



Lodz University
of Technology

Study programme

Faculty:	Faculty of Civil Engineering, Architecture and Environmental Engineering
Major:	Environmental Engineering in Civil Construction
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:	Environmental Engineering in Civil Construction
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:	2645
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:	0712
Language of study:	polish

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

Discipline	Percentage share
Civil engineering and transport	100%

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	1ISB1	Knows and understands selected processes and significant phenomena that may occur in devices and facilities in environmental engineering and construction, as well as the laws of mathematics, physics, chemistry and biology explaining the relationships between them.	P6U_W, P6U_U	P6S_WG, P6S_WG_inż, P6S_UW_inż
2	1ISB2	Has the knowledge necessary to design and construct networks and installations, as well as facilities and equipment used in environmental engineering in construction, in accordance with applicable technical requirements and legal regulations.	P6U_W, P6U_U	P6S_WG, P6S_UW_inż
3	1ISB3	Knows and understands the social, environmental, economic, legal and other non-technical conditions and effects of engineering activities in the field of civil engineering, including knowledge of the basic concepts and principles of life cycle analysis of equipment, facilities, installations and systems, industrial property and copyright protection, construction law and environmental protection.	P6U_W, P6U_U	P6S_WK, P6S_WK_inż, P6S_UW_inż
4	1ISB4	Is able to identify and solve technical problems and perform, in conditions that are not fully predictable, tasks related to the design and construction of technical infrastructure in urban areas, including water supply, sewage, heating, ventilation, gas, and water, sewage and air purification systems, as well as municipal installations related to waste processing. He is able to prepare and read the required technical documentation using appropriate sources of information and methods and tools, including advanced information and communication technologies.	P6U_U	P6S_UW, P6S_UW_inż
5	1ISB5	Is able to communicate with a diverse audience and participate in debates on issues related to environmental engineering in construction, using specialist terminology in Polish and a foreign language at B2 level.	P6U_U	P6S_UK
6	1ISB6	Is able to plan and organise work on assigned tasks (both individually and in a team) at the stage of preparation and implementation of environmental engineering projects in construction. He independently acquire and use knowledge about modern processes and technologies used in environmental engineering. He can assess the functioning of existing technical solutions. He consciously plans and develops his own lifelong learning process.	P6U_U	P6S_UO, P6S_UU, P6S_UW_inż
7	1ISB7	Is ready to critically evaluate their own knowledge and skills in environmental engineering in construction. Is ready to form opinions on technical/technological and non-technical processes related to environmental engineering. Is aware of the need for continuous improvement of engineering skills. Recognizes the importance of expert knowledge and opinions in the field.	P6U_K, P6U_U	P6S_KK, P6S_UW_inż

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
8	1ISB8	Is ready to recognize the importance of professional responsibility arising from the role of an engineer. Is ready to consider the interests of co-participants in the investment project, respecting diversity of views and cultures, and to take responsibility for jointly implemented tasks. Identifies the need to act for the benefit of the social environment and to communicate knowledge related to problems in broadly understood environmental engineering to society in a clear and understandable manner. Is ready to think and act entrepreneurially.	P6U_K	P6S_KO, P6S_KR

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

No.	Course name	Program content	1ISB1	1ISB2	1ISB3	1ISB4	1ISB5	1ISB6	1ISB7	1ISB8
1	Mathematics I	Propositional calculus, quantifiers, set algebra. Complex numbers. Elementary functions. Sequences and series of real numbers. Differential calculus of real-valued functions of one variable. Basic methods of integration. Matrices.	x			x				
2	Physics	Core interactions and structure of matter. Fundamental concepts and laws of mechanics, thermodynamics, electromagnetism, optics, and nuclear physics. Elements of acoustics. Elements of energy technology. Scientific basis of knowledge about climate change.	x				x	x		
3	Chemistry for Sanitary Engineering	The structure of the atom, the periodic table of elements, chemical bonds. Basic issues in inorganic chemistry. The kinetics of chemical reactions. Laboratory experiments useful in environmental engineering.	x				x	x		
4	Hydrology and Environmental Protection	Hydrological cycle. Elements of water balance. Links between the water cycle and human activity. Basic measurement and research methods used in hydrology and climatology. Processes and phenomena occurring in the environment. Interactions between environmental components. Principles of sustainable development. Effects of anthropogenic pressure. Environmental protection instruments.			x		x		x	x
5	Technical Thermodynamics	Basic thermodynamic concepts: working fluid parameters, substances, phases, systems. Ideal/real gases, gas mixtures. Thermodynamic processes of ideal gas. Laws of thermodynamics. Work and heat. Moist air – Mollier diagram. Heat transfer.	x			x				
6	Installation Drawing	Methods of descriptive geometry in engineering practice. Principles of construction, installation and mechanical drawing. Projection on a plane. Drawing of installation components and small mechanical details. Basics of computer-aided design. The idea of working in a CAD environment, basic tools available in the programme. Working on layers.		x		x				
7	Information Technologies I	Issues related to working in the Windows system, the Office suite, and a selected mathematical program. Network security principles. Creating spreadsheets and charts using Microsoft Excel. Data analysis and automated processing.				x				
8	Mathematics II	Fundamentals of probability theory and statistics (descriptive and mathematical). Elements of finance and cash flow analysis (interest rates, capital annuities, loans). Valuation of securities (bonds, shares).	x			x				
9	Fluid Mechanics	Fluid properties, pressure, communicating vessels, hydraulic press. Bernoulli's equation, flow continuity, Reynolds number, pressure losses, pipe calculations. Pressure/velocity measurement, capillarity, buoyancy/thrust forces, pumps, water hammer, sedimentation, flow in open channels/soil.	x			x				
10	Biology for Sanitary Engineering	Microorganisms in water and soil environments, biochemical cycles and the role of microbes in wastewater treatment and water purification. It includes microscopy exercises and hydrobiological analyses.	x					x		
11	Information Technologies II	Continuation of work in Microsoft Excel. Continuation of work in the CAD programme by moving from basic drawing operations to more advanced design functions. Basic issues related to digitisation, algorithmisation, and artificial intelligence tools.				x				

