



Lodz University
of Technology

Study programme

Faculty:	Faculty of Process and Environmental Engineering
Major:	Environmental Engineering
Level of study:	second-cycle programme (magister)
Form of study:	part-time studies
Academic year:	2026/27

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Basic information

Name of the field of study:	Environmental Engineering
Level of study:	second-cycle programme (magister)
Study profile:	general academic
Form of studies:	part-time studies
Duration of studies (number of semesters):	4
The number of ECTS points required to complete studies:	90
Total number of hours of classes:	1127
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:	45
Professional title awarded to graduates:	magister
ISCED code:	0712
Language of study:	polish

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

Discipline	Percentage share
Chemical engineering	57%
Environmental engineering, mining and energy	27%
Civil engineering and transport	16%

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	2IOS1	Knows and understands, at an advanced level, modern concepts, models and technologies in the field of environmental engineering that are used to mitigate anthropogenic changes in environmental components.	P7U_W	P7S_WG
2	2IOS2	Knows and thoroughly understands development trends and advanced research methodologies relevant to environmental engineering, particularly within the leading scientific discipline – chemical engineering, including its links to other scientific fields.	P7U_W	P7S_WG
3	2IOS3	Knows and understands the legal, economic, social and ethical conditions of engineering and research activities in the field of environmental engineering, including the principles of industrial property protection and copyright, as well as the basics of the creation, operation and development of various forms of ventures and entrepreneurial activity.	P7U_W	P7S_WK
4	2IOS4	Is able to design, model and optimise technical solutions and environmental protection systems, taking into account technological, operational, environmental and economic conditions.	P7U_U	P7S_UW
5	2IOS5	Is able to formulate and solve complex research and engineering problems specific to environmental engineering, related to the analysis, design and optimization of environmental systems and processes, using advanced analytical and computational methods.	P7U_U	P7S_UW
6	2IOS6	Is able to perform tasks innovatively and creatively interpret research and design problems. Effectively communicates work results using specialized terminology, including in a foreign language (B2+), collaborates with diverse audiences, leads discussions, and works in interdisciplinary teams, including as a leader.	P7U_U	P7S_UW, P7S_UK, P7S_UO
7	2IOS7	Is ready to critically assess technologies and engineering solutions in environmental protection and to recognise the importance of current scientific and technical knowledge in solving environmental problems.	P7U_U, P7U_K	P7S_UU, P7S_KK
8	2IOS8	Is ready to responsibly perform professional roles in environmental engineering, including making decisions with awareness of their environmental and social consequences, and acting in accordance with professional ethics.	P7U_K	P7S_KO, P7S_KR

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

No.	Course name	Program content	21OS1	21OS2	21OS3	21OS4	21OS5	21OS6	21OS7	21OS8
1	Workshops in Environmental Process Engineering	Computational and analytical methods used in chemical engineering, necessary for interpreting and assessing the environmental impact of technological processes in industry. Based on didactic materials they also prepare themselves, students practice recalculating concentrations and substance streams, performing mass and energy balances, and estimating emissions and energy consumption. Prepared materials are presented during the seminar.		x		x			x	
2	Environmental Data Monitoring and Analysis	Development, interpretation and acquisition of data from environmental monitoring databases, such as air, water, or soil quality measurements. The course also includes the operation of field equipment, sample preparation, and performing basic analyses. An important component is the analysis and visualisation of measurement data in Excel using statistical functions and graphical tools. As part of the project, students independently process a selected set of environmental data and prepare a results report.	x			x	x			
3	Energy Transition and Decarbonization	Decarbonisation and energy transition, including energy mix structures, greenhouse gas emissions, and climate policy strategies. Low-emission technologies such as renewable energy sources, energy storage, hydrogen, electromobility, and energy efficiency. The course also includes modelling and analysis of energy data and case studies of the transition in selected sectors and regions.								
4	ESG and Environmental Obligations of Enterprises	Economic and social conditions of corporate environmental responsibility and the role of ESG reporting in organisational management. Special emphasis is placed on the analysis of regulatory obligations, economic mechanisms associated with environmental use (e.g., environmental fees), and the impact of environmental policies on business operations and stakeholder relations. Students prepare projects including legal and institutional requirements analysis, assessment of environmental costs of economic activity, and proposals for pro-environmental actions from the perspective of management and social responsibility.			x			x		x
5	Industrial Ecology and Circular Economy	Issues of industrial ecology and the circular economy, illustrating how industrial processes can be designed and optimised to minimise environmental impact. Analysis of material and energy flows, identification of waste sources, and the design of recycling and resource-reuse systems.								
6	Application of Mathematical Modelling in Air Protection	Legal foundations of air protection, including emission permits and notifications, emission standards, and the principles of preparing documentation related to pollutant emissions. The course also covers meteorology and atmospheric dynamics, pollution diffusion processes, and factors influencing their dispersion in the air. As part of the project and laboratory work, students learn to calculate emissions from various sources and to model pollutant dispersion using the OPA03 program.								
7	Integrated Water and Wastewater Management Systems in Enterprises	Water management in various sectors of the national economy, including water resources, water demand, and methods for preparing water-management balances for catchments, settlements, or industrial facilities. The course also discusses the legal basis for issuing water-law permits and the methodology for preparing water-law reports.								
8	Harmful and Nuisancing Factors in the Work Environment	Factors in the work environment that may have a harmful effect on the human body or reduce a person's ability to work. Characteristics of harmful factors from the following categories: chemical, biological, physical (noise, radiation), and environmental nuisances. Exposure pathways, doses, effects, prevention, protective measures, and legislation. Students research and present specific topics and familiarize themselves with selected methods of workplace monitoring.								

