



Lodz University
of Technology

Study programme

Faculty:	Faculty of Textiles and Design
Major:	Advanced Design and Technology
Level of study:	first-cycle programme (inżynier)
Form of study:	full-time studies
Academic year:	2026/27

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Basic information

Name of the field of study:	Advanced Design and Technology
Level of study:	first-cycle programme (inżynier)
Study profile:	practical
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:	2635
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:	105
Professional title awarded to graduates:	inżynier
ISCED code:	0719
Language of study:	polish

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

Discipline	Percentage share
Material Engineering	60%
Visual arts and art conservation	40%

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	1IWP1	Has advanced knowledge in the field of technical sciences, including mechanics, materials science, engineering graphics, engineering materials testing methods, and in the field of art, preparing for correct ergonomic design with awareness of all the conditions of the product life cycle.	P6U_W	P6S_WG, P6S_WG_inż
2	1IWP2	Has basic knowledge of information technology necessary to carry out engineering and design work involving computer-aided design (CAD), computer simulations of the behaviour of designed objects, and the analysis of results for the purpose of implementing design modifications.	P6U_W	P6S_WG
3	1IWP3	Has basic knowledge of management, marketing, business operations, and the protection of industrial property and copyright.	P6U_W	P6S_WK, P6S_WK_inż
4	1IWP4	Is able to plan and conduct design research, including measurements and computer simulations, to evaluate the functionality and validity of design solutions.	P6U_U	P6S_UW, P6S_UW_inż
5	1IWP5	Is able to independently design an uncomplicated industrial product in accordance with accepted specifications and applicable norms and standards.	P6U_U	P6S_UW, P6S_UW_inż
6	1IWP6	Can be proficient in the use of workshop techniques, developing their own design language and operating freely with style, imagination and intuition using a variety of expressive means and manufacturing techniques, both traditional and digital.	P6U_U	P6S_UW
7	1IWP7	Can prepare professional design studies: reports, notes, presentations, according to design industry standards and present using up-to-date visualisation tools and techniques, both traditional and digital in Polish and a modern foreign language at a level of at least B2.	P6U_U	P6S_UK
8	1IWP8	Can independently plan own work, organise learning and develop professional competences as well as initiate and sustain cooperation with various project stakeholders and participate effectively in interdisciplinary teams.	P6U_U	P6S_UO, P6S_UU
9	1IWP9	Is prepared to be critical of his/her knowledge and skills, demonstrating a willingness to consult experts and to supplement and improve his/her acquired knowledge and skills.	P6U_K	P6S_KK
10	1IWP10	Is ready to consciously fulfil his role as a design engineer in society, in particular in terms of striving to improve the quality of life, being responsible for the consequences of his design actions and their impact on the environment, seeking optimal management and marketing solutions that are socially acceptable and in accordance with professional ethics.	P6U_K	P6S_KO, P6S_KR

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

No.	Course name	Program content	1W1P1	1W1P2	1W1P3	1W1P4	1W1P5	1W1P6	1W1P7	1W1P8	1W1P9	1W1P10
1	Chemistry and Physics of Materials 1	Information about the properties of engineering materials from atomic structure through chemical bonds, intermolecular interactions, crystal structure to the microstructure of the designed product. Learning about the structure of inorganic compounds such as oxides, acids, bases and salts, as well as the structure of condensed matter using metals and ceramics as examples. Theoretical fundamentals and the ability to solve tasks in kinematics, dynamics, hydrostatics, hydrodynamics and special relativity.	x				x				x	
2	Fundamentals of Product Design 1	Introduction to issues related to product design from an industrial design perspective. Familiarization with basic 3D modeling techniques, visual mold construction, and rapid prototyping methods, enabling the transition from concept to physical model.		x				x	x			
3	Selected Issues of Modern, Contemporary Art and Design 1	Basic information on the history of artistic and industrial design, applied art from the second half of the 19th century to the first half of the 20th century. Mastering the theoretical foundations and acquiring skills in the development of forms of applied graphic design (posters, typography, advertising), ceramics, furniture, glass, metal products.	x						x		x	
4	Quality Engineering and Standardization 1	Indicators and factors that determine product quality (product utility, technological, environmental aspects) and certificates and certification principles. The principles of standardization, laboratory accreditation, quality management systems, introducing new products to the market. Interpreting standardization documents and legal acts, creating system and product documentation.			x					x	x	x
5	Mathematics I	Elements of mathematical logic and set algebra. The concept of a function, composite function, inverse function, properties of functions. Elementary functions: polynomials, rational, exponential, logarithmic function, trigonometric and cyclometric functions. Application of logical laws and set calculus in solving equations and inequalities related to elementary functions. Limits of number sequences. Limits of functions. Derivative of a function of one real variable, use of differential calculus to study the course of variability of a function. Basic methods of integration. Definite and improper integrals, applications of integrals.	x			x						
6	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			
7	Chemistry and Physics of Materials 2	Learning the homologous series of organic compounds - alkanes, alkenes and alkynes. Analysis of classes of organic compounds (carboxylic acids, esters, aldehydes, alcohols, etc.) from the point of view of their chemical and physical properties and methods of preparation. Information on the molecular, supramolecular structure of polymers in the context of microstructure, and macroscopic features of products including composite materials. Learning the theoretical basis and ability to perform experiments in the following branches of physics: electromagnetism, thermodynamics, and optics.	x				x				x	