No.	Course name	Program content	11SB1	11SB2	11SB3	11SB4	11SB5	11SB6	11SB7	11SB8
12	Surveying and Spatial Information Systems	Geodetic surveyings (levelling, angles, lines, instruments), working with situational and elevation maps, vector/raster maps. Spatial data analysis in GIS (visualisation, 3D models, utility networks, map compositions). Field measurements and geodetic documentation.		x				x		
13	Construction Technology	Structural systems, building components and materials as well as technologies used in general construction. Slab calculations and functional layout design principles.	x			x				
14	Soil Mechanics	Soil classification, physical and mechanical properties of soils, and fundamentals of soil mechanics, including consolidation, effective stress and water flow in soil. Laboratory analysis of soil parameters.		x						
15	English B2 module I	Depending on the chosen language and in accordance with the details of the curriculum.					x			
16	English B2+ module I	Depending on the chosen language and in accordance with the details of the curriculum.					x			
17	German B2 module I	Depending on the chosen language and in accordance with the details of the curriculum.					x			
18	English C1 module I	Depending on the chosen language and in accordance with the details of the curriculum.					x			
19	Mechanics and Strength of Materials	Statics of systems (equilibrium of forces, support reactions, trusses, moments, friction). Strength of materials (loads: tension/compression, bending, torsion, buckling; stresses/strains, cross-section design). Experimental testing (measurement techniques, strain gauging).	x			x				
20	Solid Waste Management	Waste classification, collection and transport systems, recovery and disposal methods, and design of facilities such as landfills, composting plants and biogas plants. Quantitative and economic analyses.	x			x		x		x
21	Water Supply Systems	Water demand calculations, design of water supply networks, material and equipment selection, and hydraulic analysis of pipe systems. Pump station and pipeline design.		x		x			x	x
22	Air Protection	Types and sources of air pollutants, dispersion processes, and methods of air purification. The operation of air protection devices. Laboratory measurements.			x	x		x		x
23	Material Science	Properties of metals, polymers and installation materials, corrosion mechanisms, protective coatings and material selection for sanitary systems. Practical work on joints and environmental effects.		x				x		
24	Computer Methods of Design in Environmental Engineering	The use of computer methods to prepare professional projects in the field of environmental engineering.				x				
25	Steel Structures	Structural steel properties, design of beams, columns and joints, and steel structures such as halls and bridges. Fire and corrosion protection.		x						
26	English B2 module II	Depending on the chosen language and in accordance with the details of the curriculum.					x			

