

Learning outcomes for the field of study SUSTAINABLE BUILDING 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 Sustainable Building 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		
Efekt uczenia się dla kierunku Budownictwo Zrównoważone	Having completed the 1 st cycle (BSc degree) studies in the field of SUSTAINABLE BUILDING ENGINEERING, the graduates:	Charakterystyki drugiego stopnia efektów uczenia się dla kwalifikacji na poziomie 6
KNOWLEDGE		
KSB_W01	have knowledge in the fields of mathematics, physics, chemistry, biology and other fields of sciences suitable to formulate and solve problems concerning sustainable building engineering (civil engineering, environmental engineering and architecture).	P6S_WG (O)
KSB_W02	have advanced knowledge of the principles of descriptive geometry and technical drawing, recording and reading architectural drawings, construction maps and geodesic maps, as well as the methods of preparing the maps both traditionally and using the BIM technology (Building Information Modelling).	P6S_WG (I)
KSB_W03	are able to define map projections and identify basic land surveying in sustainable building engineering.	P6S_WG (I)
KSB_W04	have detailed knowledge in theoretical mechanics, knowledge of materials' strength, and general rules of shaping structures.	P6S_WG (O/I)
KSB_W05	have basic knowledge of the methods for shaping building components with respect of heat, moisture, leakproofness, foundation in soil of heat and sanitary networks.	P6S_WG (O/I)
KSB_W06	have knowledge in construction theory and analysis of bar systems in the field of statics, dynamics, and stability.	P6S_WG (I)
KSB_W07	know building legislation, Polish standards (PN) and European standards (EN), technical conditions of constructing building facilities and energy-saving buildings.	P6S_WG (O) P6S_WK (O)
KSB_W08	know the principles of constructing and dimensioning metal, concrete, wooden and brick elements as well as connections of building units.	P6S_WG (I)
KSB_W09	know the basics of geology, soil mechanics and foundation engineering of building facilities.	P6S_WG (I)

KSB_W10	know the rules of constructing and analysing civil engineering, low-energy, passive and sustainable, industrial, road, bridge, and railroad units.	P6S_WG (I)
KSB_W11	have basic knowledge of the design of general infrastructure constructions as well as sustainable road and rail transport.	P6S_WG (I)
KSB_W12	have basic knowledge of operation algorithms of selected software (including the usage of BIM technology), supporting the calculation and design of constructions, construction work organisation, cost estimation, technical fitting of buildings; basic knowledge of operation algorithms of software dedicated for evaluation and design of energy-saving buildings.	P6S_WG (O/I)
KSB_W13	know the basics of building physics, concerning heat and moisture flows in building components and facilities, energy supply, and the main rules of selecting building installation systems with respect to renewable energy sources.	P6S_WG (I)
KSB_W14	have knowledge of most frequently applied building and installation materials and their properties, research methods, basic elements of their design, performance and assembly technologies, methods for evaluation and maintenance of structure technical condition.	P6S_WG (O/I)
KSB_W15	have basic knowledge of the organisation and rules of managing the construction site, the development of construction work quality management procedures; know the working standards in building engineering.	P6S_WK (I)
KSB_W16	have basic knowledge of conducting business activities in building engineering.	P6S_WK (O/I)
KSB_W17	have basic knowledge of land planning and energy planning, relations between architecture and urban planning, technical and economic potential of building engineering as well as the effect of building investment on the built sustainable environment.	P6S_WG (O) P6S_WK (O)
KSB_W18	have structured and theoretically based knowledge comprising key problems of architecture history, urban planning and sustainable building engineering development.	P6S_WG (O)
KSB_W19	have structured and theoretically based knowledge of key problems of heat technique, technical thermodynamics, heat and mass exchange, fluid mechanics (including fluid-flow machines), environmental biology and environmental chemistry.	P6S_WG (I)
KSB_W20	know basic methods, techniques, tools and materials applied to solve simple engineering tasks in the field of environmental engineering.	P6S_WG (I)
KSB_W21	have basic knowledge of development trends and life cycle as referred to technical fitting of building unit.	P6S_WG (I)
KSB_W22	have basic knowledge of development trends and life cycle of external infrastructure.	P6S_WG (I)