No.	Course name	Program content	11WP1	11WP2	11WP3	11WP4	11WP5	11WP6	11WP7	11WP8	11WP9	11WP10
8	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			
9	Podstawy wzorniczego projektowania produktów 2	The basic principles of building a visual composition, including contrast and rhythm on a plane and in space, the basics of drawing, raster graphics, vector graphics, and design processes in the area of the selection of techniques, tools, and style; and color management in the light of applicable standards and norms.		x					x		x	
10	Selected Issues of Modern, Contemporary Art and Design 2	Basic information on the history of artistic and industrial design, applied art from the second half of the 20th century to the 1920s. Mastering the theoretical foundations and acquiring skills in the field of applied graphic design forms (posters, advertising, electronic media), furniture, glass, textiles.	x						x		x	
11	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			
12	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			
13	Mathematics 2	Elements of differential and integral calculus of functions of several variables. Matrix calculus. Systems of linear equations. Operations in the set of complex numbers, quadratic equation in the set of complex numbers, Elements of probability calculus - one-dimensional random variable. Elements of descriptive statistics: description of a sample for one measurable feature. Elements of mathematical statistics: interval estimation, selected significance tests.	x			x						
14	Information Technologies 1	Familiarization with the environment and conditions for the safe use of software and internet services, particularly with the extended capabilities of office software such as word processors, presentation programs, and spreadsheets; e-services available in Poland, cybersecurity in computer networks, digitization techniques, practical mechanisms of artificial intelligence, as well as copyright laws and licensing principles.		x					x			
15	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			
16	Fundamentals of Product Design 3	Fundamental knowledge of occupational health and safety, ergonomics and principles of ergonomic design of selected technical objects. Principles of creating technical drawing documentation in accordance with applicable technical drawing standards using computer-aided design. Topics related to design as a creative act (methods of creative design), the role of the designer, and communication with the user in the context of sustainable and responsible design.	x				x	x	x			

No.	Course name	Program content	11WP1	11WP2	11WP3	11WP4	11WP5	11WP6	11WP7	11WP8	11WP9	11WP10
17	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			
18	Presentation Techniques in Design 1	Interdisciplinary artistic practices - visual techniques and means of expression, methods of shaping visual communication - as tools supporting skills of a designer. Conceptual photography as a method of project presentation.						x	x			
19	Modeling of Physical and Chemical Properties of Product 1	Basics of modeling the physical and chemical properties of products. Modeling the physical properties of the product as a rigid body (statics, physical and mathematical models). Model of body in state of static equilibrium - axioms of statics and freedom from constraints, in the range of loads: a plane system of convergent forces and an arbitrary plane system of forces, along with solutions. Modeling of chemical properties: conditions for the implementation of basic processes of modeling the chemical properties of plastic products and textiles, depending on the type of raw material and the expected effects of the designed product.	x			x			x		x	
20	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			
21	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			
22	Quality Engineering and Standardization 2	Methods of evaluating indicators and factors that determine product quality (safety aspects, environmental aspects). Developing skills in the selection of materials in product design, taking into account the safety of use, durability and impact on humans and the environment.	x			x						
23	Information Technologies 2	Methods of representing algorithms for solving engineering problems, as well as the specifics of formulating them, which are closely tied to the structures of modern programming languages and the unique algorithmic way of thinking. Ability to program both typical and self-defined problems in a chosen programming language. Introduced to common data types and structures, control statements, and the overall structure of a program.		x					x			
24	Product Design - Plastics Processing	Introduction to product design and the opportunity to gain first experience in designing plastic products. Identification of simple functional problems and development of their possible solutions taking into account the basics of technology, aesthetics and usability. Development of team design skills and approach to product analysis from the perspective of the user and the environment.					x	x	x			
25	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			