No.	Course name	Program content	1ISB1	1ISB2	1ISB3	1ISB4	1ISB5	1ISB6	1ISB7	1ISB8
27	English B2+ module II	Depending on the chosen language and in accordance with the details of the curriculum.					x			
28	German B2 module II	Depending on the chosen language and in accordance with the details of the curriculum.					x			
29	English C1 module II	Depending on the chosen language and in accordance with the details of the curriculum.					x			
30	Ventilation	Design of ventilation systems, airflow balancing, pressure loss calculations and indoor air quality and comfort requirements. Flow measurements and system adjustment.		x		x		x		x
31	Heating Systems	Building heat load calculations, design of central heating systems, selection of heating equipment, and hydraulic analysis of heating installations. Students acquire skills in the selection and sizing of radiators, piping, and control fittings.		x		x		x	x	
32	Water Treatment Technology	Water treatment processes including sedimentation, filtration, coagulation, adsorption, disinfection, iron and manganese removal. Design of treatment facilities. Laboratory analysis of water quality.	x			x		x	x	
33	Sewage Systems	Wastewater flow calculations, sewer sizing and hydraulic analysis of sewer networks.		x		x		x		x
34	Conventional and Renewable Energy Sources	The basics of conventional and renewable heat sources used in heating, district heating and ventilation systems. Characteristics of fuels, combustion technologies and renewable energy devices. Impact on energy efficiency and the environment.		x		x		x	x	
35	Gas Networks and Installations	Design and sizing of gas networks and gas installations, safety principles, construction of gas meters, gas stations, and methods of gaseous fuel transmission. Pressure loss calculations. Gas installation project.		x		x			x	x
36	Economics in Civil Engineering	Issues related to the legal and economic analysis of facilities and systems. The socio-economic, technical and legal environment of an enterprise. Legal and economic conditions for the implementation of processes.			x					
37	Legal and Economic Issues in Engineering Practice	Construction law, public procurement, spatial planning. Phases and participants in the investment process. Construction contracts. Sources of financing and evaluation criteria.			x					
38	English B2 module III	Depending on the chosen language and in accordance with the details of the curriculum.					x			
39	English B2+ module III	Depending on the chosen language and in accordance with the details of the curriculum.					x			
40	German B2 module III	Depending on the chosen language and in accordance with the details of the curriculum.					x			
41	English C1 module III	Depending on the chosen language and in accordance with the details of the curriculum.					x			
42	Indoor Plumbing and Sewerage Systems	Design of internal cold and hot water supply systems, hot water circulation systems, as well as sanitary and stormwater drainage systems. Hydraulic calculations and preparation of technical documentation.		x		x		x	x	

No.	Course name	Program content	1ISB1	1ISB2	1ISB3	1ISB4	1ISB5	1ISB6	1ISB7	1ISB8
43	Wastewater Treatment Technology	Wastewater treatment processes: mechanical, physicochemical, and biological, as well as the design of wastewater treatment plant units, including sedimentation tanks, bioreactors, biological filters, and sludge management systems. Process calculations and laboratory measurements.			x	x		x	x	
44	Sewage System - Project	Preparation of a sanitary sewer network design for an urban area, including hydraulic calculations, determination of the vertical alignment and preparation of graphic documentation. Emphasis is placed on practical principles of engineering design.				x			x	x
45	Interdisciplinary Team Project - PBL	Team-based work on a design task integrating spatial planning, architecture, construction, and environmental engineering, from problem analysis to development of a solution concept and final reporting.					x	x	x	x
46	Ventilation System of Housing Buildings and Communal Facilities	Ventilation system design for a selected residential/public building. Calculation of ventilation air volume. Analysis of air distribution in the building/room. Selection of ventilation equipment and ducts. Calculation of ventilation system. Preparation of technical drawings.				x		x	x	x
47	Industrial Ventilation Systems	Ventilation system design for a selected industrial. Calculation of ventilation air volume. Analysis of air distribution in the building/room. Selection of ventilation equipment and ducts. Calculation of ventilation system. Preparation of technical drawings.				x		x	x	x
48	Heating of Residential and Public Buildings	Analysis of plumbing systems used in residential and public buildings. Selection of components and equipment for central heating systems in residential and public buildings, taking into account thermal comfort and energy savings standards. Hydraulic calculations of installations in accordance with current technical and legal standards.				x		x	x	x
49	Heating of Industrial Facilities	Analysis of installation systems used in industrial buildings. Calculations of heat transfer coefficients for building envelopes. Calculations of design heat loads. Selection of materials, equipment, and components for central heating systems in industrial buildings, taking into account dynamic loads and integration with production processes.				x		x	x	x
50	Water Treatment for Municipal Purposes	Design of a water treatment plant for industrial purposes based on raw water quality parameters, plant capacity and requirements for water quality and its transmission to the recipient. Selection of water treatment technology, technological calculations for equipment, site plan, hydraulic profile and drawings of selected equipment.				x		x	x	x
51	Water Treatment for Industrial Purposes	Design of a water treatment plant for industrial purposes based on raw water quality parameters, plant capacity and requirements for water quality and its transmission to the recipient. Selection of water treatment technology, technological calculations for equipment, site plan, hydraulic profile and drawings of selected equipment.				x		x	x	x
52	English B2 module IV	Depending on the chosen language and in accordance with the details of the curriculum.					x			
53	English B2+ module IV	Depending on the chosen language and in accordance with the details of the curriculum.					x			
54	German B2 module IV	Depending on the chosen language and in accordance with the details of the curriculum.					x			
55	English C1 module IV	Depending on the chosen language and in accordance with the details of the curriculum.					x			

