computer science.	P6U_W	P6S_WG, P6S_WK
3	1MPC3	Has advanced knowledge in the field of raw materials, underpinned by detailed topics in the areas of chemistry, technology and materials engineering, combined with the exploitation and area of application of chemical products.	P6U_W	P6S_WG
4	1MPC4	Knows and understands to an advanced degree selected management concepts, methods and techniques and is able to apply them taking into account the specificity of chemical products, the needs of individual and business customers as well as ethical standards and principles of corporate social responsibility.	P6U_W	P6S_WG, P6S_WK, P6S_WK_inż
5	1MPC5	Will be able to implement and supervise processes for the processing and modification of materials, both engineering and functional, produced by the wider chemical industry including technologies for the production and recycling of finished products.	P6U_U	P6S_UW, P6S_UW_inż
6	1MPC6	Will be able to carry out physico-chemical analyses, synthesise raw materials and chemical products, interpreting the results in the context of assessing their quality, suitability and safety of transport, storage and use, taking into account the environmental load.	P6U_U	P6S_UW, P6S_UW_inż
7	1MPC7	Is able to analyse the needs of individual and business customers and advise on the development, sale and supply of chemical products, taking into account technological innovations, marketing trends, logistical considerations in the supply chain, quality requirements, safety and legal regulations.	P6U_U	P6S_UW, P6S_UW_inż
8	1MPC8	Will be able to work individually and in interdisciplinary teams, make presentations and conduct negotiations in Polish and foreign languages at B2 level using specialist terminology and ICT.	P6U_U	P6S_UK, P6S_UO, P6S_UU
9	1MPC9	Is prepared to make decisions in the development and marketing of chemical products in accordance with the principles of responsible business, including environmental protection, protection of intellectual property and consumer rights.	P6U_K	P6S_KO, P6S_KR

No.	Learning outcome code	Learning Outcome Content	Reference to the universal characteristics of the first level of PRK	Reference to the second-level characteristics of the PRK, taking into account the second-level characteristics enabling the acquisition of engineering competences
10	1MPC10	Are prepared to consciously manage their career path by continuously improving their engineering and managerial competences in response to the changing needs of the labour market.	P6U_K	P6S_KK, P6S_KO, P6S_KR

Matrix of course modules in relation to learning outcomes and curriculum content

No.	Course name	Program content	1MPC1	1MPC2	1MPC3	1MPC4	1MPC5	1MPC6	1MPC7	1MPC8	1MPC9	1MPC10
1	Mathematics I	Complex numbers. Matrices and determinants. Systems of linear equations. Infinite number sequences, properties and limits. Differential calculus. Limits of functions. Derivative of a function. Taylor and Maclaurin formulas. Optimization problems. Indefinite integrals. Definite and improper integral.		x						x		
2	Engineering Drawing	Theory of technical drawing, projections of objects, various theories of presenting objects on a two-dimensional plane and individual elements of technical drawing.			x				x	x		x
3	Computer-Aided Design	Theory of technical drawing, elements of classical technical drawing, use of computer programs supporting design, CAD software.			x				x	x		x
4	General and Inorganic Chemistry	Basic chemical definitions, concepts and symbols. Nomenclature of chemical compounds. Structural and molecular formulas. Chemical equations. Basic chemical laws. Structure of matter. Pauli exclusion principle and Hund's rule. Hybridization of atomic orbitals. Types of chemical bonds, Periodic table of elements. Acids and bases. Equilibria in aqueous solutions, pH, dissociation constant and degree, buffer solutions. Mechanisms of chemical reactions.	x	x	x		x			x		x
5	Materials Science	Types of materials (metals, ceramics and polymers), including composites and special materials. Chemical structure, physical structure and properties of materials, areas of their application, possibilities and limitations. Basic technologies of manufacturing, processing and modification of materials.	x		x		x		x	x	x	
6	Basics of Marketing in a Sustainable Environment	The concept of the company's marketing activities, including environmental protection issues and pro-ecological activities of the company as well as adequate changes in consumer behavior.				x			x	x		x
7	Academic Competence and Research Practice	Functioning of the university, organization of classes and techniques supporting learning. Behavior and communication in the academic environment, culture and ethics in academic life with attention to the international environment and cultural differences.				x				x	x	x
8	Fundamentals of Economics and Management	Microeconomics and management to assess individual and business customer needs and make development and sales decisions.				x			x	x	x	
9	Sales Techniques and Psychology in Business	Shaping and implementing modern sales techniques, needed by every salesperson in cooperation not only with customers but also with the manufacturer of chemical products. Analysis of case studies will allow students to consolidate the knowledge they have acquired.				x			x	x	x	x
10	Entrepreneurship Basics, Occupational Health and Safety	Forms of conducting business activity. Rights and obligations of the entrepreneur. Enterprise management and labor protection systems in Poland. Hazardous and harmful factors in the work environment. Mechanisms of chemical hazards. Detection and combating fire and explosion hazards. Chemical rescue systems in Poland. Ergonomics as interdisciplinary knowledge. Human-technical object system. Possibilities of humanizing working conditions. Fitts' list.				x	x	x	x		x	x