No.	Course name	Program content	11WP1	11WP2	11WP3	11WP4	11WP5	11WP6	11WP7	11WP8	11WP9	11WP10
26	Design Methodology	Exploration of creative and systematic methods for solving design problems in industrial design. Analysis of the design process conditions and development of competences in creating, evaluating and optimizing product concepts. Fostering a reflective, informed and responsible design attitude.	x			x	x					x
27	Product Design - Composite Processing	Introduction to product design and the opportunity to gain first experience in designing composite material products. Identification of simple functional problems and development of their possible solutions taking into account the basics of technology, aesthetics and usability. Development of team design skills and approach to product analysis from the perspective of the user and the environment.					x	x	x			
28	Presentation Techniques in Design 2	Introduction to advanced project presentation techniques through photography and aims to acquaint students with creative and appropriate artistic methods, encompassing a wide range of tools and formal means. It also considers the latest photographic trends. Interdisciplinary drawing practices, presentation drawing.						x	x	x	x	
29	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			
30	Modeling of Physical and Chemical Properties of Product 2	Advanced modeling of physical and chemical properties of the product. Modeling of physical properties the product as a deformable body and its parameters for different material properties. Types of mechanical and thermal loads and the corresponding measures of material effort. Fiber modification methods - chemical surface modification methods for textile products, methods for creating nano- and microparticles, and encapsulation methods.	x			x			x		x	
31	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			
32	Product Design - Metal Processing	Introduction to product design and the opportunity to gain first experience in designing metal products. Identification of simple functional problems and development of their possible solutions taking into account the basics of technology, aesthetics and usability. Development of team design skills and approach to product analysis from the perspective of the user and the environment.					x	x	x			
33	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			
34	Textronics and 3D Structural Engineering	Foundational knowledge in textronics as well as skills in designing and analyzing functional spatial structures. Integration of textronic systems with 3D modeling and structural strength analysis using the finite element method (FEM). Interdisciplinary competencies in designing advanced structures integrated with textronic solutions.	x				x		x			

No.	Course name	Program content	11WP1	11WP2	11WP3	11WP4	11WP5	11WP6	11WP7	11WP8	11WP9	11WP10
35	Product Design - Light Industry	Introduction to product design and the opportunity to gain first experience in designing for light industry. Identification of simple functional problems and development of their possible solutions taking into account the basics of technology, aesthetics and usability. Development of team design skills and approach to product analysis from the perspective of the user and the environment.					x	x	x			
36	Product Design - Furniture Industry	Introduction to product design and the opportunity to gain first experience in furniture design. Identification of simple functional problems and development of their possible solutions taking into account the basics of technology, aesthetics and usability. Development of team design skills and approach to product analysis from the perspective of the user and the environment.					x	x	x			
37	Product Design - Packaging Industry	Introduction to product design and the opportunity to gain first experience in packaging design. Identification of simple functional problems and development of their possible solutions taking into account the basics of technology, aesthetics and usability. Development of team design skills and approach to product analysis from the perspective of the user and the environment.					x	x	x			
38	Advanced Design Issues	Analysis of complex relationships between form, function, material, and manufacturing processes in the context of contemporary design challenges. Exploration of advanced design methods focused on technology, simulation, experimentation, and critical design thinking. Consideration of ecological constraints, artificial intelligence (AI), and disruptive innovation approaches (breakthrough innovations that reshape market structures) as key factors in contemporary design practice. Development of skills in integrating engineering and design aspects within the design process.	x			x	x					
39	Introduction to Animation	Fundamental 3D animation techniques based on keyframes. Animations of basic transformations of entire objects as well as their geometric components. Animations involving shape modifications using modifiers, as well as animations of digital materials and lighting. Mechanism of non-keyframe animation with interpolation techniques.		x			x	x				
40	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			
41	Product Life Cycle Analysis	Acquiring basic knowledge to conduct a product life cycle assesment, taking into account and distinguishing the Cradle to Grave and Cradle to Cradle methodologies. Analysis of the provisions in the standards. Examples of LCA analyses for devices, products or processes. Preparation of data and performance of a life cycle analysis in a shortened version for a selected device, product or process.	x			x					x	
42	Introduction to Web Page Design	Rules of publishing content on the web and the requirements that must be met to ensure accessibility. Process of converting a graphic design into website elements and implementing them into a site structure using web editing software. Key concepts related to hosting and domain names.		x			x	x				

