Learning outcomes for the field of study ENVIRONMENTAL ENGINEERING 1st cycle (BSc degree), general academic education profile

Explanation of symbols:

- K - learning outcomes as per of field of study
- W - knowledge category
- U - category of skills
- KB - learning outcomes for the field of Environmental Engineering
- (O) - (general) characteristics of 1st degree in the Polska Rama Kwalifikacji (PRK) – level 6
- (I) - characteristics of 1st degree in the PRK for qualifications comprising engineering competence – level 6

DESCRIPTION OF THE FIELD-SPECIFIC LEARNING OUTCOMES		
Efekty uczenia się na kierunku Inżynieria Środowiska (KIS)	Having completed the 1st cycle (BSc degree) studies in the field of ENVIRONMENTAL ENGINEERING, the graduates:	Kod składnika opisu / odniesienie do charakterystyk drugiego stopnia PRK
KNOWLEDGE		
KIS_W01	have knowledge in the fields of mathematics, physics, chemistry, biology and other fields of science, suitable to formulate and solve simple problems of environmental engineering.	P6S_WG (O)
KIS_W02	have basic knowledge in the field of architecture, technical mechanics, building engineering, construction and structure of buildings as well as the method for shaping building components with respect to their thermal, moisture, air leakproofness aspects, with respect to foundation engineering of buildings and structures, foundation in soil of heat and sanitary networks, installation materials and methods for connecting leads and networks into systems, power engineering and automatic control as well as computing, meteorology and ecology, suitable to formulate and solve simple problems of environmental engineering.	P6S_WG (O/I)
KIS_W03	have structured and theoretically based general knowledge of key issues of technical thermodynamics, heat and mass exchange, fluid mechanics (including fluid-flow machines), environmental biology and chemistry.	P6S_WG (O/I)

KIS_W04	have detailed knowledge of such subject areas as: energy balancing, thermal conductivity in stationary and non-stationary state, convection, radiation and heat transmission, compressible and incompressible fluid flows, thermodynamic processes in ideal gas and humid air, clockwise and counterclokswise thermodynamic cycles, combustion, including low-emission combustion, hydrology, sanitary biology, water pollution evaluation, water protection, sanitary chemistry.	P6S_WG (O/I)
KIS_W05	have basic knowledge of development trends in environmental engineering, including: - technical fitting of buildings systems, - heat sources, thermal networks and centres, heat exchangers, - water pipe networks and sewage systems, - water conditioning systems and sewage treatment, - air protection engineering, - hydrology, - role of microorganisms in the processes of sewage treatment and water conditioning, - air microbiology, - global phenomena influencing and shaping land development.	P6S_WG (O/I)
KIS_W06	have basic knowledge of life cycle of devices, buildings, and technical systems in environmental engineering, including: - technical fitting of buildings systems, - heat supply systems, - thermal networks, water pipe networks and sewage systems, - water conditioning systems and sewage treatment, - air protection equipment, - hydrology.	P6S_WG (I)
KIS_W07	know basic methods, techniques, tools and materials, including elements of BIM technology, applied to solve simple engineering tasks in environmental engineering, especially those concerning: - technical fitting of buildings systems, - selection of Heating, Ventilation, Air Conditioning (HVAC) structures for buildings with different energy characteristics, - control system structures in building engineering and municipal engineering, - thermal networks, water pipe networks and sewage systems, - water conditioning systems and sewage treatment, - air protection systems, - municipal wastes and methods for utilization and disposal, - hydrology and water protection, - disinfection of water and sewage.	P6S_WG (I)
KIS_W08	have basic knowledge necessary to understand social, economic, legal and other non-technical conditions of engineering activities, including the principles of sustainable development.	P6S_WK (O)

KIS_W09	have basic knowledge of management, including quality management and conducting business in environmental engineering: - technical fitting of buildings systems, - heat supply systems, - thermal networks, water pipe networks and sewage systems, - construction engineering works in heat and sanitary installation (systems), - water conditioning systems and sewage treatment, - air protection systems, - environmental management, - hydrology, - work organisation in research laboratories.	P6S_WK (O)
KIS_W10	know and understand basic ideas and regulations in the field of industrial and intellectual property protection.	P6S_WK (O)
KIS_W11	know general rules of developing different forms of individual entrepreneurship, utilizing knowledge obtained in the field of environmental engineering.	P6S_WK (O/I)
SKILLS		
KIS_U01	are able to obtain information from literature, databases and other properly selected information sources, also in English, or in another foreign language regarded as a language of international communication in environmental engineering; can integrate, interpret and evaluate the obtained information as well as draw conclusions, formulate, discuss and justify opinions.	P6S_UW (O)
KIS_U02	are able to use information and communication technologies (ICT) appropriate to perform typical engineering tasks, including those applying the BIM technology.	P6S_UW (O)
KIS_U03	are able to plan and carry out experiments, including measurements and computer simulation in the field of: - heat supply equipment, heaters and heat exchangers, - selected building components, - selected elements of technical fitting of buildings systems, - selected elements of water conditioning systems and sewage treatment, - selected elements of water supply systems, - selected elements of heat supply systems, - selected elements of sewage disposal systems, - selected elements of air protection systems, - selected elements of microbiological environmental pollution; are able to clearly present and interpret the obtained results and draw conclusions.	P6S_UW (I)