No.	Course name	Program content	1MPC1	1MPC2	1MPC3	1MPC4	1MPC5	1MPC6	1MPC7	1MPC8	1MPC9	1MPC10
11	Mathematics 2	Differential calculus of functions of several variables, ordinary differential equations, linear differential equations of the second order, integral calculus of functions of two variables, number and functional series.		x						x		
12	English B2 module I	First part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
13	Colors of the World - Dyes and Pigments Through the Ages	To familiarise students with the history and evolution of the meaning of colour media from antiquity to the present.			x				x	x	x	
14	Interpersonal Communication and Psychology in Business	Basic principles of correct social communication. The essence of verbal and non-verbal communication. Principles of conversation, presentation of views and speeches. Tools of organisational communication. Relationship building. Conflict resolution: negotiation and mediation.				x			x	x	x	x
15	English B2+ module I	First part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
16	German B2 module I	First part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
17	English C1 module I	First part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
18	Health and Safety and Labor Law	Hazardous and harmful factors in the work environment. Mechanisms of chemical hazards. Fire and explosion hazard states. Chemical rescue system in Poland. Ergonomics as interdisciplinary knowledge. Human-technical object system. Humanization of working conditions. Fitts' list. The legal system of labor protection in Poland resulting from the Labor Code and derivative regulations. Sources, characteristics and practical implementation of labor law principles in society.				x	x	x	x		x	x
19	Customer Perception of Color	The role and significance of colour. The psychophysiological impact of colour. Colour and contrast in marketing and promotional activities. Customer perception of colour.			x				x	x	x	
20	Physics	Concepts and laws: kinematics of a material point, dynamics, work, energy and power, dynamics of a rigid body, gravitational field, electrostatics, magnetism, electromagnetic induction, mechanical vibrations and waves, and physical optics and geometric optics.		x	x					x		

No.	Course name	Program content	1MPC1	1MPC2	1MPC3	1MPC4	1MPC5	1MPC6	1MPC7	1MPC8	1MPC9	1MPC10
21	Organic Chemistry	Structure of organic compounds, nomenclature, physical and chemical properties; basic methods of synthesis, isolation, identification and purity analysis of the organic compounds obtained; health and safety rules in the organic chemistry laboratory.	x		x			x		x		x
22	Information Technology	Introduction to the programming, cyber security and artificial intelligence. Creating documents, presentations, performing calculations and data analysis.		x				x	x	x		x
23	English B2 module II	Second part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
24	English B2+ module II	Second part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
25	English C1 module II	Second part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
26	German B2 module II	Second part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
27	Product Management	Product Management. Introducing new products to the market and managing the product throughout its life cycle. Design Thinking.	x	x		x		x	x	x	x	x
28	International Commerce	Basic concepts, mechanisms and practical aspects of the functioning of international trade. Theoretical foundations of international exchange, practical issues related to the implementation of commercial transactions between entities from different countries.	x			x		x	x	x	x	
29	Social Media Marketing	Using social media in a company's marketing strategy. Using a variety of platforms available on the Internet. Running virtual brand communities in a way that increases consumer engagement.	x			x		x	x	x	x	
30	Life Cycle and Quality of Chemical Products	The concept of quality management and life cycle analysis as an element of cooperation in business. Quality tools in the implementation of industrial processes. Identification of industry management systems and discussion of their scope of activity. Interpretation of ISO standards requirements.	x	x		x		x	x	x	x	x
31	Market Analysis of Chemical Industry Products	Relationships between chemical structure and material properties - determination of the influence of these factors on the technological process and the design stage of finished chemical products. Selected management concepts, methods and techniques and market analysis of an exemplary chemical product in its near and distant environment.	x			x		x	x	x	x	

No.	Course name	Program content	1MPC1	1MPC2	1MPC3	1MPC4	1MPC5	1MPC6	1MPC7	1MPC8	1MPC9	1MPC10
32	Physical Chemistry	Chemical thermodynamics, thermochemistry, phase equilibria. Properties of gases and liquids. Electrolyte solutions: chemical equilibria in electrolyte solutions, conductivity. Galvanic cells. Chemical kinetics. Adsorption. Homogeneous and heterogeneous catalysis.	x					x		x		
33	Raw Materials and Chemical Products Analytics	Analytical chemistry of raw materials and chemical products. Research techniques of analytical chemistry. Principles of selecting an appropriate analytical method. Overview of instrumental methods dedicated to the analysis of raw materials and chemical products. Spectroscopic, electrochemical, thermal methods. Analysis of materials subjected to ageing agents.	x	x	x			x		x		
34	Introduction to Data Analysis	Collecting and organizing data, operations on data blocks, formatting tables, graphs. Measurement errors, systematic and random, methods of error reduction. Operations on approximate numbers. Basic quantities used in statistical description. The concept of probability distribution, density and distribution function. Normal distribution, the importance of the normal distribution in data analysis, estimators of normal distribution parameters. Working with spreadsheets (e.g. MSExcel) and specialist software for data processing (e.g. Origin).		x				x		x		
35	Supply Chain Management	Basic and essential information in two areas: supply chain management and ecology and closed circulation among chemical industry companies.	x			x			x	x	x	
36	Ceramic i Metallic Materials	Ceramic materials, powders, fillers and their chemical composition and research methods. Micro- and nanostructures of ceramic materials, sol-gel processes, ceramic technologies and properties and applications of ceramic materials. Glass, its production and coloring and refractory and ballistic ceramics. Ceramic materials market, their toxicity and recycling. Basic technologies of manufacturing and thermochemical treatment of metals.	x	x	x		x	x		x	x	
37	Polymer Materials	Introduction to the materials science of plastics. Overview of the most important polymer materials. Properties, modification methods, and main areas of application of engineering polymers.	x	x	x		x	x	x	x	x	
38	English B2 module III	Third part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
39	English B2+ module III	Third part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
40	English C1 module III	Third part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
41	German B2 module III	Third part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		