No.	Course name	Program content	210S1	210S2	210S3	210S4	210S5	210S6	210S7	210S8
9	Leak Prevention Systems and Soil Protection	Formation and consequences of hazardous substance leaks and processes governing the migration of pollutants in soil and groundwater. Technologies for preventing leaks, sealing systems, environmental monitoring, and the basics of contaminated site remediation. Practical classes focus on case studies, risk assessment, and designing protection systems for engineering structures.								
10	Modelling and Simulation of Environmental Protection Technologies	Issues related to mathematical and computer modelling of technological processes used in environmental protection, as well as the analysis and interpretation of simulation results. Classes are conducted using CHEMCAD software for building and analysing process models. An important element of the course is also the development of skills in using scientific literature and preparing a literature review and a simulation report in the form of a scientific-style paper.		x			x			
11	Eco-Innovations and Commercialization of Research Results	Concepts and definitions of eco-innovation, methods of creative thinking, evaluation of new ideas and solutions, including the Quicklook method. Commercialisation strategies, basics of patent law, economic analysis of innovative ventures, project financing, and participation in consultations and group project work to develop competencies in entrepreneurship and implementation of ecological solutions.								
12	Emerging Technologies in Environmental Engineering	An overview of global environmental issues and innovative technologies in air protection, water purification, renewable energy sources, and energy recovery. During the seminar, students complete group assignments related to selected environmental topics and new technological solutions.						x		x
13	Life Cycle Assessment	Life cycle assessment principles aimed at identifying environmental risks and identifying ways to reduce the environmental burden of a product.						x		x
14	Safety Rules	Applicable safety regulations, issues related to the storage and transport of substances, operation of industrial equipment, and chemical and physical hazards, including static electricity and chemical reactions. Principles of safe conduct of production activities, maintenance of installations, and procedures in emergency situations such as leaks or entry into tanks. The seminar focuses on identifying safety violations and the practical application of occupational health and safety principles.								
15	Human Safety in Fires	Regulations on fire protection of buildings, evacuation conditions, and hazards to people occurring during a fire. Fire protection strategies, evacuation during a fire, and independent interpretation of regulations, including the selection of appropriate safety measures for a sample building. Students practically apply calculation techniques to design evacuation routes, perform evacuation time calculations, and prepare presentations.								
16	Foreign Language for Specialist Purposes	Grammatical and linguistic scope appropriate for a scientific text within the disciplines of chemical and environmental engineering, mining, and energy. Presentation preparation. Case study - scientific article - analysis and development.						x		
17	Advanced Processes and Technologies in Waste Management	Processes and technologies used in waste management enabling compliance with the latest legal requirements in this field. Students develop and present a technological concept for a facility processing a selected type of waste or a waste management system in an industrial plant or local government unit.								