No.	Course name	Program content	11WP1	11WP2	11WP3	11WP4	11WP5	11WP6	11WP7	11WP8	11WP9	11WP10
43	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			
44	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			
45	Internship 1	Acquiring practical knowledge and new professional competences in natural workplace conditions.							x	x	x	x
46	Introduction to Interior Visualization	Analysis of selected examples of interior visualization. Learning the programs necessary to implement interior visualization. Creating your own interior arrangements using computer programs.		x			x	x		x		
47	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			
48	Introduction to Virtual Reality	Analysis of selected VR applications. Learning VR tools and technologies. Creation of own VR implementations.		x			x	x		x		
49	Research Presentation Methods	The program content includes issues related to techniques for preparing oral presentations and posters on scientific issues, taking into account the requirements for scientific and diploma theses, including basic issues related to the use of artificial intelligence (AI).	x						x		x	
50	Universal Design of Specialized Products	Fundamentals of universal design methodology and building awareness of the needs of users with diverse needs. Analysis of physical and cognitive capabilities and changing needs of various user groups. Identification, analysis and assessment of barriers generated by organizational and technical solutions for users with diverse needs based on the principles of universal design, legal regulations, normative acts and others. Designing concepts for improving these solutions.		x			x	x		x		
51	Legal, Economic and Environmental Aspects in Design	Key topics related to conducting design activities within legal, economic and environmental frameworks. Basic concepts in economics and marketing, market mechanisms, and the economic role of industrial design. Specifics of running a business in the SME sector, the process of internationalisation, opportunities for financing innovation, and issues related to intellectual property. Issues related to environmental responsibility, sustainable development and the ecological challenges faced by contemporary design.			x	x				x		x
52	Engineering Approach to Design	Engineering approach to a design project, taking into account a study of its technical feasibility.		x			x	x	x			
53	Contexts of Design Theory and Art Issues	Contexts of modern and contemporary design, its role in public and private space. Designer's tasks. Industrial design. Developing skills in building scientific theoretical statements on its subject.	x						x	x	x	
54	Industrial Design Engineer Portfolio	Preparation of an individual portfolio of an industrial design engineer based on work completed during studies and personal interests. Preparation of the layout by determining the format, colors and typography.		x			x	x	x			

No.	Course name	Program content	11WP1	11WP2	11WP3	11WP4	11WP5	11WP6	11WP7	11WP8	11WP9	11WP10
55	Case Study in Industrial Design	Analysis of selected examples of projects implemented in the field of industrial design. Learning about design processes, product implementation strategies and the relationship between form, function and market context. Developing critical thinking and design analysis skills based on real case studies.				x					x	x
56	Selected Art and Design Issues	Designing a selected product. The student identifies inspirations, prepares sketches, creates a prototype and a project map in the form of a poster.		x			x	x	x			
57	Integrated New Product Development	A complex design process carried out in conditions resembling real-world practice, focused on the development of a new product considering functional, technological, environmental, and market requirements. Lifecycle analysis, implementation feasibility and resolution of design contradictions are addressed through structured methods and ecological impact tools. Collaborative work in a multidisciplinary team, supported by tutoring and mentoring. Final presentation of the project to an expert panel assessing both the solution and its communication quality.		x			x	x		x		
58	Product of the Future	Analysis of the latest technological solutions and the search for innovative ways to apply them in textile products. It involves developing design assumptions and creating a series of projects, as well as enhancing the ability to tailor products to the needs of a specific target group. The course also focuses on developing critical thinking and design analysis skills based on real case studies.	x					x				x
59	Material-Form-Function: Circular Design	Design strategies supporting material circularity, considering durability, disassembly, reuse, and biodegradability. It examines the relationships between material structure, form, and product function from the perspective of circular design. Systemic implementation strategies and methods of assessing environmental and social impacts are also discussed. The course combines analysis and project-based work, emphasizing the development of responsible and conscious design approaches.	x			x	x					
60	Technical Documentation in Design Practice	Developing skills in design presentation through the preparation of technical documentation using computer-aided design (CAD), in accordance with the principles of technical drawing.	x				x					
61	Applying Research Methods in Design Projects	The ability to effectively apply research techniques within the design process, including experimental planning and analysis of results. Enhancing the integration of research data into the creative process and supporting design decisions with reliable analysis and testing.				x						
62	Selected Aspects of Optimal Design in Utility Objects	Review of optimization criteria used in utility objects. Searching for a connection between aesthetics and optimization - is there a criterion for mechanical description of aesthetics? Selection of an optimal design criterion. Selection of a strategy for solving the problem (global, local). Application in selected utility program. Construction of an object model as an approximate structure using the finite element method. Solution procedure. Analysis of obtained shapes, verification of solutions.		x			x					
63	Multimedia Documentation of Project	Improving skills in using the software system and digital creation tools used to document a project in multimedia form. Familiarization with the process of digital processing of audiovisual materials.		x				x	x			