No.	Course name	Program content	1MPC1	1MPC2	1MPC3	1MPC4	1MPC5	1MPC6	1MPC7	1MPC8	1MPC9	1MPC10
42	Elastomeric Materials and Composites	Elastomeric materials and composites: components, structure and physical and chemical properties, crosslinking, processing, test methods and quality control, engineering and operation with examples of application in products.	x	x	x		x	x	x	x	x	
43	Digital Marketing	Marketing activities of the company in the digital environment, taking into account the dynamic development of technology, changing consumer behavior and tools and strategies for effective communication on the Internet. The latest trends, analytical tools and methods of building brand value in the digital ecosystem.				x			x	x	x	
44	Automation and Electronics	Podstawy elektryczności, budowy i działania wybranych urządzeń elektrycznych oraz automatycznych systemów sterowania, które są przydatne w procesach technologicznych i przetwórstwie materiałów.	x		x		x			x		
45	Marketing Research in Practice	Marketing research in process, methodological and systemic terms, with particular emphasis on the course of the marketing research process, methods and instruments used during their preparation and conduct, as well as the development and analysis of the collected data in order to transform them into information resources characterized by applicability for chemical enterprises operating in the modern consumer and industrial market.				x			x	x	x	
46	B2B Marketing	B2B marketing and their practical application in the context of the operation of real businesses in the market.				x			x	x	x	
47	Managerial Workshops	Project management and improving students' managerial skills. Combining theory with practice by organizing part of the classes with internships and implementing exercises/projects using project management software.				x			x	x		x
48	Logistics of Chemical Products	Fundamentals of chemical product logistics; Regulations and standards; Principles of chemical product transportation; Warehousing of chemical products; Safety and risk management; Modern technologies and sustainability.				x			x	x		x
49	English B2 module IV	Fourth part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
50	Brand management	Brand building, positioning and development strategies in the context of the chemical industry, both in B2C and B2B. Key issues such as: brand identity and image, brand equity, brand strategies and brand marketing communications.				x			x	x	x	x
51	Household Chemistry	Characteristics and requirements of household chemical products. Surfactants, fragrances, stabilizers, preservatives and colorants - properties and action. Standards and regulations of household chemical products.	x	x	x		x	x	x	x	x	
52	English B2+ module IV	Fourth part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		

No.	Course name	Program content	1MPC1	1MPC2	1MPC3	1MPC4	1MPC5	1MPC6	1MPC7	1MPC8	1MPC9	1MPC10
53	English C1 module IV	Fourth part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
54	German B2 module IV	Fourth part of a business language course with elements of industry-specific terminology; development of all language skills; development and improvement of soft skills oriented around the future working environment of the university graduate.							x	x		
55	Functional Materials and Nanomaterials	Different classes of functional materials and nanomaterials, their specific properties, functionalities and selected applications. Selected methods of synthesis, modification and testing of functional materials and nanomaterials.	x	x	x			x		x	x	x
56	Biomaterials	Biomaterials and medical products, their classification, production, specific properties, functionalities, selected applications, as well as methods of their testing and sterilization.	x	x	x			x		x	x	x
57	Design of Pharmaceutical and Biotechnological Products	The drug development process - from idea to commercialization. Design of small-molecule lead compounds and biotechnology products with desired therapeutic properties. Analysis of pharmacokinetics, mechanisms of action, safety and therapeutic efficacy. Technologies for fine-tuning the structure of a drug to its therapeutic target. Technologies for delivering drugs to the site of action. Basic methods of drug formulation.	x		x		x	x		x	x	
58	Dyes and Pigments	Functional and chemical division of coloring agents, including azo dyes, anthraquinone dyes and various groups such as acid, direct, photochromic and thermochromic dyes. Functional properties of dyes and pigments. Synthesis of organic dyes and pigments and products with thermochromic pigments, color evaluation in the CIE Lab system.	x	x	x		x	x	x	x	x	
59	Management of the Company's Image	Managing the company's image activities leading to the creation of a positive image of the company using selected public relations tools.				x			x	x	x	x
60	REACH and ADR	Issues relating to the transport of hazardous materials by road and logistical issues that companies may face in the context of availability, speed of delivery and permits for the use of chemical materials in the European Union.		x		x		x	x	x	x	x
61	Packaging	Polymer materials, packaging technologies (polymers, paper, glass). Innovative solutions for environmental protection, (bio)degradation, aging processes and susceptibility of packaging materials to decomposition in the natural environment. Methods of obtaining and types of polymers and composites used in packaging production.	x		x		x	x		x	x	
62	Development of Manager Competences	Manager in an organization; Team in an organization; Communication in an organization; Power and leadership; Forming pro-employee attitudes; Problems of teamwork.				x			x	x		x
63	Challenges of Modern Chemistry	Challenges of modern chemistry, with particular emphasis on the technology of synthesis, processing of polymers and polymer composites, as well as various functional materials. Impact on the environment throughout the product life cycle ("from cradle to grave") - from the production stage, through operation, to waste management - in the context of sustainable development. Assessment of carbon, water and ecological footprint. Modeling of processes and product life cycles using specialist computer software.			x	x		x	x	x	x	x