No.	Course name	Program content	1ISB1	1ISB2	1ISB3	1ISB4	1ISB5	1ISB6	1ISB7	1ISB8
56	Air Conditioning	Issues related to air treatment processes, heat and moisture balance calculations, design of central air-conditioning units, and selection of supply air parameters. Preparation of an air-conditioning system design project.		x		x		x		x
57	Pre-insulated Heating Networks	Principles of designing pre-insulated pipeline networks, thermal expansion compensation, selection of pipe diameters, and hydraulic and thermal calculations. Design of chambers, fittings, and alarm systems.		x		x				x
58	Water Management	Topics related to water quality assessment, water resources balancing, analysis of discharges and abstractions, and water-wastewater management in industrial facilities. Legal framework and analysis of the status of water bodies under the Water Framework Directive.		x		x				x
59	Engineering Project	A complex technological, network or installation design in the field of sanitary networks and installations for a selected facility, including elements of project management basics, product life cycle analysis and standardisation.			x	x		x	x	x
60	Numerical Methods in Installations Design	Computer simulations of heating, ventilation, and water supply systems. Heat load calculations and the use of software such as EPANET, SWMM, Audytor, QGIS, and others. Project tasks based on numerical analyses.				x				
61	Technology and Cost Estimation for Installation Works	Technologies for executing sanitary installations, principles of testing and acceptance, health and safety requirements, and assessment of the quality of materials and workmanship. Preparation of investor, bid, and as-built cost estimates, and application of quantity survey catalogs and methods for pricing construction works.		x	x	x				
62	Municipal Sewage Treatment	Technological design for a municipal wastewater treatment plant, including selection and sizing of treatment units, analysis of flows and pollutant mass balances, and development of the graphical documentation.				x		x	x	x
63	Industrial Sewage Treatment	Technological design for a non-municipal wastewater treatment plant, including selection and sizing of treatment units, analysis of flows and pollutant mass balances, and development of the graphical documentation.				x		x	x	x
64	Creation of Innovative Solutions	Generating creative solutions through the application of creative thinking principles. Anticipating, formulating and solving problems. Methods, techniques and tools for problem analysis. Overcoming difficulties and developing improvements in team performance.						x	x	
65	Creative Problem Solving	Factors supporting creativity. Creative, bold and unrestricted thinking, focused on results. Methods and paths of creative thinking, creating new values, and verifying and selecting the best ideas. The team as a creative potential for generating new, innovative ideas.						x	x	
66	Electrical Installations in Buildings	Fundamentals of electrical engineering, low-voltage installations, electrical protection, and protection against electric shock, as well as the operation of devices such as transformers and motors. Control systems and data transmission standards in building automation systems.		x			x	x		
67	Selected Problems of Environmental Engineering	Summary of basic issues in environmental engineering in English using specialist vocabulary.			x		x			

No.	Course name	Program content	1ISB1	1ISB2	1ISB3	1ISB4	1ISB5	1ISB6	1ISB7	1ISB8
68	Selected Topics in Air Protection, Heating, Ventilation, and Air Conditioning	Summary of issues related to air protection, heating, ventilation and air conditioning, allowing you to improve the knowledge, skills and competences developed in the Engineerings Project.		x		x			x	
69	Selected Topics in Water Supply, Sewerage, Water Technology, Wastewater Technology, and Waste Management	Summary of issues related to waterworks, sewage systems, water technology, sewage and waste, allowing you to improve the knowledge, skills and competences developed in the Engineerings Project.		x		x			x	
70	Diploma Seminar	Working with printed literature and databases; verifying sources; synthesizing and interpreting information. Clarifying the thesis problem and its elements. Discussing possible solutions; justifying the selection of methods and approaches. Presentations: progress on the thesis + selected issues related to the competency exam. Professional and scientific ethics; plagiarism. Commercialization of research results. Copyright and patent protection.					x	x	x	x
71	Final Project	Formulation of theoretical and empirical problems; objectives and assumptions of the work. Selection of methods and tools (analytical, numerical or experimental) appropriate to the level of education. Review of professional literature; acquisition, verification and synthesis of information. Performing calculations/experimental research; development, analysis and interpretation of results. Drawing conclusions with regard to responsibility for decisions and solutions. Writing and editing the work; preparation of a presentation illustrating the diploma, presentation of results.				x	x	x	x	x
72	Internships - Field Placement	Professional internship related to the installation/construction/technological sector, carried out at an external company.				x	x	x	x	x
73	Internship - Construction Administration Practice	Students may complete professional internships in design offices and studios, environmental engineering contractors, municipal and housing companies, analytical laboratories, or other institutions whose activities are consistent with the curriculum in the field of environmental engineering in construction.				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	Physics	4			4	
3	Chemistry for Sanitary Engineering	6			6	
4	Hydrology and Environmental Protection	4			4	
5	Technical Thermodynamics	3			3	
6	Installation Drawing	3				
7	Information Technologies I	3				
8	Mathematics II	7				
9	Fluid Mechanics	6			6	
10	Biology for Sanitary Engineering	3			3	
11	Information Technologies II	3			3	
12	Surveying and Spatial Information Systems	3				
13	Construction Technology	4				
14	Soil Mechanics	2				
15	English B2 module I	2		2		
16	English B2+ module I	2		2		
17	German B2 module I	2		2		
18	English C1 module I	2		2		
19	Mechanics and Strength of Materials	5				
20	Solid Waste Management	5			5	