No.	Course name	Program content	210S1	210S2	210S3	210S4	210S5	210S6	210S7	210S8
18	Environmental Auditing of Enterprises	Practical application of environmental management system requirements compliant with EMAS / ISO 14001. Discussion of the structure of an environmental audit. Preparation of an audit for a selected or model enterprise: identification of environmental aspects, compliance assessment, preparation of audit documentation with recommendations for improvement actions.			x					x
19	Diploma Seminar	Methodology for preparing a thesis, acquisition and analysis of literature sources, ability to present technical issues and engage in discussion. Preparation for the competency examination verifying aggregated learning outcomes.								
20	Integrated Permits and Best Available Techniques (BAT)	Integrated permits and Best Available Techniques (BAT), legal requirements, corporate obligations, and identification of emission and waste sources. Classes are conducted using the case-teaching method, in which students analyse real or simulated industrial installations, select BAT-compliant technologies, and prepare project reports.								
21	Final Project	Analysis of sources, definition of objectives, identification of novelty elements and understanding environmental conditions relevant to the proposed solution. Completing the thesis requires experimental research, literature analysis, calculations and simulations, interpretation of results, and preparation of the thesis. Tasks in this field are complex, interdisciplinary, and require creating new, often unique solutions consistent with sustainable development principles, as well as considering environmental, health and social impacts that may be difficult to predict.								
22	Heat Pumps and Energy Storage Systems	Theoretical foundations of heat pumps, heat pump thermodynamics, efficiency of heat pumps, history of heat pumps, types and construction solutions, types and selection of heat sources (ground and upper sources), methods of storing mechanical and thermal energy, and devices used for storing mechanical and thermal energy.								
23	Energy Balance of HVAC Ventilation Systems	Modeling of buildings and technical systems; determination of energy demand profiles; characteristics of heating systems (air-based, convective, surface, radiant, etc.), cooling systems (air, water, evaporative, etc.) and ventilation; demand profiles; building control and automation; primary and auxiliary systems (peak systems).								
24	Energy Consulting	Principles of energy consulting, energy efficiency of buildings, and the use of renewable energy technologies. In the project component, an energy analysis of a selected facility is carried out, including improvement proposals, their cost-effectiveness, and environmental impact. The curriculum is complemented by an overview of available financing sources for energy investments, including national programs, EU programs, and market mechanisms.								
25	Hydrogen Energy and Synthetic Fuels	Elements of electrochemistry theory. Engineering of power systems based on fuel cells. Hydrogen production technologies and storage methods. Current state of practical use of fuel cells and hydrogen fuel, as well as trends in hydrogen energy. Synthetic fuels: methane and ammonia—production and use as energy carriers, carbon dioxide conversion toward synthetic fuels. Laboratory exercises include work with demonstrational fuel cells.	x					x	x	
26	Biofuel Production	Analysis of biomass-to-biofuel production possibilities using various chemical, thermal, and biological methods. Preparation of design assumptions for a biomass-to-fuel production installation based on experimental results and literature data								
27	Integration of Renewable Energy Sources	Optimization of energy supply for various types of facilities; integration of conventional and renewable sources; characteristics of heat sources; selection of energy supply sources depending on demand profiles; storage of excess energy; self-consumption; energetic and ecological effects of using various energy sources.								