No.	Course name	Program content	1MPC1	1MPC2	1MPC3	1MPC4	1MPC5	1MPC6	1MPC7	1MPC8	1MPC9	1MPC10
64	Technical English Terminology	Fundamentals of English terminology in organic chemistry, general and inorganic chemistry and physical chemistry.	x		x			x		x	x	
65	GIS	Fundamentals of geographic information systems including network analysis.				x		x	x	x	x	x
66	Transport Organisation	Organization of transport, with particular emphasis on the transport of chemical products. Transport organization, with particular emphasis on the transport of chemical products. The role of transport in logistics. The relationship between transport and the supply chain. Basic modes of transport. Intermodal transport. Development of individual modes of transport. International transport. Transport costs. Cost function. Transport of hazardous products, including chemical products.				x		x	x	x	x	x
67	Costs and Financial Indicators	Basic classifications and cost systems and their role in enterprise management; Financial indicators in cost efficiency assessment. Examples of using costs to create financial statements; in making long-term decisions; in making short-term decisions.				x			x	x		
68	Electronic Resources of Scientific Information	Journal services: ACS, Wiley, RSC, Elsevier; Reaxys database; creation of reference bibliographies.	x		x			x		x	x	
69	Negotiations	Negotiation with an emphasis on developing practical negotiation skills that are essential in the work of a chemical product manager. Key principles of negotiation, such as separating people and their emotions from the problem, focusing on interests rather than positions, creating win-win solutions, and using objective criteria.				x			x	x		x
70	Transport Regulations	Legal bases of transport - hierarchy of legal acts, contract law and regulations of domestic and international transport. Liability and recovery - principles of determining liability in transportation (Civil Code, CMR Convention, Transportation Law). Customs procedures and trade in goods - principles of customs clearance, transport customs procedures (WPT, TIR), simplified procedures and customs warehouses.				x		x	x	x	x	x
71	Summative Module	Implementation of an elective project dedicated to the knowledge, skills, and social competences defined for the study program.	x	x	x	x	x	x	x	x	x	x
72	Technological Project and Research Methodology	Discussion of research methodology. Defining the research problem and scope. Planning the conduct of research and individual experiments. Basics of analysis, qualitative and quantitative methods of evaluating experimental results. Interpretation of research results based on literature data. Planning the concept and discussion of the assumptions of the directional project. Searching for and critically analyzing scientific literature regarding the scope of the project. Design and experimental work, including laboratory work validating the project assumptions. Analyzing the results, their development and critical analysis.		x	x	x	x	x	x	x		x
73	Fundamentals and Methods of Artificial Intelligence	Artificial intelligence concepts, classical reasoning methods, machine learning and deep learning, scientific and managerial applications of artificial intelligence, including scientific literature analysis and information retrieval, natural language processing, computer vision, creating graphics, video, sound, ethical and philosophical aspects of artificial intelligence. Machine learning methods through programming in the Python and R language environment.			x					x		

No.	Course name	Program content	1MPC1	1MPC2	1MPC3	1MPC4	1MPC5	1MPC6	1MPC7	1MPC8	1MPC9	1MPC10
74	Protection of Intellectual Properties	Basic concepts and principles of protection of intellectual property, including copyright.		x					x		x	
75	Patent and Invention Law	Basic concepts and principles of intellectual property protection in relation to patent and invention law.		x					x		x	
76	Internship	Gaining practical knowledge and new professional competences in natural workplace conditions.							x	x	x	x
77	Engineering Laboratory	Presentations on the main issues related to the diploma thesis. Discussion on the presented presentations. The subject also includes a competency exam. The student conducts experiments related to the topic of the diploma thesis and analyzes and develops the obtained results.					x	x	x	x		
78	Interdisciplinary Project	The company's new chemical product. Development strategy for a new chemical product. Development of a product data sheet. Selection of analytical methods to assess product quality. Launching and promoting a new chemical product on the market. Mistakes made when introducing a chemical product to the market.										
79	Final Project	Familiarization with available literature on the issues provided by the supervisor. Selection, justification and development of a research method (experimental or theoretical). Conducting experimental research, computer calculations or preparing a technological project. Development of research results. Drawing conclusions from the obtained results. Preparation of a multimedia presentation illustrating the work performed.	x	x	x	x	x	x	x	x	x	x

ECTS - subjects

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
1	Mathematics I	7				
2	Engineering Drawing	2		2		
3	Computer-Aided Design	2		2		
4	General and Inorganic Chemistry	5			5	
5	Materials Science	3			3	
6	Basics of Marketing in a Sustainable Environment	6			6	
7	Academic Competence and Research Practice	5	5			
8	Fundamentals of Economics and Management	2			2	
9	Sales Techniques and Psychology in Business	2		2	2	
10	Entrepreneurship Basics, Occupational Health and Safety	2		2		
11	Mathematics 2	7				
12	English B2 module I	2		2		
13	Colors of the World - Dyes and Pigments Through the Ages	1	1	1		
14	Interpersonal Communication and Psychology in Business	2		2	2	
15	English B2+ module I	2		2		
16	German B2 module I	2		2		
17	English C1 module I	2		2		
18	Health and Safety and Labor Law	2		2		
19	Customer Perception of Color	1	1	1		
20	Physics	7				
21	Organic Chemistry	5			5	

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
22	Information Technology	4				
23	English B2 module II	2		2		
24	English B2+ module II	2		2		
25	English C1 module II	2		2		
26	German B2 module II	2		2		
27	Product Management	2		2	2	
28	International Commerce	3		3	3	
29	Social Media Marketing	3		3	3	
30	Life Cycle and Quality of Chemical Products	2		2	2	
31	Market Analysis of Chemical Industry Products	3		3	3	
32	Physical Chemistry	5			5	
33	Raw Materials and Chemical Products Analytics	4			4	
34	Introduction to Data Analysis	2				
35	Supply Chain Management	6			6	
36	Ceramic i Metallic Materials	6			6	
37	Polymer Materials	10		10	10	
38	English B2 module III	2		2		
39	English B2+ module III	2		2		
40	English C1 module III	2		2		
41	German B2 module III	2		2		
42	Elastomeric Materials and Composites	10		10	10	
43	Digital Marketing	3			3	