No.	Course name	Program content	11WP1	11WP2	11WP3	11WP4	11WP5	11WP6	11WP7	11WP8	11WP9	11WP10
64	Product Certification	Improving skills in confirming compliance with product safety and quality requirements, especially those from legally regulated areas (conformity assessment, mandatory certification). The role of a manufacturer or distributor introducing its new product to the EU market (requirements, standards, procedures, obligations).					x					x
65	Diploma Seminar	Rules and methodology of writing a diploma thesis. Preparation for the presentation of the results of the diploma thesis and for the competency exam testing knowledge and aggregated skills.	x			x	x	x		x	x	x
66	Final Project	Implementation of an individual diploma project, including problem field analysis, project task definition, method selection, and the full design process ending with the presentation of the solution. The project is supported by consultations and accompanied by the preparation of documentation and descriptive material in line with editorial and industry standards.				x		x		x		x
67	Internship 2	Acquiring practical knowledge and new professional competences in natural workplace conditions.							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	Chemistry and Physics of Materials 1	8				
2	Fundamentals of Product Design 1	9			9	
3	Selected Issues of Modern, Contemporary Art and Design 1	3	3		3	
4	Quality Engineering and Standardization 1	2			2	
5	Mathematics I	8				
6	English B2 module I	2		2		
7	Chemistry and Physics of Materials 2	8				
8	English B2+ module I	2		2		
9	Podstawy wzorniczego projektowania produktów 2	8			8	
10	Selected Issues of Modern, Contemporary Art and Design 2	2	2		2	
11	English C1 module I	2		2		
12	German B2 module I	2		2		
13	Mathematics 2	6				
14	Information Technologies 1	4				
15	English B2 module II	2		2		
16	Fundamentals of Product Design 3	9			9	
17	English B2+ module II	2		2		
18	Presentation Techniques in Design 1	8			8	
19	Modeling of Physical and Chemical Properties of Product 1	4			4	
20	English C1 module II	2		2		

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
21	German B2 module II	2		2		
22	Quality Engineering and Standardization 2	3			3	
23	Information Technologies 2	4				
24	Product Design - Plastics Processing	4		4	4	
25	English B2 module III	2		2		
26	Design Methodology	4			4	4
27	Product Design - Composite Processing	4		4	4	
28	Presentation Techniques in Design 2	4			4	
29	English B2+ module III	2		2		
30	Modeling of Physical and Chemical Properties of Product 2	6			6	
31	English C1 module III	2		2		
32	Product Design - Metal Processing	4		4	4	
33	German B2 module III	2		2		
34	Textronics and 3D Structural Engineering	6			6	
35	Product Design - Light Industry	4		4	4	
36	Product Design - Furniture Industry	4		4	4	
37	Product Design - Packaging Industry	4		4	4	
38	Advanced Design Issues	4		4	4	
39	Introduction to Animation	4		4	4	
40	English B2 module IV	3		3		
41	Product Life Cycle Analysis	3			3	

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
42	Introduction to Web Page Design	4		4	4	
43	English B2+ module IV	3		3		
44	English C1 module IV	3		3		
45	Internship 1	12			12	
46	Introduction to Interior Visualization	4		4	4	
47	German B2 module IV	3		3		
48	Introduction to Virtual Reality	4		4	4	
49	Research Presentation Methods	4				
50	Universal Design of Specialized Products	3		3	3	
51	Legal, Economic and Environmental Aspects in Design	5				
52	Engineering Approach to Design	3		3	3	
53	Contexts of Design Theory and Art Issues	3	3		3	
54	Industrial Design Engineer Portfolio	3		3	3	
55	Case Study in Industrial Design	3		3	3	
56	Selected Art and Design Issues	3		3	3	
57	Integrated New Product Development	9		9	9	
58	Product of the Future	3		3	3	
59	Material-Form-Function: Circular Design	3		3	3	
60	Technical Documentation in Design Practice	1		1		
61	Applying Research Methods in Design Projects	1		1		
62	Selected Aspects of Optimal Design in Utility Objects	1		1		