No.	Course name	Program content	210S1	210S2	210S3	210S4	210S5	210S6	210S7	210S8
28	Environmental Assessment Methods for Buildings	EPBD Directive; simulation methods for calculating energy demand; methods for assessing indoor environmental quality; thermal and visual comfort, air quality, acoustics; energy optimization and transformation in buildings; modeling of physical processes at building scale.	x					x		
29	Revitalization and Environmental Shaping of Urban Areas	Pro-environmental actions in urban areas, reduction of air pollution, heat island effect, noise, etc.; solar radiation, green and blue infrastructure; smart-city elements; climate-resilient cities; socially informed revitalization; self-sufficient districts; revitalization of degraded areas; modeling of physical processes on the city scale.					x		x	x
30	Sustainable Building Materials and Technologies	LCA of building materials and technical systems, carbon footprint, circular construction; circular economy; low-emission technologies; elements of sustainable development; LCC—life-cycle cost assessment.		x				x	x	
31	Operation and Modernization of Buildings and Installations	Energy efficiency and indoor environmental quality assessment; building SRI indicators; building stock modernization; data acquisition and monitoring; efficient power systems and installations; digital twins; building stock management components.				x				x
32	Innovations in the Decarbonization of the Built Environment	Passive and active systems for improving the energy efficiency of buildings, including solutions reducing energy losses and technologies using renewable energy sources, such as envelope-integrated RES, e.g., PV modules integrated into façades or roofs. The focus is on environmentally neutral buildings and concepts of self-sufficient neighborhoods combining autonomous energy systems with circular approaches. These solutions form the basis of modern low-emission urban design.								
33	Environmental Assessment of Buildings	Certification systems such as LEED, BREEAM, DGNB, and CASBEE enable the assessment of buildings' environmental performance based on standardized criteria related to energy, materials, water, and indoor environmental quality. These methods allow comparison of design solutions and identification of strategies to minimize a building's environmental impact. The final project involves developing a comprehensive building assessment following a selected methodology, along with proposed actions to improve its ecological and energy performance.								

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	Workshops in Environmental Process Engineering	5			5	
2	Environmental Data Monitoring and Analysis	6			6	
3	Energy Transition and Decarbonization	4			4	
4	ESG and Environmental Obligations of Enterprises	4	4			
5	Industrial Ecology and Circular Economy	4			4	
6	Application of Mathematical Modelling in Air Protection	6		6		
7	Integrated Water and Wastewater Management Systems in Enterprises	5		5		
8	Harmful and Nuisancing Factors in the Work Environment	4		4		
9	Leak Prevention Systems and Soil Protection	5		5		
10	Modelling and Simulation of Environmental Protection Technologies	5			5	
11	Eco-Innovations and Commercialization of Research Results	2	2			2
12	Emerging Technologies in Environmental Engineering	2		2		2
13	Life Cycle Assessment	2		2		2
14	Safety Rules	2		2		2
15	Human Safety in Fires	2		2		2
16	Foreign Language for Specialist Purposes	2				
17	Advanced Processes and Technologies in Waste Management	6		6	6	
18	Environmental Auditing of Enterprises	4		4		
19	Diploma Seminar	2			2	
20	Integrated Permits and Best Available Techniques (BAT)	4				

No.	Course name	ECTS	Subjects in the field of humanities and social sciences	Elective subjects	Profile items	Classes in a foreign language
21	Final Project	20		20	20	
22	Heat Pumps and Energy Storage Systems	5		5		
23	Energy Balance of HVAC Ventilation Systems	5		5		
24	Energy Consulting	5		5		
25	Hydrogen Energy and Synthetic Fuels	5		5		
26	Biofuel Production	6		6	6	
27	Integration of Renewable Energy Sources	4		4		
28	Environmental Assessment Methods for Buildings	5		5		
29	Revitalization and Environmental Shaping of Urban Areas	5		5		
30	Sustainable Building Materials and Technologies	5		5		
31	Operation and Modernization of Buildings and Installations	5		5		
32	Innovations in the Decarbonization of the Built Environment	6		6	6	
33	Environmental Assessment of Buildings	4		4		

ECTS indicators

Name	Specialty: Environmental Management in Enterprises	Specialty: Integration of Energy Systems	Specialty: Transformation of Cities and Buildings
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)	52/90 (57.78%)	52/90 (57.78%)	52/90 (57.78%)
The total number of ECTS credits to be earned by a student through courses in the fields of humanities or social sciences	6	6	6
The total number of ECTS credits that a student must obtain from courses related to research conducted at the university, amounting to more than 50% of the total ECTS credits required to graduate from a given level of study	52/90 (57.78%)	52/90 (57.78%)	52/90 (57.78%)

Methods of verifying and assessing learning outcomes

Weryfikacja osiągniętych efektów uczenia się opiera się na stosowaniu zróżnicowanych i adekwatnych metod oceniania studentów, dostosowanych do zakresu wiedzy, umiejętności oraz kompetencji społecznych objętych tymi efektami. Dobór narzędzi oceny uwzględnia specyfikę danego przedmiotu oraz formę realizowanych zajęć i jest każdorazowo szczegółowo określony w karcie przedmiotu.