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
21	Water Supply Systems	6			6	
22	Air Protection	5			5	
23	Material Science	3			3	
24	Computer Methods of Design in Environmental Engineering	2			2	
25	Steel Structures	2				
26	English B2 module II	2		2		
27	English B2+ module II	2		2		
28	German B2 module II	2		2		
29	English C1 module II	2		2		
30	Ventilation	6			6	
31	Heating Systems	6			6	
32	Water Treatment Technology	6			6	
33	Sewage Systems	3			3	
34	Conventional and Renewable Energy Sources	2			2	
35	Gas Networks and Installations	2			2	
36	Economics in Civil Engineering	3	3	3		
37	Legal and Economic Issues in Engineering Practice	3	3	3		
38	English B2 module III	2		2		
39	English B2+ module III	2		2		
40	German B2 module III	2		2		
41	English C1 module III	2		2		

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
42	Indoor Plumbing and Sewerage Systems	5			5	
43	Wastewater Treatment Technology	6			6	
44	Sewage System - Project	3			3	
45	Interdisciplinary Team Project - PBL	4				
46	Ventilation System of Housing Buildings and Communal Facilities	3		3	3	
47	Industrial Ventilation Systems	3		3	3	
48	Heating of Residential and Public Buildings	3		3	3	
49	Heating of Industrial Facilities	3		3	3	
50	Water Treatment for Municipal Purposes	3		3	3	
51	Water Treatment for Industrial Purposes	3		3	3	
52	English B2 module IV	3		3		
53	English B2+ module IV	3		3		
54	German B2 module IV	3		3		
55	English C1 module IV	3		3		
56	Air Conditioning	6				
57	Pre-insulated Heating Networks	3				
58	Water Management	2				
59	Engineering Project	7			7	
60	Numerical Methods in Installations Design	4			4	
61	Technology and Cost Estimation for Installation Works	3				
62	Municipal Sewage Treatment	3		3	3	

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
63	Industrial Sewage Treatment	3		3	3	
64	Creation of Innovative Solutions	2	2	2	2	
65	Creative Problem Solving	2	2	2	2	
66	Electrical Installations in Buildings	2				
67	Selected Problems of Environmental Engineering	2				2
68	Selected Topics in Air Protection, Heating, Ventilation, and Air Conditioning	3		3	3	
69	Selected Topics in Water Supply, Sewerage, Water Technology, Wastewater Technology, and Waste Management	3		3	3	
70	Diploma Seminar	2				
71	Final Project	15				
72	Internships - Field Placement	6		6		
73	Internship - Construction Administration Practice	6		6		

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)	35/210 (16.67%)
The total number of ECTS credits to be earned by a student through courses in the fields of humanities or social sciences	5
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	117/210 (55.71%)

Methods of verifying and assessing learning outcomes

The verification of achieved learning outcomes requires the use of diverse assessment methods appropriate to the categories of knowledge, skills, and social competencies to which these outcomes pertain. The selection of suitable tools also depends on the specific nature of the subject and the format of the classes and is described in detail in the course syllabi. The achievement of the required learning outcomes is assessed through:

1. written assignments (exams, quizzes, reports, essays, projects, posters, thesis, etc.);
2. oral assessments (oral exams, public speaking, e.g., delivering a paper, presentation, etc.);
3. practical and/or project-based tasks (both individual and group work);
4. observation and evaluation of students' participation and activity during classes;
5. self-assessment and peer evaluation (especially in the case of group projects);
6. competency exams and final diploma examinations.

Verification can be formative (partial, conducted multiple times during the course) and/or summative (final grade assessment). The final verification result is given according to the currently applicable grading scale.

The course coordinator or instructor is required to present the course syllabus during the first class and to clearly define and formally communicate the assessment methods and conditions for verifying learning outcomes.

Professional internships

Duration: 6 weeks

ECTS credits: 6

Student internships are carried out in accordance with the study program in a format adapted to the profile and specifics of the field of study, following the regulations set by the faculty and the university.