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
63	Multimedia Documentation of Project	1		1		
64	Product Certification	1		1		
65	Diploma Seminar	2				
66	Final Project	15		15		
67	Internship 2	12			12	

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)	63/210 (30%)
The total number of ECTS credits to be earned by a student through courses in the fields of humanities or social sciences	8
The total number of ECTS credits that a student must obtain from courses developing practical skills, amounting to more than 50% of the total ECTS credits required to graduate from a given level of study	136/210 (64.76%)

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

Internships are an integral part of the course and are credited according to the study plan and curriculum. Industrial Design Engineering is a practical course, therefore students are required to complete a 6-month work placement. After the internship, the student receives 24 ECTS credits. During the internship, the student is expected to acquire and develop knowledge and skills in the field of industrial design engineering and related sciences, in particular through active participation in the planning and development and/or implementation of commercial projects and the effective design of industrial products.

Characteristics of the course

Graduate profile

A graduate of Industrial Design Engineering is a highly qualified specialist capable of independent and team-oriented design activity in the fields of industrial design, visual communication and social and technological design. Their skills lie at the interface of technology, art, science and the humanities, enabling them to work efficiently in interdisciplinary design teams and to respond effectively to the complex challenges of the modern world.

Graduates have a sound technical knowledge of materials engineering, the fundamentals of engineering design, manufacturing technology and computer-aided design (CAD/CAE). At the same time, he or she has a sound artistic workshop, knowledge of art and cultural history, principles of composition and artistic techniques. They are able to combine analytical and technical thinking with the creativity and imagination of a designer.

With a developed aesthetic and social sensitivity, the graduate is able to accurately diagnose user needs and translate them into functional and innovative design solutions. Their skills include the design of consumer and investment products, the design of visual communication and the co-creation of design systems and structures within industrial and service organisations.

Graduates have the conceptual, analytical and workshop skills necessary for all stages of the design process - from research, ideation and prototyping to technological implementation. He/she is prepared to work with engineers, technologists, marketers, researchers and users. Able to communicate design ideas in the form of presentations, technical documentation and visualisations.

Graduates are aware of the role of design in innovation processes, economic competitiveness and the creation of social and cultural values. They act in accordance with the principles of sustainable development and are able to assess the effectiveness of projects and their impact on the environment and society. He/she has competences in design management, orientation in economic and legal aspects of design and willingness for continuous learning and development.

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

The leitmotif of the Lodz University of Technology strategy is COOPERATION, based on 11 equivalent areas. One of them is education.

The Industrial Design Engineering programme meets the general objective in the area of education, which is to develop a model of undergraduate and postgraduate education that prepares graduates to meet the dynamically changing needs of the socio-economic environment, as well as its specific objectives.

In an attempt to meet the expectations of the labour market, the opinions of the economic environment of the University about the Faculty of Industrial Design Engineering were collected. The collected opinions confirm that the modified major is a response to the needs of the market and potential students.

The programme of the major prepares graduates for the dynamically changing needs of the socio-economic environment, as it is an interdisciplinary educational path combining technical, artistic and management knowledge. The course will be taught by lecturers from the Faculty of Materials Technology and Textile Design and the Academy of Fine Arts in Łódź, which will certainly contribute not only to the quality of the education, but also to its interdisciplinarity.

The proposed course of study gives students the opportunity to create an individual course of study by choosing the topics to be pursued within the elective subjects in semesters IV, V and VI. This individualised approach to students is in line with the specific objective in the area of education to strengthen the talent management process by individualising students' study paths. A wide range of electives will allow students to freely design their learning pathways.

The proposed Faculty is also in line with the specific objective of Poznań's strategy to continuously improve the competences of academic staff in the field of modern educational methods, the current state of knowledge, technological development and trends in science. The planned courses at the Faculty of Industrial Design Engineering will use modern teaching methods, including Design Thinking, Flipped Education and Case Study. Courses in materials engineering, fundamentals of engineering design, manufacturing technology and computer-aided design processes (CAD/CAE), as well as art and cultural history, principles of composition and visual arts techniques will contribute to diagnosing user needs and translating them into functional and innovative design solutions.

It should also be emphasised that the Industrial Design Engineering course is in line with the specific objective of increasing student participation in research work carried out at the University and intensifying the acquisition of practical experience outside the University, as Industrial Design Engineering students will have the opportunity to design consumer and investment products, to design

visual communication and to co-create design systems and structures within industrial and service organisations.