Osiągnięcie zakładanych efektów uczenia się podlega ocenie z wykorzystaniem następujących form:

- wykłady: sprawdzian pisemny, test z udziałem pytań otwartych. W przypadku przedmiotów kończących się egzaminem: egzamin pisemny i/lub ustny;
- ćwiczenia: sprawdzian pisemny, kartkówka, ocena aktywności studenta w dyskusji i rozwiązywaniu problemów w trakcie zajęć;
- laboratoria: sprawdzian wiedzy i umiejętności studenta (forma ustna i/lub ustnej pisemna), ocena sprawozdań z wykonanych ćwiczeń laboratoryjnych, ocena aktywności studenta w dyskusji i rozwiązywaniu problemów na zajęciach;
- projekty: ocena wykonanych projektów, arkuszy projektowych, ocena prezentacji końcowych projektów, ocena aktywności studenta w dyskusji i rozwiązywaniu problemów na zajęciach, samoocena zespołu, ocena pracy zespołu;
- seminaria: ocena prezentacji seminaryjnych, ocena aktywności i poziomu merytorycznego dyskusji studentów;
- e-learning: test wiedzy i umiejętności, ocena zadań zaliczeniowych;
- egzamin kompetencyjny oraz egzamin dyplomowy.

Weryfikacja efektów uczenia się może mieć charakter formujący (prowadzony etapowo w trakcie semestru) oraz/lub sumujący (stanowiący podstawę oceny końcowej). Ostateczny wynik weryfikacji ustalany jest zgodnie z obowiązującą skalą ocen. Dla każdego przedmiotu ujętego w planie studiów opracowywana jest karta przedmiotu, która zawiera w szczególności:

- efekty uczenia się wraz ze wskaźnikami ich realizacji, odnoszącymi się do wiedzy, umiejętności i kompetencji społecznych,
- metody weryfikacji wskaźników realizacji efektów uczenia się, odpowiednio dobrane do ich kategorii,
- kierunkowe efekty uczenia się, wiedza/umiejętności/kompetencje społeczne zdefiniowane dla całego kierunku, osiągnięcie których potwierdzane jest poprzez wskaźniki,
- formy oraz warunki zaliczenia przedmiotu.

Professional internships

not applicable

Specializations/degree paths offered within the study program

Specialty: Environmental Management in Enterprises

Specialty: Integration of Energy Systems

Specialty: Transformation of Cities and Buildings

Characteristics of the course

Graduate profile

A graduate of the Master's programme in Environmental Engineering possesses advanced and in-depth knowledge of contemporary concepts, models, and technologies used to analyse and reduce anthropogenic pressure on the environment. They understand the complex interrelationships between technological, economic, and environmental processes and are able to analyse them based on current scientific trends and regulatory frameworks. Thanks to advanced analytical skills, the graduate can develop concepts for the transformation of environmental systems, create models and development scenarios, and interpret complex data in order to formulate accurate conclusions and recommendations.

The graduate is prepared to conduct comprehensive environmental impact assessments of technologies and processes, design environmental strategies, analyse environmental footprints, and develop models of sustainable solutions for industrial, energy, and urban sectors. They integrate scientific knowledge with the ability to create innovative, system-based solutions that take into account technological, environmental, economic, and regulatory aspects.

A graduate of second-cycle (Master's) studies is therefore a specialist capable of comprehensively analysing, designing, and evaluating complex environmental systems, and of working in environments that require advanced critical thinking, interdisciplinary knowledge, and the ability to develop solutions supporting sustainable development.

The programme offers opportunities to develop expertise within the following specialisations:

Environmental management in enterprises, focusing on the implementation of environmental management systems, ESG reporting, and sustainable business practices;

Integration of energy systems, covering advanced solutions for combining conventional and renewable energy sources, energy efficiency, and system optimisation;

Transformation of cities and buildings, addressing sustainable urban development, energy-efficient buildings, and the adaptation of urban infrastructure to climate challenges.