KSB_W23	have knowledge in the field of architectural design theory both traditional and using BIM technology.	P6S_WG (I)
KSB_W24	know the problems of landscape architecture and land sustainable development.	P6S_WK (O)
KSB_W25	know basic methods, techniques, tools and materials applied to solve engineering tasks in the field of design and urban technical infrastructure.	P6S_WG (I)
KSB_W26	have basic knowledge of modern development trends in the field of architectural design, including the use of BIM technologies.	P6S_WG (O/I)
KSB_W27	have knowledge of consumer, total, primary energy balance for buildings and complex systems as well as building certification, including energy characteristic, passive building certificates and other certificates recognised in Poland (e.g. BREEM, LEED).	P6S_WG (I)
KSB_W28	have knowledge of thermal comfort and air quality in high-energy standard buildings.	P6S_WG (I)
SKILLS		
KSB_U01	are able to obtain information from literature, databases and other properly selected information sources; can integrate the obtained information, interpret and evaluate it, as well as draw conclusions, formulate, discuss and justify opinions.	P6S_UW (O/I) P6S_UK (O)
KSB_U02	are able to use advanced information and communication technologies (ICT) appropriate to perform typical engineering tasks.	P6S_UW (O/I) P6S_UK (O)
KSB_U03	when formulating and solving problems in sustainable building engineering, they can notice their systemic and non-technical aspects.	P6S_UW (I) P6S_UK (O)
KSB_U04	are able to utilise geodetic equipment, both traditional optical and electronic instruments, carry out land surveying during the assembly of building structures, which does not require professional education in the field of geodesy.	P6S_UW (I) P6S_UK (O)
KSB_U05	can classify building facilities and elements of technical fitting of buildings.	P6S_UW (O/I) P6S_UK (O)
KSB_U06	can set up the strengths influencing building units and perform static analysis of statically determinate and non-determinate bar structures; can determinate natural frequency for simple bar constructions.	P6S_UW (I) P6S_UK (O)
KSB_U07	are able to correctly utilise numerical, analytical, simulation, and experimental methods, to identify and solve problems in sustainable building engineering; to obtain and verify the results.	P6S_UW (O/I) P6S_UK (O)
KSB_U08	are able to carry out both chemical and biological experiments, including measurements and computer simulation, in the field of: quality assessment of building and installation materials, simple engineering constructions, systems of technical fitting of buildings, external infrastructure, elements and systems applied in the built environment engineering, thermal comfort and air	P6S_UW (I) P6S_UO (O) P6S_UK (O)