Characteristics of the course

Graduate profile

A graduate of the engineering programme Environmental Engineering in Civil Construction possesses the knowledge, skills and competencies necessary to carry out design, implementation and operational tasks in the field of environmental engineering installations and systems operating within buildings and their surroundings. Thanks to this, they will be a sought-after and valued employee in the broadly understood construction industry as well as in design offices involved in typical installation projects. The acquired body of knowledge and skills also enables them to work in architectural and construction administration units in various positions.

The graduate is also prepared to participate in experiments and research related to water treatment, wastewater purification, air protection and waste processing, as well as to undertake second-cycle (Master's) studies.

The graduate should be able to adapt flexibly to the needs of the labour market and develop a habit of continually improving their skills, especially since - after completing the required professional practice - graduates of this programme may apply for licences to perform independent technical functions in construction. Therefore, the curriculum content is consulted with the Łódź Regional Chamber of Civil Engineers, representing the professional community.

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

The guiding theme of the PŁ strategy for 2025-2026 is COOPERATION. The Environmental Engineering in Civil Construction study programme naturally aligns with this approach, as it integrates installation and network engineering with environmental protection, water management, waste management, energy, and construction - areas that require collaboration among multiple stakeholders: administration, industry, designers, contractors, infrastructure operators, and local communities.

In the EDUCATION area of the PŁ strategy, the overarching goal is to develop a model of education that prepares graduates for the dynamically changing needs of the socio-economic environment, including the intensification of practical experience and the increased involvement of students in research activities. The Environmental Engineering in Civil Construction programme fulfils these objectives through a strong design and computational component, the presence of laboratories, and the use of digital tools employed in engineering practice (CAD/GIS/industry-specific software, simulations). Examples include courses in installation and infrastructure design using computer tools, numerical simulations, and specialized software (e.g., EPANET, SWMM, GIS), which develop digital and design competencies essential in the job market. Furthermore, the programme includes courses clearly oriented toward practical design training in the water and sewage sector, strengthening the professional profile of the graduate.

The PŁ strategy also highlights areas that build organizational culture, talent development, and systemic support for students (LEADERSHIP, TALENTS, STUDENTS). The study programme supports these goals through elements that develop teamwork, communication, and professional responsibility. A good example is the interdisciplinary team project (PBL), in which students work in multi-disciplinary project groups to solve tasks in a project-based format, learning collaboration, presentation skills, decision-making arguments, time management, and responsibility for a shared outcome.

In summary, the Environmental Engineering in Civil Construction study programme is consistent with the logic of the PŁ Strategy 2025-2030 because it:

- supports the mission of building a sustainable research university by educating specialists capable of implementing environmental solutions in construction and infrastructure,
- fulfils the EDUCATION goal through a strong emphasis on design, laboratory work, digital tools, and engineering skills,
- strengthens SUSTAINABILITY through content related to water, wastewater, air, waste, and energy, addressing climate and environmental challenges,
- builds IMPACT and INNOVATION through implementation-oriented competencies and preparation of graduates to work in sectors critical to regional and economic development,
- develops a culture of cooperation and talent through team projects and diploma modules.

Educational objectives and employment and continuing education opportunities

The aim of the Environmental Engineering in Civil Construction programme is to prepare graduates for the design, execution and operation of sanitary installations, networks and systems in buildings and their surroundings, taking into account the principles of sustainable development, as well as technical, environmental and socio-economic requirements. This objective also includes the

development of digital, design and analytical competencies, along with readiness for teamwork and professional responsibility.

In particular, graduates acquire qualifications in planning, designing, constructing and operating heating, water supply, sewage, heating, ventilation, air-conditioning and gas networks and installations, as well as systems for water, wastewater and air treatment, and facilities for waste management. The acquired competencies enable graduates to work in design offices, construction and installation companies involved in building, maintaining and operating facilities, municipal services, state and local government administration bodies related to environmental protection, and specialised production and research enterprises engaged in, among others, air protection, water supply, wastewater treatment, waste management or the reclamation of degraded areas.

The competencies developed during the studies also form a solid foundation for shaping and developing individual entrepreneurship.

Completion of first-cycle studies and obtaining the professional title of Engineer allows graduates to apply for construction licences in the installation specialty in the field of heating, ventilation, gas, water supply and sewage networks, installations and equipment, and to perform independent technical functions in construction - with full or limited authority in the supervision of construction works, and with limited authority in design. Therefore, a first-cycle graduate is prepared for continuous professional development, including continuing their education at the second-cycle (Master's) level.

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

The Environmental Engineering in Civil Construction study programme has been consulted on multiple occasions with external industry stakeholders in relation to both core and specialised education. The current modifications arise primarily from the need to comply with internal regulations and do not affect the substantive scope of the programme. Consequently, the opinions and recommendations formulated during earlier consultation processes remain valid and applicable to the proposed version of the curriculum.