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

The implementation of a modern study programme and maintaining a high level of education for competent and highly qualified personnel for the needs of the economy and administration ensures a direct link with the mission and strategy of the University. Environmental Engineering as a field of study at Lodz University of Technology fully complies with the provisions of the Statute of the Lodz University of Technology (Senate Resolution No. 88/2019 of 10 July 2019) and implements the objectives defined in the University Development Strategy. According to the Annex to Resolution No. 39/2024 of the Senate of Lodz University of Technology of 26 June 2024 on adopting the Strategy of the Lodz University of Technology for 2025–2030 – “Development Strategy of Lodz University of Technology for 2025–2030,” the University's mission is:

"Building a sustainable research university with a strong academic community, ensuring freedom of research and discussion as well as modern education, developing local and global cooperation, and fostering innovation for the benefit of society, the economy, and the world."

In line with the Development Strategy, the Environmental Engineering study programme uses modern teaching methods, offers a wide selection of specialisation and elective courses, and supports flexible learning paths, strengthening talent management through the individualisation of the graduate competency development process.

The proposed Environmental Engineering study programme responds to the need for the development of applied science and modern engineering solutions, strengthening the University's research and teaching potential and enabling work focused on real industry expectations, especially in the area of sustainable development. The programme addresses challenges related to dynamically changing socio-economic needs, including water and wastewater management, emission reduction, and the development of a circular economy, thereby supporting the achievement of the University's strategic goals and reinforcing the vision of Lodz University of Technology as a valued partner for the economy and a contributor to society.

Educational objectives and employment and continuing education opportunities

Second-cycle (Master's) studies in Environmental Engineering prepare specialists capable of independently modelling and evaluating advanced environmental and energy processes, as well as conducting research and implementing innovative solutions in line with the

principles of sustainable development. The programme includes, among others, process modelling, environmental data analysis, energy transition, industrial ecology, circular economy, and ESG-related issues. It also develops competences in technology assessment and environmental responsibility.

Graduates can work as specialists and analysts, among others, in:

- consulting and advisory firms (environmental, energy, ESG),
- industrial enterprises and units responsible for emissions, waste management, water and wastewater management, and energy efficiency,
- the renewable energy sector and building modernisation,
- laboratories, research institutes, and certification bodies,
- public administration and local government,
- non-governmental organisations.

Graduates are also prepared to run their own businesses and to continue their education in doctoral (third-cycle) studies.

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

The educational concept of the Environmental Engineering programme and the resulting graduate profile were consulted with the socio-economic environment and industrial enterprises such as Veolia Energia Łódź S.A., Veolia Energy Contracting Poland, Orifarm Manufacturing Poland Sp. z o.o., Chemat Sp. z o.o., RENA-POL Sp. z o.o. Sp. K., and Equipo Europe P.S.A.

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

In accordance with the legal regulations in force for a given academic year concerning the rules for admission to second-cycle studies at Lodz University of Technology.

The unit organizing education

Faculty of Process and Environmental Engineering

Education program

Semester 1

Course	Number of hours	ECTS points	Form of verification	Obligatory
Workshops in Environmental Process Engineering	Tutorials: 16 Seminar: 12 Laboratory classes: 10	5	Graded assignment	Obligatory
Environmental Data Monitoring and Analysis	Tutorials: 10 Laboratory classes: 10 Project work: 16 Lecture: 13	6	Exam	Obligatory
Energy Transition and Decarbonization	Seminar: 12 Project work: 13 Lecture: 8	4	Graded assignment	Obligatory
ESG and Environmental Obligations of Enterprises	Seminar: 17 Project work: 17	4	Graded assignment	Obligatory
Sum	154	19		

Semester 2

Course	Number of hours	ECTS points	Form of verification	Obligatory
Industrial Ecology and Circular Economy	Seminar: 10 Project work: 23	4	Graded assignment	Obligatory
Sum	33	4		

Specialty: Environmental Management in Enterprises

Course	Number of hours	ECTS points	Form of verification	Obligatory
Application of Mathematical Modelling in Air Protection	Tutorials: 7 Laboratory classes: 7 Project work: 20 Lecture: 8	6	Graded assignment	Obligatory specialization courses
Integrated Water and Wastewater Management Systems in Enterprises	Tutorials: 10 Project work: 15 Lecture: 10	5	Graded assignment	Obligatory specialization courses
Harmful and Nuisancing Factors in the Work Environment	Seminar: 18 Laboratory classes: 9	4	Graded assignment	Obligatory specialization courses
Leak Prevention Systems and Soil Protection	Project work: 20 Lecture: 14	5	Graded assignment	Obligatory specialization courses
Sum	138	20		

