Table 2.1.

Intended educational effects in form of tabular references of field effects to area effects

Explanation of symbols:

K – field educational effects
W – knowledge category
U – skills category
K (after the underscore) – social competencies category
01, 02, 03 and next – number of educational effect
T2A – educational effects in the field of study in the area of technical sciences for the second degree
A – general academic profile

Faculty of Environmental Sciences

Field of study: environmental engineering **Level of study:** the second degree **Specialty:** environmental biotechnology **Educational profile:** general academic		
Symbol of field effect (K)	**Field educational effects for environmental engineering – On completion of second degree studies, the graduate:**	**Symbol of educational effect for educational areas in the field of technical sciences (T)** **SUBJECTS**
KNOWLEDGE		
K_W01	Has advanced knowledge related to methods of statistical description and concluding in environmental engineering	T2A_W01 Statistics in environmental sciences Ecological aspects of biotechnology Informative techniques in environmental biotechnology Writing scientific papers
K_W02	Has advanced knowledge on the migration of chemical elements and compounds, and on the presence of detrimental and toxic substances	T2A_W01 Organic chemistry Analytical techniques Toxic chemical risk Microorganisms in industry Modeling of selected

		biotechnological processes Designing of agriculture biogas plants Technology of aerobic granular sludge Designing biowaste treatment processes Technologies of biopolymer production Algae biomass - sources and methods of application Introduction to nanobiotechnology Corrosion of metals and anticorrosion protection technology Molecular diagnostics Biomarkers of environmental contamination
K_W03	Has theoretical bases in the field of spatial development and local plans of spatial development	T2A_W01 **Not applicable***
K_W04	Possesses knowledge on the design of installations of environmental engineering considering reliability of the functioning of facilities used in environmental engineering	T2A_W02 Designing of wastewater treatment systems
K_W05	Possesses compendious knowledge on the principles of sustainable development of professional activity and relationship between production and exploitation of the natural environment	T2A_W02, T2A_W08, Renewable sources of electrical energy Environmental management
K_W06	Possesses compendious knowledge on the measurement and interpretation of monitoring data and on the evaluation of the condition of external environment	T2A_W02 Organic chemistry Analytical techniques Microorganisms in industry Modeling of selected biotechnological processes Designing of agriculture biogas plants

		Technology of aerobic granular sludge Designing biowaste treatment processes Technologies of biopolymer production Algae biomass - sources and methods of application Introduction to nanobiotechnology Corrosion of metals and anticorrosion protection technology Molecular diagnostics Biomarkers of environmental contamination
K_W07	Possesses advanced knowledge in the field of conventional and renewable energy and its role in the civic development	T2A_W05; T2A_W08 Renewable sources of electrical energy Technologies of algae biomass production
K_W08	Possesses advanced knowledge in the field of preparing investment documentation, principles of installation works organization, preparation and assessment of financial estimate	T2A_W02; T2A_W08 **Not applicable***
K_W09	Possesses knowledge in the scope of selecting technologies that minimize anthropopressure and the best available technologies in selected industry branches	T2A_W03 Designing of wastewater treatment systems Bioremediation Technologies of algae biomass production Membrane techniques in environmental engineering Technical biocenoses Molecular biotechnology
K_W10	Has theoretical bases in the area of techniques, tools and materials and in control of processes in	T2A_W06 Renewable sources

	environmental engineering	of electrical energy Bioprocess engineering
K_W11	Possesses advanced knowledge on actions linked with sanitary networks and installations, treatment of water and sewage, and waste management	T2A_W04 Environmental biotechnology Designing of wastewater treatment systems Biotechnology of solid waste
K_W12	Possesses advanced knowledge in the field of installations and technologies applied to solve problems linked with water supply, sewage treatment and waste management	T2A_W07 Environmental biotechnology Designing of wastewater treatment systems Biotechnology of solid waste Bioremediation Membrane techniques in environmental engineering Biocatalysis and biotransformation in environmental biotechnology
K_W13	Possesses advanced knowledge in the field of industrial property protection and authorship	T2A_W10 **Not applicable***
K_W14	Possesses compendious knowledge in the scope of legal and economic regulations in business, educational and research activity, and in the scope of environment management; knows principles of establishing individual business enterprise	T2A_W08 T2A_W09 T2A_W11 Environmental management
K_W15	Knows methodology of preparing and writing a research work	T2A_W10 MA Seminary
K_W16	Knows fundamental principles of safety and hygiene at work, and of ergonomics	T2A_W08; Analytical techniques Organic chemistry Environmental biotechnology Technical biocenoses
K_W17	Knows problems presented in current scientific literature in the field of study	T2A_W05; English support English for biotechnologists German for