The skills students acquire will enable them to work at the interface of technology, art and project management, combining engineering skills with product aesthetics and functionality. With this versatility, they will be prepared to create highly innovative products and technical solutions that meet the needs of the contemporary market.

Educational objectives and employment and continuing education opportunities

The aim of the Industrial Design Engineering programme is to prepare graduates for design activities, work in design offices, product development departments, consulting companies and research and development units. The design skills acquired are complemented by knowledge of the physical and chemical properties of materials used in the production of objects and appliances, as well as knowledge of the technological processes that lead to the realisation of the designed object.

Graduates will have the conceptual, analytical and workshop skills necessary for all stages of the design process - from research, ideation and prototyping to technological implementation. They will be prepared to work with engineers, technologists, marketers, researchers and users. You will develop the ability to communicate design ideas through presentations, technical documentation and visualisation.

The programme includes a strong emphasis on design and laboratory teaching, as well as work placements to enhance practical skills. During the course, the future graduate will also acquire soft skills, including interpersonal communication, logical thinking, creativity and the ability to work in a group.

Graduates are prepared to continue their education in second-cycle studies in areas such as industrial design, applied graphics, fashion design, interior design and related fields, as well as postgraduate studies.

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

As part of the consultation process for the Industrial Design Engineering bachelor's degree, an analysis was carried out with the Business Council of the Faculty of Materials Technology and Textile Design at the Lodz University of Technology. After a detailed evaluation of the programme, the Council expressed its full support for its implementation, considering it to be a response to the current and future needs of the industry.

The curriculum was assessed as modern and comprehensive, providing students with a solid technical foundation in materials engineering, engineering design, manufacturing technology and computer-aided design processes (CAD/CAE). It also highlighted its practical nature, including the mandatory 6-month work placement, which greatly enhances graduates' chances of a smooth entry into the labour market.

The Business Council also gave a positive assessment of the graduates' preparation for a variety of sectors - from design offices to consultancies to research and development units - and their readiness to run their own design business. As a result, the programme was unanimously recommended as being in line with industry expectations and valuable for students' further career development.

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

Not applicable.

The unit organizing education

Faculty of Textiles and Design

Education program

Semester 1

Course	Number of hours	ECTS points	Form of verification	Obligatory
Chemistry and Physics of Materials 1	Tutorials: 15 Laboratory classes: 60 Lecture: 40	8	Exam	Obligatory
Fundamentals of Product Design 1	Tutorials: 30 Laboratory classes: 75 Project work: 30	9	Graded assignment	Obligatory
Selected Issues of Modern, Contemporary Art and Design 1	Tutorials: 20 Lecture: 20	3	Exam	Obligatory
Quality Engineering and Standardization 1	Laboratory classes: 15 Lecture: 15	2	Graded assignment	Obligatory
Mathematics I	Tutorials: 120	8	Exam	Obligatory
Sum	440	30		

Semester 2

Course	Number of hours	ECTS points	Form of verification	Obligatory
Chemistry and Physics of Materials 2	Laboratory classes: 60 Lecture: 40	8	Graded assignment	Obligatory
Podstawy wzorniczego projektowania produktów 2	Tutorials: 55 Laboratory classes: 45	8	Graded assignment	Obligatory
Selected Issues of Modern, Contemporary Art and Design 2	Tutorials: 20 Lecture: 20	2	Exam	Obligatory
Mathematics 2	Tutorials: 90	6	Exam	Obligatory

Course	Number of hours	ECTS points	Form of verification	Obligatory
Information Technologies 1	Laboratory classes: 45 E-learning: 15	4	Graded assignment	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
English C1 module I	Tutorials: 30	2	Graded assignment	Optional
German B2 module I	Tutorials: 30	2	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
Fundamentals of Product Design 3	Laboratory classes: 35 Project work: 45 Lecture: 35	9	Graded assignment	Obligatory
Presentation Techniques in Design 1	Tutorials: 60 Project work: 40	8	Graded assignment	Obligatory
Modeling of Physical and Chemical Properties of Product 1	Laboratory classes: 30 Lecture: 30	4	Graded assignment	Obligatory
Quality Engineering and Standardization 2	Laboratory classes: 15 Project work: 15 Lecture: 15	3	Exam	Obligatory
Information Technologies 2	Laboratory classes: 45 Lecture: 15	4	Graded assignment	Obligatory
Foreign Language Module 2		2	Graded assignment	Obligatory group

Course	Number of hours	ECTS points	Form of verification	Obligatory
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 Education 2	Tutorials: 30	0	Pass	Obligatory
Sum	440	30		