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
44	Automation and Electronics	4				
45	Marketing Research in Practice	4			4	
46	B2B Marketing	2			2	
47	Managerial Workshops	2				
48	Logistics of Chemical Products	3			3	
49	English B2 module IV	3		3		
50	Brand management	2		2	2	
51	Household Chemistry	4		4	4	
52	English B2+ module IV	3		3		
53	English C1 module IV	3		3		
54	German B2 module IV	3		3		
55	Functional Materials and Nanomaterials	6		6	6	
56	Biomaterials	6		6	6	
57	Design of Pharmaceutical and Biotechnological Products	6			6	
58	Dyes and Pigments	4		4	4	
59	Management of the Company's Image	2		2	2	
60	REACH and ADR	2				
61	Packaging	5			5	
62	Development of Manager Competences	2				
63	Challenges of Modern Chemistry	8			8	
64	Technical English Terminology	2		2		2
65	GIS	2		2		

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
66	Transport Organisation	2		2		
67	Costs and Financial Indicators	2			2	
68	Electronic Resources of Scientific Information	2		2		2
69	Negotiations	3				3
70	Transport Regulations	2		2		
71	Summative Module	8		8		
72	Technological Project and Research Methodology	5				
73	Fundamentals and Methods of Artificial Intelligence	2				
74	Protection of Intellectual Properties	1		1		
75	Patent and Invention Law	1		1		
76	Internship	6				
77	Engineering Laboratory	4			4	
78	Interdisciplinary Project	2		2	2	
79	Final Project	15		15	15	

ECTS indicators

Name	Value
The total number of ECTS credits that a student must obtain through elective courses (amounting to no less than 30% of the total ECTS credits required to obtain the qualification corresponding to the given level of study)	73/210 (34.76%)
The total number of ECTS credits to be earned by a student through courses in the fields of humanities or social sciences	6
The total number of ECTS credits that a student must obtain from courses related to research conducted at the university, amounting to more than 50% of the total ECTS credits required to graduate from a given level of study	125/210 (59.52%)

Methods of verifying and assessing learning outcomes

Verification of the achieved learning outcomes requires the application of diverse forms of student assessment, appropriate to the categories of knowledge, skills, and social competences to which these outcomes relate. The selection of appropriate tools also depends on the specifics of the course and the form of instruction, and is specified in the syllabi of individual courses. The achievement of the required learning outcomes is verified through:

1. written assignments (exams, quizzes, reports, essays, projects, posters, thesis, etc.);
2. oral responses (oral knowledge tests, public speaking assignments such as delivering a paper, presentation, etc.);
3. practical and/or project-based tasks (team-based or individual);
4. observation and assessment of student activity during classes;
5. self-assessment and peer assessment (especially in the case of group projects);
6. a competency exam and a diploma examination.

Verification may be formative (conducted partially and repeatedly during the course) and/or summative (final assessment). The final result of the verification is expressed using the currently applicable grading scale.

The course coordinator or instructor is obliged, during the first class, to discuss the course syllabus and to define and formally communicate to students the methods of verification and the conditions under which learning outcomes will be assessed.

Professional internships

Duration: 6 weeks

ECTS credits awarded: 6

The internship is carried out in accordance with the study program, in a form adapted to the profile and specific nature of the field of study, and in line with the regulations established by the faculty and the University.

Characteristics of the course

Graduate profile

Graduates of the Chemical Products Manager program possess knowledge in the structure and properties, technology, and analysis of materials manufactured for various branches of industry. They are familiar with processing methods, the design of finished products, their certification and standardization, as well as logistics. They are capable of providing professional customer support in these areas, additionally applying expertise in market analysis and marketing.

Graduates are equipped to develop, implement, and supervise the technologies of manufacturing, processing, and modification of both engineering and functional materials produced by the broadly understood chemical industry. This includes technologies related to the production and recycling of finished goods. They are able to design and select materials and products for diverse applications, guided by environmental protection principles and sustainable development goals. They can competently use specialized software and leverage artificial intelligence tools.

Graduates are prepared to work both independently and as part of a team, as well as to lead teams effectively. Their knowledge and competencies make them well-suited for employment in enterprises within the chemical sector and related industries that produce materials and finished products for construction, automotive, pharmaceutical, and energy sectors. They combine knowledge of chemistry and materials engineering with the practical use and maintenance of materials and products. They demonstrate analytical, technical, and managerial skills that enable them to effectively manage the life cycle of chemical products.

Graduates will find employment opportunities in enterprises, consulting agencies, and logistics centers as consultants and client advisors representing broadly understood construction chemistry, automotive and transport sectors, pharmacy, household chemicals, and other related branches of industry, including the modern technologies sector.

The educational process in the Chemical Products Manager program is closely aligned with ongoing employer involvement in shaping the curriculum and the expected learning outcomes in terms of knowledge, skills, and social competences. During the course of study, industry representatives offer internships and project topics. Graduates will be well-prepared to enter the job market or to pursue second-cycle (Master's) or postgraduate studies in disciplines such as chemical sciences or management and quality sciences.

The relationship between the field of study and the university's strategy

The guiding theme of the Strategy of Lodz University of Technology (TUL) is COLLABORATION, with EDUCATION being one of its core pillars (Strategy document, 2025–2030).

The study program Chemical Products Manager directly supports the achievement of TUL's main educational goal, namely: developing a model of student and doctoral education that prepares graduates for the dynamically changing needs of the socio-economic environment. The program also addresses several strategic objectives of TUL, including:

1. Continuous development of academic staff competencies in modern teaching methods, up-to-date knowledge, technological advancements, and scientific trends;
2. Enhancement of the educational offer, including complementary learning formats, in response to societal and economic challenges;
3. Strengthening talent management through the individualization of student and doctoral education paths;
4. Supporting scientific development of students and doctoral candidates, with an emphasis on interdisciplinarity and internationalization;
5. Increasing student participation in university-led research and intensifying practical learning experiences beyond the university setting.