		biotechnologists MA Seminary Master thesis Ecological aspects of biotechnology Informative techniques in environmental biotechnology Writing scientific papers
SKILLS		
K_U01	Has the ability to acquire information from literature and databases, and to integrate collected information	T2A_U01; T2A_U10 English support English for biotechnologists German for biotechnologists MA Seminary Master thesis Ecological aspects of biotechnology Informative techniques in environmental biotechnology Writing scientific papers
K_U02	Has the ability to work individually and in a group, to lead a small group in a way that assures accomplishment of the planned task	T2A_U02 T2A_U05 Analytical techniques Organic chemistry Toxic chemical risk Technical biocenoses Molecular biotechnology Environmental biotechnology Bioremediation Technologies of algae biomass production Membrane techniques in environmental engineering
K_U03	Has the ability to prepare and deliver presentation on project or research task realization, and to lead	T2A_U04, T2A_U03

	discussion	Analytical techniques MA Seminary Master thesis Environmental biotechnology Bioremediation Toxic chemical risk Technical biocenoses Ecological aspects of biotechnology Informative techniques in environmental biotechnology Writing scientific papers
K_U04	Uses a selected foreign language at a level sufficient to understand research literature, prepare and deliver short oral presentation	T2A_U04, T2A_U06 T2A_U03 Organic chemistry Analytical techniques Renewable sources of electrical energy Statistics in environmental sciences English support English for biotechnologists German for biotechnologists Biocatalysis and biotransformation in environmental biotechnology Bioprocess engineering Bioremediation Biotechnology of solid waste Designing of wastewater treatment systems Toxic chemical risk Environmental biotechnology Molecular biotechnology

		Master thesis Membrane techniques in environmental engineering MA Seminary Technical biocenoses Technologies of algae biomass production Microorganisms in industry Modeling of selected biotechnological processes Designing of agriculture biogas plants Technology of aerobic granular sludge Designing biowaste treatment processes Technologies of biopolymer production Algae biomass - sources and methods of application Introduction to nanobiotechnology Corrosion of metals and anticorrosion protection technology Molecular diagnostics Biomarkers of environmental contamination Ecological aspects of biotechnology Informative techniques in environmental biotechnology Writing scientific papers
K_U05	Has the ability to use quantitative methods of statistical description and concluding, uses computer software for	T2A_U07 Statistics in

	design and computations	environmental sciences
K_U06	Knows how to use data of environmental chemistry in the evaluation of the effects of the presence of detrimental and toxic substances	T2A_U08 Organic chemistry Analytical techniques Toxic chemical risk Bioremediation Microorganisms in industry Modeling of selected biotechnological processes Designing of agriculture biogas plants Technology of aerobic granular sludge Designing biowaste treatment processes Technologies of biopolymer production Algae biomass - sources and methods of application Introduction to nanobiotechnology Corrosion of metals and anticorrosion protection technology Molecular diagnostics Biomarkers of environmental contamination
K_U07	Makes use of the principles of designing environmental engineering facilities considering their reliability, identification of threats and evaluation of risk linked with the improper functioning of these facilities	T2A_U10; T2A_U 09 Designing of wastewater treatment systems Technical biocenoses
K_U08	Makes use of the principles of sustainable development in professional activity, and is able to assess the pro-ecological activity of enterprises	T2A_U15 Renewable sources of electrical energy Environmental management
K_U09	Has the ability to plan measurements and to interpret	T2A_U09

