

Field of study:

Level of study: **2nd cycle studies**

Form of study: **Full-time studies**

Profile of Education: **Academic**

MATRIX OF EDUCATION EFFECTS

SPECJALIZACJA		Advanced Technologies in Environmental Engineering (ATEE)																																					
Symbol of field-related learning outcomes	Learning outcomes	Environmental Statistics	Advanced Environmental Chemistry	Modern Materials in Engineering Applications	Safety and Reliability of Engineering Systems	Computer Aided Design	Data Bases and Advanced GIS	Heat and Mass Transfer Processes Design	Renewable Energy Technologies	Bioprocess Engineering	Environmental Analytics	Water Treatment Technologies	Biological Wastewater Treatment	Modelling of Water Distribution Systems	Techniques of Air Pollution Control	Environmental Fluid Transport	Modelling of Pollutant Propagation in Atmosphere	Technologies of Material Reuse	Waste to Energy - Application Technologies	Energy Analysis and Feasibility Studies	Clean Fossil and Alternative Fuels	Modelling of Energy Systems	Diploma Seminar	Master's Thesis	Technical English Support/Polish Language	Physical Education	Sustainable Development for Engineers	Communication and Negotiations in Business	Ethics in Business	Creativity Training	Energy Consumption of Industrial Processes	Chemical Reactors Engineering	Mass Exchanger Design	Spatial Planning and Urban Design	Multiphase Flow in Environmental Technology	Advanced Environmental Metrology			
		KNOWLEDGE (W)																																					
IS_K2_W01	Student has broadened and deepened knowledge of selected fields of mathematics, physics, chemistry, biology and earth science in terms necessary to describe phenomena and processes related to environmental engineering technology.	X	X					X	X							X							X	X							X								
IS_K2_W02	Student has knowledge of spatial planning at local and supra-local levels.																																		X				
IS_K2_W03	Student knows rules of identifying danger, security, hygiene of work and ergonomics during the construction and installation operations used in environmental engineering.				X																																		
IS_K2_W04	Student has knowledge of conventional and alternative energy sources and of technical and technological possibilities of generating, converting and application.							X											X	X		X										X							
IS_K2_W05	Student knows statistical methods of data analysis and measurement results development.	X				X										X	X	X																		X			
IS_K2_W06	Student knows numerical and computer methods and tools useful in solving engineering tasks in the field of environmental engineering.				X									X		X	X		X		X		X	X															
IS_K2_W07	Student has knowledge of process, phenomena and device modeling in environmental engineering.										X	X				X						X	X	X															
IS_K2_W08	Student has knowledge of methods, tools and models of environmental management including waste management.																	X											X	X									
IS_K2_W09	Student has knowledge of preparation and application of investment documentation, organization of construction and installation works.													X						X																			
IS_K2_W10	Student knows the designing rules of devices and equipment used in environmental engineering and is familiar with development trends in construction of environmental protection installations					X	X	X															X	X								X	X						
IS_K2_W11	Student knows the rules of engineering design and computer programmes which support designing of environmental infrastructure.				X	X							X											X											X				
IS_K2_W12	Student has broadened knowledge of phenomena and processes observation and knows the methods of measurement of characteristic quantities relevant to the environmental engineering					X									X		X							X												X			
IS_K2_W13	Student has specialized knowledge for solving problems related to environmental engineering.		X			X												X		X																			
IS_K2_W14	Student knows the principles of processes, objects and systems of environmental engineering systems design, including their influence on the environment, reliability and safety of use.										X								X																				
IS_K2_W15	Student knows methods, techniques and equipment for analyzing physical, chemical and biological phenomena from the perspective of engineering and environmental protection, has basic knowledge of life cycle of equipment, objects and technical systems.	X								X				X								X																X	
IS_K2_W16	Student demonstrates structured and theoretically underpinned basic knowledge which includes main issues of environmental engineering. Student has knowledge about role of environment, is aware of risks and knows methods of their identification and limitation.	X								X											X																X		
IS_K2_W17	Student has current knowledge in the field of innovative technologies used in environmental engineering and related science disciplines, knows the principle of sustainable development.		X		X		X		X										X	X									X						X				
IS_K2_W18	Student knows methods, techniques, tools and materials used in solving complex engineering tasks in the field of environmental engineering.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
IS_K2_W19	Student has knowledge of using legal regulations, norms and guidelines in designing and operation of technical objects.			X							X								X																				
IS_K2_W20	Student has knowledge necessary to understand social, economical, legal and other non-technical conditions of engineering activities and their role in engineering practice.																								X	X	X	X	X	X	X	X	X	X	X	X	X	X	
IS_K2_W21	Student knows and understands the basic concepts and rules for the protection of industrial property, copyright and necessity of intellectual property management, is able to use patent information resources.																							X															
SKILLS (U)																																							
IS_K2_U01	Student obtains information from literature, databases and other sources related to technical sciences; Student can integrate obtained information, interpret, draw conclusions and formulate opinions.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