The Chemical Products Manager program equips graduates to meet the changing demands of the labor market by integrating elements of chemistry, marketing, and logistics, thus ensuring professional versatility and broad career opportunities. The curriculum, which includes chemistry, production process management, quality design, and product marketing activities, gives graduates a competitive edge in the job market by combining technical knowledge with managerial skills.

Internships included in the curriculum provide students with valuable hands-on experience. The inclusion of subjects related to intellectual property protection, patent and invention law, business psychology, business negotiations, financial costs and indicators prepares graduates to start and manage their own businesses.

Modern teaching methodologies such as project-based learning, challenge-based learning, and flipped education will be employed

throughout the program. A wide selection of elective courses will allow students to freely shape their educational paths.

Some subjects will involve interaction with industry professionals, enriching students' learning through real-world perspectives. These professionals, by sharing their experiences and success stories, may inspire and motivate students. Direct contact with professionals also supports the development of communication, interpersonal, and presentation skills essential in every career. Moreover, networking with practitioners helps students better understand job market expectations and prepare more effectively for future professional challenges.

The curriculum was consulted with stakeholders from the socio-economic environment, particularly with companies involved in the trade and distribution of chemical products, and received their endorsement.

The program includes topics tailored to the current needs of the industry, such as:

- legal regulations in chemical product management,
- planning, implementing, and reporting on the progress of new product and technology development,
- ESG reporting,
- understanding industrial applications,
- implementing eco-friendly packaging from both business and engineering perspectives and its impact on operational costs,
- developing sales and negotiation skills,
- and Lean Management principles.

The curriculum features a wide range of practical training formats, including laboratories, projects, and seminars, to enhance students' applied competencies.

Educational objectives and employment and continuing education opportunities

The aim of educating students in the Chemical Products Manager program is to prepare graduates for employment in departments such as: quality control, product development, quality management systems, private label brand development, and sales departments.

Graduates will possess knowledge related to the structure, properties, technologies, and analysis of materials manufactured for various branches of industry, methods of their processing, design of finished products, certification and quality approval procedures, as well as logistics. They will be able to provide professional consultancy to clients in these areas, supported by additional knowledge in market analysis and marketing.

Graduates will be capable of developing, implementing, and supervising technologies for the production, processing, and modification of both engineering and functional materials produced by the broadly defined chemical industry, as well as technologies for the manufacturing and recycling of finished goods. They will be able to design and select materials and products for various applications, guided by environmental protection principles and sustainable development goals, and will also be proficient in using specialized software and artificial intelligence tools.

Graduates will be equipped with teamwork and leadership skills. Their knowledge and competencies will qualify them for positions in companies operating in the chemical sector and related industries, manufacturing materials and finished products for construction, automotive, pharmaceutical, and energy sectors—merging chemistry and materials engineering with the practical application and use of products. They will demonstrate analytical, technical, and managerial skills that allow for effective management of the chemical product life cycle.

The implementation of the educational process in the Chemical Products Manager program is closely linked to the ongoing involvement of employers in shaping the curriculum and the learning outcomes in terms of knowledge, skills, and social competencies. During their studies, students will benefit from industry-provided internships and project topics.

Graduates of the program will be well-prepared to enter the labor market or continue their education at the second-cycle (Master's) level or in postgraduate programs in the disciplines of chemical sciences or management and quality sciences.

Description of the process and outcome of consultations on the proposed study program with the socio-economic environment

Companies participating in the consultations and their representatives:

1. Corning Optical Communications Polska Sp. z o.o.
2. Polska Grupa Farmaceutyczna
3. DOZ S.A.

4. WITKO Sp. z o.o.
5. Browin Sp. z o.o.

Recommendations from the socio-economic environment for the Chemical Products Manager program

According to industry representatives, the Chemical Products Manager program is highly relevant and well-suited to the current labor market. In their opinion, the program is built on solid foundations, but its attractiveness and alignment with market needs can be further enhanced by incorporating the recommendations listed below. Implementing these changes will improve the graduates' competitiveness and ensure the program responds more accurately to real industry demands.

Industry stakeholders emphasized their readiness to employ graduates of this program, both in managerial and engineering positions.

1. Inclusion of legal regulations in chemical product management.
The curriculum already covers key regulations (REACH, RoHS, CPR, ADR, patent and transport law), which is considered good practice. However, it is recommended to ensure that all critical aspects—such as customs law, MSDS, and waste management—are also included. Graduates should be familiar with chemical product and production regulations on both local and global markets. Introducing a dedicated course titled “Legal Regulations in Chemical Product Management” would help students develop a comprehensive understanding of legal requirements in this area.
2. Inclusion of planning and reporting in the implementation of new solutions in the graduate profile and learning outcomes.
It is suggested that the graduate profile and learning outcomes should include competencies related to planning, implementing, and reporting progress in the development of new products and technological solutions. Graduates should be capable of collaborating with R&D teams to create and bring new products to market.
3. Inclusion of ESG reporting topics.
New regulations introduce the requirement for ESG (Environmental, Social, and Governance) reporting for certain groups of companies, including verification by certified auditors. ESG should be included in the curriculum, covering both business aspects (reporting, management strategies, financial and investment impact) and technological ones (sustainable design, product lifecycle analysis, environmental impact).
4. Inclusion of value engineering and understanding of industrial applications.
It is recommended to include content that develops understanding of value engineering, especially in the context of optimizing projects, processes, or products by analyzing customer needs, cost-efficiency, environmental impact, and product safety.
5. Developing the content related to sustainable packaging from both business and engineering perspectives, including cost impact.
The curriculum should include packaging technologies, composition, and sustainability—especially regarding cost management and sustainable development.
6. Developing the content related to sales and negotiation skills development.
While the program includes aspects of management and collaboration with clients and suppliers, given the increasing importance of business relationships, it is advisable to further emphasize sales and negotiation techniques—not only with clients but also with suppliers. The curriculum should ensure the development of written and verbal communication skills, as well as negotiation capabilities.
7. Integration of Lean Management concepts into the curriculum.
Including Lean Management in logistics-related subjects will better prepare students for work in production and distribution enterprises.