	monitoring data in order to evaluate the condition of external environment	Analytical techniques
K_U10	Has the ability to demonstrate the economic and environmental advisability of using alternative energy sources of pro-ecological technologies	T2A_U10; T2A_U14 Renewable sources of electrical energy Environmental management Technologies of algae biomass production Biotechnology of solid waste
K_U11	Has the ability to prepare investment documentation of construction works, financial estimates and plans of spatial development	T2A_U13 **Not applicable***
K_U12	Knows how to use simple devices monitoring and controlling engineering processes in the scope of environmental engineering	T2A_U12 T2A_U19 Membrane techniques in environmental engineering Technologies of algae biomass production
K_U13	Is able to elaborate documentation from the realization of a project or research task, and is able to prepare a report containing discussion of these results in the scope of water supply, sewage treatment and waste management	T2A_U04 Bioremediation Designing of wastewater treatment systems
K_U14	Has the ability to select technologies that minimize anthropopressure, including the ability to analyze effects that result from pro-ecological actions implemented in industrial plants	T2A_U10 T2A_U17 T2A_U19 Renewable sources of electrical energy Bioprocess engineering Bioremediation Biotechnology of solid waste Designing of wastewater treatment systems Environmental biotechnology Molecular biotechnology Membrane techniques in environmental

		engineering Technical biocenoses Technologies of algae biomass production
K_U15	Is able to design installations and systems used in environmental engineering	T2A_U11 T2A_U16 T2A_U18 T2A_U19 Designing of wastewater treatment systems Biocatalysis and biotransformation in environmental biotechnology
K_U16	Uses a selected foreign language to describe techniques and technologies in the scope of environmental engineering	T2A_U06 Organic chemistry Analytical techniques Renewable sources of electrical energy Statistics in environmental sciences English support English for biotechnologists German for biotechnologists Biocatalysis and biotransformation in environmental biotechnology Bioprocess engineering Bioremediation Biotechnology of solid waste Designing of wastewater treatment systems Toxic chemical risk Environmental biotechnology Molecular biotechnology Master thesis Membrane techniques in

		environmental engineering MA Seminary Technical biocenoses Technologies of algae biomass production
SOCIAL COMPETENCIES		
K_K01	Has the skill of creative and resourceful thinking and acting	T2A_K02 T2A_K03 T2A_K04 T2A_K06 Organic chemistry Analytical techniques Renewable sources of electrical energy Biocatalysis and biotransformation in environmental biotechnology Bioprocess engineering Bioremediation Biotechnology of solid waste Designing of wastewater treatment systems Toxic chemical risk Environmental biotechnology Molecular biotechnology Master thesis Membrane techniques in environmental engineering Technical biocenoses Technologies of algae biomass production Microorganisms in industry Modeling of selected biotechnological processes

		Designing of agriculture biogas plants Technology of aerobic granular sludge Designing biowaste treatment processes Technologies of biopolymer production Algae biomass - sources and methods of application Introduction to nanobiotechnology Corrosion of metals and anticorrosion protection technology Molecular diagnostics Biomarkers of environmental contamination
K_K02	Understands the need for formulating and delivering principles of sustainable use of environment, including the significance of environmental engineering, to the society	T2A_K07 T2A_K05 Renewable sources of electrical energy Environmental management Bioremediation Biotechnology of solid waste Environmental biotechnology Designing of wastewater treatment systems Membrane techniques in environmental engineering Technical biocenoses Technologies of algae biomass production
K_K03	Understands the need for continuous education, inspiring others and knowledge transfer	T2A_K01 Organic chemistry Analytical

		techniques Renewable sources of electrical energy Statistics in environmental sciences English support English for biotechnologists German for biotechnologists Biocatalysis and biotransformation in environmental biotechnology Bioprocess engineering Bioremediation Biotechnology of solid waste Designing of wastewater treatment systems Toxic chemical risk Environmental biotechnology Molecular biotechnology Master thesis Membrane techniques in environmental engineering MA Seminary Technical biocenoses Technologies of algae biomass production Microorganisms in industry Modeling of selected biotechnological processes Designing of agriculture biogas plants Technology of aerobic granular sludge Designing biowaste

		treatment processes Technologies of biopolymer production Algae biomass - sources and methods of application Introduction to nanobiotechnology Corrosion of metals and anticorrosion protection technology Molecular diagnostics Biomarkers of environmental contamination Ecological aspects of biotechnology Informative techniques in environmental biotechnology Writing scientific papers

Not applicable*

Field effects not implemented due to the fact that studies are planned as an international and a target group are students from all over the world. In the absence of uniform legislation in the world, the issues relating to spatial development, the rules for the preparation of investment documentation, industrial property and copyright law, regulatory and economic activity, education, research, environmental management, the creation of individual entrepreneurship, specific for the Polish conditions, are not included in the curriculum.