IS_K2_U02	Student uses intellectual achievements of other authors complying with copyright law in order to prepare scientific papers.																		X																				
IS_K2_U03	Student can use statistical methods in data development and environmental analysis.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
IS_K2_U04	Student uses computer programs to solve engineering tasks.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
IS_K2_U05	Student is able to communicate in the range relating to environmental engineering using different techniques in various environments, also in a foreign language.		X			X												X	X	X								X											
IS_K2_U06	Student can prepare in Polish and in a foreign language, considered as basic, a set problem of environmental engineering.																		X																				
IS_K2_U07	Student is able to prepare and present in Polish and in a foreign language, considered as basic, an oral presentation of detailed engineering issues.																			X																			
IS_K2_U08	Student has autonomous learning skills, works individually and in a team.		X			X								X		X		X							X		X	X	X	X	X	X	X	X	X	X	X	X	
IS_K2_U09	Student has the ability to communicate in a foreign language at B2 level of The Common European Framework of Reference for Languages, including knowledge of technical language of environmental engineering.																								X														
IS_K2_U10	Student can use information and communication techniques necessary for the implementation typical engineering activities												X	X									X	X															
IS_K2_U11	Student can formulate general guidelines for spatial planning in a graphical and descriptive manner.																																			X			
IS_K2_U12	Student is able to plan and carry out experiments, to interpret the results and to draw conclusions.	X																																			X	X	
IS_K2_U13	Student can use the measurement devices, is able to estimate errors.							X							X	X																							
IS_K2_U14	Student is able to carry out the analysis of engineering tasks and apply simulation methods leading to the solution, interpret the results, draw conclusions and test the hypothesis.					X							X	X			X																				X	X	
IS_K2_U15	Student can recognize the system and non-technical aspects during formulating and solving engineering tasks.																			X								X											
IS_K2_U16	Student can use the investment documentation, evaluate the costs of investment, apply the principles of the organization of installation works.																			X																			
IS_K2_U17	Student can make a preliminary economic analysis of engineering activities.																			X										X	X								
IS_K2_U18	Student has the skills of phenomena and process observation and is able to do experimental measurements of characteristic physical, chemical and biological quantities relevant to environmental engineering and to interpret the results.	X								X															X														
IS_K2_U19	Student is able to solve complex engineering tasks in the field of environmental engineering, comprising a research component and to assess the suitability of various methods and tools for solving them.																								X														
IS_K2_U20	Student can perform simple tasks concerning broadly defined environmental protection technologies.																																		X			X	
IS_K2_U21	Student can make a critical analysis of the functioning and evaluate the existing technical solutions used in environmental engineering.		X															X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
IS_K2_U22	Student can - in accordance with set specification - design and implement a simple device, object, system or process typical for environmental engineering using appropriate methods, techniques and tools.			X	X							X	X										X													X			
IS_K2_U23	Student evaluates the processes, equipment, objects and systems related to environmental engineering in terms of their energy and economic efficiency and their influence on the environment.																	X								X										X			
IS_K2_U24	Student is able to prepare scientific paper in Polish or a foreign language presenting the results of their own research including master thesis.																								X	X													
SOCIAL COMPETENCES (K)																																							
IS_K2_K01	Student can understand the necessity of further training, of improving professional skills, is able to inspire and organize learning process of others.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
IS_K2_K02	Student can understand the importance of necessity to provide safe working environment.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
IS_K2_K03	Student can correctly identify engineering problems and is able to set priorities for professional activities.		X			X													X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
IS_K2_K04	Student is able to interact and work in a group performing different roles; Student can understand the importance of collective action.	X				X	X	X							X											X		X	X	X	X	X	X	X	X	X	X	X	
IS_K2_K05	Student is aware of the importance and it can understand the non-technical aspects and effects of engineering actions, including their impact on the environment, and the associated responsibility for decisions.			X								X				X	X		X								X		X							X			
IS_K2_K06	Student has awareness of the importance of professional behaviour, compliance with the principles of professional ethics and it can respect the diversity of views and opinions.				X																					X			X	X									
IS_K2_K07	Student can think and act in a creative, innovative and entrepreneurial way.	X			X	X					X	X				X	X							X	X										X	X	X		
IS_K2_K08	Student can understand the social role of an engineer and can understand the need for reliable public information about the achievements of engineering.		X		X	X	X							X	X	X	X																				X		

Dean of Faculty of Mechanical Engineering

date/signature