Description of competencies expected from a candidate applying for admission to studies

Not applicable.

The unit organizing education

Faculty of Chemistry

Education program

Semester 1

Course	Number of hours	ECTS points	Form of verification	Obligatory
Mathematics I	Tutorials: 45 Lecture: 45	7	Graded assignment	Obligatory
General and Inorganic Chemistry	Laboratory classes: 30 Lecture: 30	5	Exam	Obligatory
Materials Science	Seminar: 15 Lecture: 15	3	Graded assignment	Obligatory
Basics of Marketing in a Sustainable Environment	Tutorials: 30 Lecture: 30	6	Graded assignment	Obligatory
Academic Competence and Research Practice	Laboratory classes: 30 Lecture: 15 E-learning: 5	5	Graded assignment	Obligatory
Fundamentals of Economics and Management	Tutorials: 15 Lecture: 30	2	Exam	Obligatory
Elective Course 1		2	Graded assignment	Obligatory group
The student chooses 1 subject.				
Engineering Drawing	Tutorials: 20 Lecture: 10	2	Graded assignment	Optional
Computer-Aided Design	Tutorials: 20 Lecture: 10	2	Graded assignment	Optional
Sum	365	30		

Semester 2

Course	Number of hours	ECTS points	Form of verification	Obligatory
Mathematics 2	Tutorials: 45 Lecture: 45	7	Exam	Obligatory
Foreign Language Module 1		2	Graded assignment	Obligatory group
The student chooses one module from the group.				
English B2 module I	Tutorials: 30	2	Graded assignment	Optional
English B2+ module I	Tutorials: 30	2	Graded assignment	Optional
German B2 module I	Tutorials: 30	2	Graded assignment	Optional
English C1 module I	Tutorials: 30	2	Graded assignment	Optional
Physics	Tutorials: 30 Laboratory classes: 30 Lecture: 30	7	Exam	Obligatory
Organic Chemistry	Tutorials: 15 Laboratory classes: 15 Lecture: 30	5	Graded assignment	Obligatory
Information Technology	Laboratory classes: 45 E-learning: 15	4	Graded assignment	Obligatory
Elective Course 2		2	Graded assignment	Obligatory group
The student chooses 1 subject.				
Entrepreneurship Basics, Occupational Health and Safety	Seminar: 15 Lecture: 30	2	Graded assignment	Optional
Health and Safety and Labor Law	Seminar: 15 Lecture: 30	2	Graded assignment	Optional
Elective Course 3		2	Graded assignment	Obligatory group
The student chooses 1 subject.				
Sales Techniques and Psychology in Business	Tutorials: 30	2	Graded assignment	Optional
Interpersonal Communication and Psychology in Business	Tutorials: 30	2	Graded assignment	Optional
Elective Course 4		1	Graded assignment	Obligatory group

Course	Number of hours	ECTS points	Form of verification	Obligatory
The student chooses 1 subject.				
Colors of the World - Dyes and Pigments Through the Ages	Seminar: 15	1	Graded assignment	Optional
Customer Perception of Color	Seminar: 15	1	Graded assignment	Optional
Physical Education 1	Tutorials: 30	0	Pass	Obligatory
Sum	450	30		

Semester 3

Course	Number of hours	ECTS points	Form of verification	Obligatory
Foreign Language Module 2		2	Graded assignment	Obligatory group
The student chooses one module from the group.				
English B2 module II	Tutorials: 30	2	Graded assignment	Optional
English B2+ module II	Tutorials: 30	2	Graded assignment	Optional
English C1 module II	Tutorials: 30	2	Graded assignment	Optional
German B2 module II	Tutorials: 30	2	Graded assignment	Optional
Physical Chemistry	Tutorials: 15 Laboratory classes: 30 Lecture: 15	5	Graded assignment	Obligatory
Raw Materials and Chemical Products Analytics	Laboratory classes: 39 Lecture: 21	4	Exam	Obligatory
Introduction to Data Analysis	Laboratory classes: 15 Lecture: 15	2	Graded assignment	Obligatory
Supply Chain Management	Tutorials: 15 Project work: 30 Lecture: 30	6	Exam	Obligatory
Ceramic i Metallic Materials	Laboratory classes: 45 Lecture: 30	6	Graded assignment	Obligatory

Course	Number of hours	ECTS points	Form of verification	Obligatory
Elective Course 5		3	Graded assignment	Obligatory group
The student chooses 1 subject.				
International Commerce	Laboratory classes: 15 Lecture: 30	3	Graded assignment	Optional
Social Media Marketing	Laboratory classes: 15 Project work: 15 Lecture: 15	3	Graded assignment	Optional
Market Analysis of Chemical Industry Products	Project work: 30 Lecture: 15	3	Graded assignment	Optional
Elective Course 6		2	Graded assignment	Obligatory group
The student chooses 1 subject.				
Product Management	Project work: 15 Lecture: 15	2	Graded assignment	Optional
Life Cycle and Quality of Chemical Products	Project work: 15 Lecture: 15	2	Graded assignment	Optional
Physical Education 2	Tutorials: 30	0	Pass	Obligatory
Sum	435	30		