	quality; can clearly present and interpret the obtained results and draw conclusions.	
KSB_U09	can utilize selected software supporting design decisions in sustainable building engineering, including programs based on the BIM technology; are able to critically evaluate the obtained results of numerical analysis of building unit.	P6S_UW (O/I) P6S_UK (O)
KSB_U10	are able to design selected elements and simple metal, concrete, wooden and brick structures.	P6S_UW (I) P6S_UK (O)
KSB_U11	are able to dimension basic construction elements in civil, industrial, road, bridge and railroad building units.	P6S_UW (I) P6S_UK (O)
KSB_U12	using appropriate methods, techniques and tools, are able to design installations and devices typical for environmental engineering.	P6S_UW (I) P6S_UK (O)
KSB_U13	are able to perform the analysis of linear stability and ultimate limit capacity of simple bar structures, in the aspect of evaluating critical and ultimate limit states of constructions, and dynamic analysis of simple bar structures in the aspect of evaluating resonance states.	P6S_UW (I) P6S_UK (O)
KSB_U14	are able to perform energy balance when creating the inside comfort of building units.	P6S_UW (I) P6S_UK (O)
KSB_U15	are able to interpret architectural, building, installation and geodesic drawings; to prepare graphic documentation in traditional way, and in the environment of selected CAD software (including the BIM technology).	P6S_UW (O/I) P6S_UK (O)
KSB_U16	are able to perform preliminary economic analysis of engineering activities in respect of building facilities, technical fitting systems of buildings and external infrastructure as well as for components and systems applied in built environment; can prepare a simple cost calculation and a work schedule.	P6S_UW (O/I) P6S_UK (O)
KSB_U17	are able to estimate the hazards of construction and installation works, implement appropriate safety rules (including elements of Safety and Health Protection (BIOZ – Bezpieczeństwo i Ochrona Zdrowia)).	P6S_UW (I) P6S_UK (O)
KSB_U18	are able to critically analyse and evaluate the way of performance of a given technical solution in the field of environmental engineering.	P6S_UW (I) P6S_UK (O)
KSB_U19	can communicate in a foreign language (also other than English), including technical terminology in the field of sustainable building engineering.	P6S_UK (O)
KSB_U20	can apply the building law regulations and legal documents concerning building facilities.	P6S_UW (O) P6S_UK (O)
KSB_U21	are able to analyse the architectural and urban planning needs of investor; to select building and installation materials for the	P6S_UW (O/I) P6S_UK (O)

	intended purpose and the rules of sustainable building engineering.	
KSB_U22	are able to organise work at the construction site, applying the rules of technology and building engineering management.	P6S_UW (I) P6S_UK (O)
KSB_U23	can identify and specify simple practical engineering tasks, typical for environmental engineering.	P6S_UW (I) P6S_UK (O)
KSB_U24	understanding mutual relations between object and surroundings, are able to identify the existing functional-spatial resources, evaluate them and formulate correct conclusions on possible transformations in urban scale; are able to prepare a development plan with growing degree of complexity.	P6S_UW (O/I) P6S_UK (O)
KSB_U25	are able to apply various technical and material means, in order to present an architectural and urban idea.	P6S_UW (O/I) P6S_UK (O)
KSB_U26	are able to plan and organise work; both individual and team; can cooperate with other people, are prepared to team work, also in interdisciplinary design teams (professionals of different sectors).	P6S_UO (O/I) P6S_UK (O)
KSB_U27	are equipped with various skills necessary for performing design tasks in the form of particular works in the field of sustainable building engineering, including such skills as: traditional techniques (freehand drawing), specialized software dedicated for design (CAD and BIM technology).	P6S_UW (I) P6S_UU (O) P6S_UK (O)
SOCIAL COMPETENCE		
KSB_K01	are able to adapt to new and changing circumstances, can define priorities for performing tasks defined by themselves and other people, acting in the public interest and with regard to the purposes of sustainable development.	P6S_KK (O) P6S_KO (O) P6S_KR (O)
KSB_K02	take responsibility for the accuracy and reliability of working results and their interpretation.	P6S_KK (O)
KSB_K03	are ready to autonomously complete and broaden knowledge in the field of modern processes and technologies of building engineering.	P6S_KR (O)
KSB_K04	understand the need of team work, are responsible for the safety of their own work and team's work.	P6S_KO (O) P6S_KR (O)
KSB_K05	can realise that it is necessary to improve professional and personal competence, understand the need and opportunities of continuous learning (Master and PhD studies, post-diploma studies, trainings).	P6S_KR (O)
KSB_K06	are communicative in multimedia presentations.	P6S_KO (O) P6S_KR (O)
KSB_K07	understand the need to transfer to the society the knowledge about sustainable building engineering, transfers the knowledge in a clear and easily comprehensible manner.	P6S_KO (O) P6S_KR (O)

KSB_K08	are able to critically evaluate the results of their own work.	P6S_KK (O)
KSB_K09	understand that it is necessary to protect the intellectual property and are ready to obey the principles of professional ethics.	P6S_KR (O)
KSB_K10	can realise how important is to take care of personal health and physical fitness.	P7S_KR (O)