Semester 4

Course	Number of hours	ECTS points	Form of verification	Obligatory
Design Methodology	Project work: 30 Lecture: 15	4	Graded assignment	Obligatory
Presentation Techniques in Design 2	Tutorials: 60	4	Graded assignment	Obligatory
Modeling of Physical and Chemical Properties of Product 2	Project work: 50 Lecture: 30	6	Graded assignment	Obligatory
Textronics and 3D Structural Engineering	Tutorials: 15 Laboratory classes: 40 Project work: 15 Lecture: 15	6	Exam	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
German B2 module III	Tutorials: 30	2	Graded assignment	Optional

Course	Number of hours	ECTS points	Form of verification	Obligatory
Elective Course 1		8	Exam	Obligatory group
The student chooses 2 subjects.				
Product Design - Plastics Processing	Project work: 55	4	Exam	Optional
Product Design - Composite Processing	Project work: 55	4	Exam	Optional
Product Design - Metal Processing	Project work: 55	4	Exam	Optional
Product Design - Light Industry	Project work: 55	4	Exam	Optional
Product Design - Furniture Industry	Project work: 55	4	Exam	Optional
Product Design - Packaging Industry	Project work: 55	4	Exam	Optional
Physical Education 3	Tutorials: 30	0	Pass	Obligatory
Sum	440	30		

Semester 5

Course	Number of hours	ECTS points	Form of verification	Obligatory
Advanced Design Issues	Project work: 65	4	Graded assignment	Obligatory subjects to choose from
Product Life Cycle Analysis	Laboratory classes: 15 Project work: 15 Lecture: 15	3	Exam	Obligatory
Internship 1	Internship: 0	12	Pass	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

Course	Number of hours	ECTS points	Form of verification	Obligatory
English C1 module IV	Tutorials: 30	3	Exam	Optional
German B2 module IV	Tutorials: 30	3	Exam	Optional
Elective Course 2		8	Graded assignment	Obligatory group
The student chooses 2 subjects.				
Introduction to Animation	Project work: 50	4	Graded assignment	Optional
Introduction to Web Page Design	Project work: 50	4	Graded assignment	Optional
Introduction to Interior Visualization	Project work: 50	4	Graded assignment	Optional
Introduction to Virtual Reality	Project work: 50	4	Graded assignment	Optional
Sum	240	30		

Semester 6

Course	Number of hours	ECTS points	Form of verification	Obligatory
Research Presentation Methods	Tutorials: 15 Project work: 45	4	Graded assignment	Obligatory
Legal, Economic and Environmental Aspects in Design	Project work: 45 Lecture: 45	5	Exam	Obligatory
Contexts of Design Theory and Art Issues	Tutorials: 15 Seminar: 30	3	Graded assignment	Obligatory
Case Study in Industrial Design	Project work: 45	3	Graded assignment	Obligatory subjects to choose from
Integrated New Product Development	Project work: 120	9	Graded assignment	Obligatory subjects to choose from
Elective Courses 3		6	Graded assignment	Obligatory group
The student chooses 2 subjects.				

Course	Number of hours	ECTS points	Form of verification	Obligatory
Universal Design of Specialized Products	Project work: 45	3	Graded assignment	Optional
Engineering Approach to Design	Project work: 45	3	Graded assignment	Optional
Industrial Design Engineer Portfolio	Project work: 45	3	Graded assignment	Optional
Selected Art and Design Issues	Project work: 45	3	Graded assignment	Optional
Product of the Future	Project work: 45	3	Graded assignment	Optional
Material-Form-Function: Circular Design	Project work: 45	3	Graded assignment	Optional
Sum	450	30		

Semester 7

Course	Number of hours	ECTS points	Form of verification	Obligatory
Elective Courses 4		1	Graded assignment	Obligatory group
The student chooses 1 subject.				
Technical Documentation in Design Practice	Project work: 25	1	Graded assignment	Optional
Applying Research Methods in Ddesign Pprojects	Project work: 25	1	Graded assignment	Optional
Selected Aspects of Pptimal Design in Utility Objects	Project work: 25	1	Graded assignment	Optional
Multimedia Documentation of Project	Project work: 25	1	Graded assignment	Optional
Product Certification	Project work: 25	1	Graded assignment	Optional
Diploma Seminar	Seminar: 15	2	Graded assignment + exam	Obligatory
Final Project	Diploma Thesis: 0	15	Pass	Obligatory subjects to choose from
Internship 2	Internship: 0	12	Pass	Obligatory
Sum	40	30		