In parallel, internal consultations were carried out with students, doctoral candidates, and Faculty staff. A student representative actively participated in the meetings of the Programme Council, providing feedback on key changes. Comments concerning the content and quality of courses were collected through evaluation surveys.

An important additional source of information was the annual reports prepared by the Career Office of Lodz University of Technology, analysing the professional career paths of graduates of the programme.

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

According to the admission resolution for the relevant academic year.

The unit organizing education

Faculty of Civil Engineering, Architecture and Environmental Engineering

Education program

Semester 1

Course	Number of hours	ECTS points	Form of verification	Obligatory
Mathematics I	Tutorials: 60 Lecture: 30	7	Exam	Obligatory
Physics	Tutorials: 15 Laboratory classes: 30 Lecture: 15	4	Graded assignment	Obligatory
Chemistry for Sanitary Engineering	Tutorials: 15 Laboratory classes: 30 Lecture: 30	6	Exam	Obligatory
Hydrology and Environmental Protection	Tutorials: 15 Seminar: 15 Lecture: 30	4	Graded assignment	Obligatory
Technical Thermodynamics	Tutorials: 15 Lecture: 30	3	Graded assignment	Obligatory
Installation Drawing	Project work: 60	3	Graded assignment	Obligatory
Information Technologies I	Laboratory classes: 45 E-learning: 15	3	Graded assignment	Obligatory
Sum	450	30		

Semester 2

Course	Number of hours	ECTS points	Form of verification	Obligatory
Mathematics II	Tutorials: 60 Lecture: 30	7	Exam	Obligatory

Course	Number of hours	ECTS points	Form of verification	Obligatory
Fluid Mechanics	Tutorials: 15 Laboratory classes: 30 Lecture: 25	6	Exam	Obligatory
Biology for Sanitary Engineering	Laboratory classes: 30 Lecture: 20	3	Graded assignment	Obligatory
Information Technologies II	Laboratory classes: 45	3	Graded assignment	Obligatory
Surveying and Spatial Information Systems	Tutorials: 15 Laboratory classes: 30 Lecture: 15	3	Graded assignment	Obligatory
Construction Technology	Laboratory classes: 15 Project work: 15 Lecture: 15	4	Exam	Obligatory
Soil Mechanics	Laboratory classes: 15 Lecture: 15	2	Graded assignment	Obligatory
Foreign Language Module 1		2	Graded assignment	Obligatory group
The student chooses 1 module				
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
Physical Education 1	Tutorials: 30	0	Pass	Obligatory
Sum	450	30		

Semester 3

Course	Number of hours	ECTS points	Form of verification	Obligatory
Mechanics and Strength of Materials	Tutorials: 15 Project work: 30 Lecture: 15	5	Graded assignment	Obligatory
Solid Waste Management	Tutorials: 15 Project work: 30 Lecture: 30	5	Graded assignment	Obligatory
Water Supply Systems	Tutorials: 15 Project work: 30 Lecture: 30	6	Exam	Obligatory
Air Protection	Tutorials: 15 Laboratory classes: 30 Lecture: 15	5	Graded assignment	Obligatory
Material Science	Laboratory classes: 15 Lecture: 30	3	Graded assignment	Obligatory
Computer Methods of Design in Environmental Engineering	Laboratory classes: 45	2	Graded assignment	Obligatory
Steel Structures	Lecture: 30	2	Graded assignment	Obligatory
Foreign Language Module 2		2	Graded assignment	Obligatory group
The student chooses 1 module				
English B2 module II	Tutorials: 30	2	Graded assignment	Optional
English B2+ module II	Tutorials: 30	2	Graded assignment	Optional
German B2 module II	Tutorials: 30	2	Graded assignment	Optional
English C1 module II	Tutorials: 30	2	Graded assignment	Optional
Physical Education 2	Tutorials: 30	0	Pass	Obligatory
Sum	450	30		

Semester 4

Course	Number of hours	ECTS points	Form of verification	Obligatory
Ventilation	Tutorials: 15 Laboratory classes: 30 Lecture: 30	6	Exam	Obligatory
Heating Systems	Tutorials: 15 Laboratory classes: 30 Lecture: 30	6	Exam	Obligatory
Water Treatment Technology	Tutorials: 15 Laboratory classes: 30 Lecture: 30	6	Exam	Obligatory
Sewage Systems	Tutorials: 15 Lecture: 30	3	Exam	Obligatory
Conventional and Renewable Energy Sources	Project work: 15 Lecture: 15	2	Graded assignment	Obligatory
Gas Networks and Installations	Tutorials: 15 Project work: 15 Lecture: 15	2	Graded assignment	Obligatory
Elective Courses 1		3	Graded assignment	Obligatory group
The student chooses 1 subject				
Economics in Civil Engineering	Lecture: 30	3	Graded assignment	Optional
Legal and Economic Issues in Engineering Practice	Lecture: 30	3	Graded assignment	Optional
Foreign Language Module 3		2	Graded assignment	Obligatory group
The student chooses 1 module				
English B2 module III	Tutorials: 30	2	Graded assignment	Optional
English B2+ module III	Tutorials: 30	2	Graded assignment	Optional
German B2 module III	Tutorials: 30	2	Graded assignment	Optional
English C1 module III	Tutorials: 30	2	Graded assignment	Optional
Sum	405	30		