KIS_U04	in order to formulate and solve engineering tasks in environmental engineering, can apply analytical, simulation and experimental methods, including: - open and commercial numerical codes and engineering software, - measurement methods (pressure, temperature of fluid speed, fluid flows, heat flows, heat exchanger performance, thermal imaging).	P6S_UW (I)
KIS_U05	when formulating and solving engineering tasks in environmental engineering, can notice the systemic and non-technical aspects as well as the need to apply the principles of sustainable development.	P6S_UW (O/I)
KIS_U06	are able to perform preliminary economic and ecological analysis of engineering activities concerning: - technical fitting of buildings systems, - thermal networks, water pipe networks and sewage systems, - water conditioning systems and sewage treatment, - air protection systems, - hydrology.	P6S_UW (I)
KIS_U07	are able to critically analyse and evaluate the performance of existing technical solutions in the field of environmental engineering, especially devices, objects, systems, processes, services related to: - technical fitting of buildings systems, - central heating supply, - thermal networks, water pipe networks and sewage systems, - water conditioning systems and sewage treatment, - air protection systems, - biological sewage treatment, - quality control in water production.	P6S_UW (I)
KIS_U08	can identify and specify simple practical engineering tasks, typical for environmental engineering, including: - technical fitting of buildings systems, - selected elements of water conditioning systems and sewage treatment, - selected elements of water supply systems, - selected elements of sewage disposal systems, - selected elements of heat supply systems, - selected elements of air protection systems, - disinfection of water, sewage and air.	P6S_UW (I)
KIS_U09	can evaluate the suitability of routine methods and tools dedicated to solve simple practical engineering tasks in environmental engineering; can choose and apply an appropriate method and tool.	P6S_UW (O/I)

KIS_U10	utilizing appropriate methods, technologies and tools (including the BIM technology), can design and implement a simple device, object, system or process, select a device typical for environmental engineering, especially in the field of: - technical fitting of buildings systems, - heaters and heat exchangers, thermal networks, - heat supply systems, - thermal networks, water pipe networks and sewage systems, - water conditioning systems and sewage treatment, - air protection systems, - hydrology, - water cleanliness control and water disinfection.	P6S_UW (I)
KIS_U11	can communicate by means of different techniques with professionals active in the field of environmental engineering, architecture and building engineering as well as in other professional environments connected with environmental engineering.	P6S_UK (O/I)
KIS_U12	can prepare, in the Polish language and in a foreign language, a well-documented scientific publications on significant problems of environmental engineering, including: - technical fitting of buildings systems, - heat supply systems, heat sources, heat exchangers thermal networks, - water pipe networks and sewage systems, - utilization of renewable heat resources and heat recuperation, - water conditioning systems and sewage treatment, - air protection systems, - hydrology, - environmental biology and ecology, - water protection against pollution.	P6S_UK (O/I)
KIS_U13	can prepare and present in the Polish and English language an oral presentation concerning detailed issues of environmental engineering, such as: - technical fitting of buildings systems, - heat supply systems, heat sources, heat exchangers, thermal networks, - water pipe networks and sewage systems, - utilization of renewable heat resources and heat recuperation, - water conditioning systems and sewage treatment, - air protection systems, - hydrology, - technical microbiology, - water protection and pollution.	P6S_UK (O/I)

KIS_U14	have language skills in the field of science and scientific disciplines, appropriate for environmental engineering, according to the Common European Framework of Reference for Languages, B2 level.	P6S_UK (O)
KIS_U15	are prepared to work in industrial environment of environmental engineering, especially connected with: networks and systems of technical fitting of buildings, heat supply systems, water conditioning systems, sewage systems and air protection equipment, basic environment monitoring, water, sewage and air quality control; know the safety rules related to that work.	P6S_UO (O/I)
KIS_U16	can cooperate and work in a team, taking different roles; can correctly define priorities for performing tasks defined by themselves and other people.	P6S_UO (O)
KIS_U17	can realise the self-education process; understand the need of Life-Long Learning (LLL).	P6S_UU (O)
SOCIAL COMPETENCE		
KIS_K01	are aware of non-technical aspects and effects of engineering activity, including its environmental impact.	P6S_KK (O)
KIS_K02	are aware of negative effects of activities exceeding the engineer's competence, and understand the need of expertise.	P6S_KK (O)
KIS_K03	are aware of responsibility for taking decision.	P6S_KK (O)
KIS_K04	are ready to think and act in a business-like way.	P6S_KO (O)
KIS_K05	are aware of the social role of technical university graduate, are prepared to formulate and transfer information and opinions concerning the achievements of technology and other aspects of engineering activity in a commonly comprehensible way.	P6S_KO (O)
KIS_K06	are prepared to correctly identify and solve problems concerning the pursuit of the occupation.	P6S_KR (O)
KIS_K07	are aware of how necessary it is to obey the principles of professional ethics, being a result of the social role of technical university graduate.	P6S_KR (O)