Semester 4

Course	Number of hours	ECTS points	Form of verification	Obligatory
Foreign Language Module 3		2	Graded assignment	Obligatory group
The student chooses one module from the group.				
English B2 module III	Tutorials: 30	2	Graded assignment	Optional
English B2+ module III	Tutorials: 30	2	Graded assignment	Optional
English C1 module III	Tutorials: 30	2	Graded assignment	Optional

Course	Number of hours	ECTS points	Form of verification	Obligatory
German B2 module III	Tutorials: 30	2	Graded assignment	Optional
Digital Marketing	Tutorials: 15 Project work: 15 Lecture: 15	3	Graded assignment	Obligatory
Automation and Electronics	Laboratory classes: 30 Lecture: 30	4	Graded assignment	Obligatory
Marketing Research in Practice	Tutorials: 15 Laboratory classes: 15 Lecture: 15	4	Exam	Obligatory
B2B Marketing	Project work: 15 Lecture: 15	2	Graded assignment	Obligatory
Managerial Workshops	Seminar: 15	2	Graded assignment	Obligatory
Logistics of Chemical Products	Laboratory classes: 15 Lecture: 30	3	Exam	Obligatory
Elective Course 7		10	Graded assignment	Obligatory group
The student chooses 1 subject.				
Polymer Materials	Laboratory classes: 30 Project work: 30 Lecture: 60	10	Graded assignment	Optional
Elastomeric Materials and Composites	Laboratory classes: 30 Project work: 30 Lecture: 60	10	Graded assignment	Optional
Physical Education 3	Tutorials: 30	0	Pass	Obligatory
Sum	420	30		

Semester 5

Course	Number of hours	ECTS points	Form of verification	Obligatory
Foreign Language Module 4		3	Exam	Obligatory group
The student chooses one module from the group.				
English B2 module IV	Tutorials: 30	3	Exam	Optional
English B2+ module IV	Tutorials: 30	3	Exam	Optional
English C1 module IV	Tutorials: 30	3	Exam	Optional
German B2 module IV	Tutorials: 30	3	Exam	Optional
Design of Pharmaceutical and Biotechnological Products	Laboratory classes: 16 Project work: 14 Lecture: 45	6	Graded assignment	Obligatory
REACH and ADR	Project work: 15 Lecture: 15	2	Graded assignment	Obligatory
Packaging	Laboratory classes: 15 Project work: 15 Lecture: 45	5	Exam	Obligatory
Development of Manager Competences	Tutorials: 30	2	Graded assignment	Obligatory
Elective Course 8		4	Graded assignment	Obligatory group
The student chooses 1 subject.				
Household Chemistry	Laboratory classes: 30 Lecture: 30	4	Graded assignment	Optional
Dyes and Pigments	Laboratory classes: 30 Lecture: 30	4	Graded assignment	Optional
Elective Course 9		2	Graded assignment	Obligatory group
The student chooses 1 subject.				
Brand management	Project work: 15 Lecture: 15	2	Graded assignment	Optional
Management of the Company's Image	Project work: 15 Lecture: 15	2	Graded assignment	Optional

Course	Number of hours	ECTS points	Form of verification	Obligatory
Elective Course 10		6	Graded assignment	Obligatory group
The student chooses 1 subject.				
Functional Materials and Nanomaterials	Laboratory classes: 40 Lecture: 35	6	Graded assignment	Optional
Biomaterials	Laboratory classes: 40 Lecture: 35	6	Graded assignment	Optional
Sum	405	30		

Semester 6

Course	Number of hours	ECTS points	Form of verification	Obligatory
Challenges of Modern Chemistry	Seminar: 40 Project work: 45 Lecture: 20	8	Exam	Obligatory
Costs and Financial Indicators	Seminar: 15 Lecture: 15	2	Exam	Obligatory
Negotiations	Tutorials: 30 Seminar: 15	3	Graded assignment	Obligatory
Summative Module	Project work: 90	8	Graded assignment	Obligatory subjects to choose from
Technological Project and Research Methodology	Project work: 55 Lecture: 20	5	Graded assignment	Obligatory
Elective Course 11		2	Graded assignment	Obligatory group
The student chooses 1 subject.				
Technical English Terminology	Tutorials: 15 Laboratory classes: 15	2	Graded assignment	Optional

Course	Number of hours	ECTS points	Form of verification	Obligatory
Electronic Resources of Scientific Information	Tutorials: 15 Laboratory classes: 15	2	Graded assignment	Optional
Elective Course 12		2	Graded assignment	Obligatory group
The student chooses 1 subject.				
GIS	Laboratory classes: 30	2	Graded assignment	Optional
Transport Organisation	Lecture: 30	2	Graded assignment	Optional
Transport Regulations	Tutorials: 15 Lecture: 15	2	Graded assignment	Optional
Sum	405	30		

Semester 7

Course	Number of hours	ECTS points	Form of verification	Obligatory
Fundamentals and Methods of Artificial Intelligence	Laboratory classes: 30 Lecture: 15	2	Graded assignment	Obligatory
Internship	Internship: 0	6	Pass	Obligatory
Engineering Laboratory	Seminar: 15 Laboratory classes: 85	4	Exam	Obligatory
Interdisciplinary Project	Project work: 30	2	Graded assignment	Obligatory subjects to choose from
Final Project	Seminar: 10	15	Pass	Obligatory subjects to choose from
Elective Course 13		1	Graded assignment	Obligatory group
The student chooses 1 subject.				
Protection of Intellectual Properties	E-learning: 15	1	Graded assignment	Optional

Course	Number of hours	ECTS points	Form of verification	Obligatory
Patent and Invention Law	E-learning: 15	1	Graded assignment	Optional
Sum	200	30		