Specialty: Integration of Energy Systems

Course	Number of hours	ECTS points	Form of verification	Obligatory
Heat Pumps and Energy Storage Systems	Tutorials: 7 Project work: 20 Lecture: 8	5	Graded assignment	Obligatory specialization courses
Energy Balance of HVAC Ventilation Systems	Seminar: 8 Project work: 27	5	Graded assignment	Obligatory specialization courses
Energy Consulting	Seminar: 8 Project work: 27	5	Graded assignment	Obligatory specialization courses
Hydrogen Energy and Synthetic Fuels	Seminar: 13 Laboratory classes: 10 Lecture: 10	5	Graded assignment	Obligatory specialization courses
Sum	138	20		

Specialty: Transformation of Cities and Buildings

Course	Number of hours	ECTS points	Form of verification	Obligatory
Environmental Assessment Methods for Buildings	Seminar: 8 Project work: 26	5	Graded assignment	Obligatory specialization courses
Revitalization and Environmental Shaping of Urban Areas	Seminar: 7 Project work: 26	5	Graded assignment	Obligatory specialization courses
Sustainable Building Materials and Technologies	Seminar: 8 Project work: 26	5	Graded assignment	Obligatory specialization courses
Operation and Modernization of Buildings and Installations	Seminar: 10 Laboratory classes: 9 Project work: 14	5	Graded assignment	Obligatory specialization courses
Sum	134	20		

Semester 3

Course	Number of hours	ECTS points	Form of verification	Obligatory
Modelling and Simulation of Environmental Protection Technologies	Seminar: 12 Laboratory classes: 20 Project work: 10	5	Graded assignment	Obligatory
Eco-Innovations and Commercialization of Research Results	Project work: 16	2	Graded assignment	Obligatory
Elective Course 1		2	Graded assignment	Obligatory group
Student wybiera 1 przedmiot z grupy				
Emerging Technologies in Environmental Engineering	Seminar: 9 Lecture: 9	2	Graded assignment	Optional
Life Cycle Assessment	Laboratory classes: 11 Lecture: 7	2	Graded assignment	Optional

Course	Number of hours	ECTS points	Form of verification	Obligatory
Safety Rules	Seminar: 9 Lecture: 9	2	Graded assignment	Optional
Human Safety in Fires	E-learning: 18	2	Graded assignment	Optional
Foreign Language for Specialist Purposes	Tutorials: 30	2	Graded assignment	Obligatory
Sum	106	11		

Specialty: Environmental Management in Enterprises

Course	Number of hours	ECTS points	Form of verification	Obligatory
Advanced Processes and Technologies in Waste Management	Tutorials: 10 Seminar: 14 Project work: 20	6	Exam	Obligatory specialization courses
Environmental Auditing of Enterprises	Seminar: 15 Project work: 20	4	Graded assignment	Obligatory specialization courses
Sum	79	10		

Specialty: Integration of Energy Systems

Course	Number of hours	ECTS points	Form of verification	Obligatory
Biofuel Production	Seminar: 14 Laboratory classes: 10 Project work: 20	6	Exam	Obligatory specialization courses
Integration of Renewable Energy Sources	Seminar: 15 Project work: 20	4	Graded assignment	Obligatory specialization courses
Sum	79	10		

Specialty: Transformation of Cities and Buildings

Course	Number of hours	ECTS points	Form of verification	Obligatory
Innovations in the Decarbonization of the Built Environment	Seminar: 14 Laboratory classes: 10 Project work: 20	6	Exam	Obligatory specialization courses
Environmental Assessment of Buildings	Seminar: 15 Project work: 20	4	Graded assignment	Obligatory specialization courses
Sum	79	10		

Semester 4

Course	Number of hours	ECTS points	Form of verification	Obligatory
Diploma Seminar	Seminar: 18	2	Graded assignment + exam	Obligatory
Integrated Permits and Best Available Techniques (BAT)	Seminar: 10 Project work: 20	4	Graded assignment	Obligatory
Final Project	Diploma Thesis: 0	20	Pass	Obligatory subjects to choose from
Sum	48	26		