Semester 5

Course	Number of hours	ECTS points	Form of verification	Obligatory
Indoor Plumbing and Sewerage Systems	Tutorials: 20 Project work: 15 Lecture: 15	5	Exam	Obligatory
Wastewater Treatment Technology	Tutorials: 15 Laboratory classes: 30 Lecture: 30	6	Exam	Obligatory
Sewage System - Project	Project work: 30	3	Graded assignment	Obligatory
Interdisciplinary Team Project - PBL	Project work: 60	4	Pass	Obligatory
Elective Courses 2		3	Graded assignment	Obligatory group
The student chooses 1 subject				
Ventilation System of Housing Buildings and Communal Facilities	Project work: 30	3	Graded assignment	Optional
Industrial Ventilation Systems	Project work: 30	3	Graded assignment	Optional
Elective Courses 3		3	Graded assignment	Obligatory group
The student chooses 1 subject				
Heating of Residential and Public Buildings	Project work: 30	3	Graded assignment	Optional
Heating of Industrial Facilities	Project work: 30	3	Graded assignment	Optional
Elective Courses 4		3	Graded assignment	Obligatory group
The student chooses 1 subject				
Water Treatment for Municipal Purposes	Project work: 30	3	Graded assignment	Optional
Water Treatment for Industrial Purposes	Project work: 30	3	Graded assignment	Optional
Foreign Language Module 4		3	Exam	Obligatory group
The student chooses 1 module				
English B2 module IV	Tutorials: 30	3	Exam	Optional

Course	Number of hours	ECTS points	Form of verification	Obligatory
English B2+ module IV	Tutorials: 30	3	Exam	Optional
German B2 module IV	Tutorials: 30	3	Exam	Optional
English C1 module IV	Tutorials: 30	3	Exam	Optional
Physical Education 3	Tutorials: 30	0	Pass	Obligatory
Sum	365	30		

Semester 6

Course	Number of hours	ECTS points	Form of verification	Obligatory
Air Conditioning	Tutorials: 15 Project work: 30 Lecture: 30	6	Exam	Obligatory
Pre-insulated Heating Networks	Project work: 15 Lecture: 30	3	Graded assignment	Obligatory
Water Management	Tutorials: 15 Lecture: 15	2	Graded assignment	Obligatory
Engineering Project	Project work: 60	7	Graded assignment	Obligatory
Numerical Methods in Installations Design	Laboratory classes: 60	4	Graded assignment	Obligatory
Technology and Cost Estimation for Installation Works	Laboratory classes: 15 Project work: 30 Lecture: 15	3	Graded assignment	Obligatory
Elective Course 5		3	Graded assignment	Obligatory group
The student chooses 1 subject				
Municipal Sewage Treatment	Project work: 30	3	Graded assignment	Optional
Industrial Sewage Treatment	Project work: 30	3	Graded assignment	Optional
Elective Courses 6		2	Graded assignment	Obligatory group

Course	Number of hours	ECTS points	Form of verification	Obligatory
The student chooses 1 subject				
Creation of Innovative Solutions	Tutorials: 15	2	Graded assignment	Optional
Creative Problem Solving	Tutorials: 15	2	Graded assignment	Optional
Sum	375	30		

Semester 7

Course	Number of hours	ECTS points	Form of verification	Obligatory
Electrical Installations in Buildings	Laboratory classes: 15 Lecture: 20	2	Graded assignment	Obligatory
Selected Problems of Environmental Engineering	Seminar: 15	2	Graded assignment	Obligatory
Elective Courses 7		3	Graded assignment	Obligatory group
The student chooses 1 subject				
Selected Topics in Air Protection, Heating, Ventilation, and Air Conditioning	Tutorials: 45	3	Graded assignment	Optional
Selected Topics in Water Supply, Sewerage, Water Technology, Wastewater Technology, and Waste Management	Tutorials: 45	3	Graded assignment	Optional
Diploma Seminar	Seminar: 30	2	Graded assignment + exam	Obligatory
Final Project	Diploma Thesis: 0	15	Pass	Obligatory
Elective Courses 8		6	Pass	Obligatory group
The student chooses 1 subject				
Internships - Field Placement	Internship: 0	6	Pass	Optional
Internship - Construction Administration Practice	Internship: 0	6	Pass	Optional
Sum	125	30		