

Learning outcomes for the field of study BUILDING ENGINEERING 2<sup>nd</sup> cycle (MSc 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 Building Engineering
- (O) - (general) characteristics of 1st degree in the Polskiej Ramy Kwalifikacji (PRK) – level 7
- (I) - characteristics of 1st degree in the PRK for qualifications comprising engineering competence – level 7

<b>DESCRIPTION OF THE FIELD-SPECIFIC LEARNING OUTCOMES</b>		
Efekt uczenia się dla kierunku Budownictwo	Having completed the 2 <sup>nd</sup> cycle (MSc degree) studies in the field of BUILDING ENGINEERING, the graduates	Charakterystyki drugiego stopnia efektów uczenia się dla kwalifikacji na poziomie 7
<b>KNOWLEDGE</b>		
KB_W01	have extended and detailed knowledge of mathematics, physics and chemistry, forming theoretical principles appropriate to formulate and solve tasks related to building engineering.	<b>P7S_WG (O)</b>
KB_W02	know in detail the principles of analysing, constructing and dimensioning elements and connections in selected building structures.	<b>P7S_WG (I)</b>
KB_W03	know key issues of continuous medium mechanics; principles of analysing the issues of statics, stability and dynamics.	<b>P7S_WG (O/I)</b>
KB_W04	have extended and detailed knowledge of material strength, modelling and constructing; have knowledge of theoretical principles of the finite element method as well as general rules of non-linear calculations of engineering structures.	<b>P7S_WG (O/I)</b>
KB_W05	know in detail currently utilised construction materials and products, their properties and testing methods as well as production and assembly technologies.	<b>P7S_WG (O/I)</b>
KB_W06	have detailed and theoretically based knowledge in the field of building physics, related to heat and moisture migration in selected building units.	<b>P7S_WG (I)</b>
KB_W07	know in detail the rules of design, construction and operation of selected building units.	<b>P7S_WG (I)</b>

KB_W08	have detailed knowledge in the field of operation algorithms of selected software supporting the analysis and design of building facilities, which are also useful to plan and manage construction projects, including Building Information Modelling (BIM).	<b>P7S_WG (O/I)</b>
KB_W09	have advanced and detailed knowledge of the theoretical principles of structure analysis and optimization as well as design of selected building units.	<b>P7S_WG (I)</b>
KB_W10	have detailed knowledge of geodesic compilations and measurement methods applied in implementation, inventory, diagnostic and control works in building investment process.	<b>P7S_WG (I)</b>
KB_W11	have detailed knowledge of the rules of foundation engineering of complex building units.	<b>P7S_WG (I)</b>
KB_W12	know in detail the rules of developing the procedures of construction project quality management; have knowledge of the effectiveness, costs and timing of construction projects under risk and uncertainty conditions.	<b>P7S_WG (I)</b>
KB_W13	have detailed knowledge on business activity in construction industry and the ways of developing different forms of individual entrepreneurship; understand the principles of enterprise financial economy.	<b>P7S_WG (O/I)</b> <b>P7S_WK (O)</b>
KB_W14	have structured and theoretically based knowledge of the processes in the full life cycle of building structures and their management rules. They also know and understand the need for systematic evaluation and maintenance of structure technical condition.	<b>P7S_WG (O/I)</b> <b>P7S_WK (O)</b>
KB_W15	have detailed knowledge of the impact of building investments on the environment and understand the need to implement the rules of sustainable development.	<b>P7S_WG (O/I)</b> <b>P7S_WK (O)</b>
KB_W16	know in detail the Act of Building Law, standards and recommendations for building unit design: Polish standards (PN) and European standards (EN) as well as the technical conditions of constructing selected building units.	<b>P7S_WG (O)</b> <b>P7S_WK (O)</b>
KB_W17	know the legal regulations in the field of industrial and intellectual property protection.	<b>P7S_WG (O)</b> <b>P7S_WK (O)</b>
<b>SKILLS</b>		
KB_U01	can prepare an evaluation and statement of strengths influencing both simple and complex building units.	<b>P7S_UW (I)</b>
KB_U02	can design elements and connections in complex building units, working both individually and in a team.	<b>P7S_UW (I)</b> <b>P7S_UO (O)</b>
KB_U03	can perform a classical static and dynamic analysis and stability analysis of statically determinate and non-determinate bar structures (trusses, frames and strands); as well as surface construction (discs, plates, membranes and shells).	<b>P7S_UW (I)</b>

KB_U04	use advanced specialized tools in order to search for useful information, communication and in order to obtain software supporting the designer and organizer of building engineering works.	<b>P7S_UW (O/I)</b>
KB_U05	are able to correctly define a computational model and carry out an advanced linear analysis of complex building units, their elements and connections; are able to apply basic nonlinear computational techniques together with a critical evaluation of numerical analysis results.	<b>P7S_UW (I)</b>
KB_U06	are able to prepare and analyse the energy balance of a selected building unit, match the materials and technologies to perform traditional, ecological, sustainable and energy-saving constructions in complex conditions.	<b>P7S_UW (I)</b>
KB_U07	can dimension complex construction details in selected building units.	<b>P7S_UW (I)</b>
KB_U08	are able to perform geodesic compilations of building projects and land surveying at the level of construction and operation of selected building units.	<b>P7S_UW (I)</b>
KB_U09	are able to prepare an introductory economic analysis of proposed solutions and undertaken engineering activities; can prepare a cost calculation and a work schedule, contract and business plan of a building project; are able to manage building processes, define duties and tasks in investment and building control.	<b>P7S_UW (I)</b>
KB_U10	are able to plan and perform lab experiments, using suitable methods and tools for evaluating the quality of applied materials and evaluating the strength of elements of selected building structures.	<b>P7S_UW (I)</b>
KB_U11	can estimate hazards of building projects and building operation, implement suitable safety rules and prepare work standards as well as quality management procedures.	<b>P7S_UW (O/I)</b>
KB_U12	utilizing the obtained knowledge, they can select appropriate (analytical, numerical, simulation, experimental) methods and tools to solve technical problems.	<b>P7S_UW (O/I)</b>
KB_U13	can communicate in a foreign language at B2 level according to the Common European Framework of Reference for Languages; know technical vocabulary in the field of building engineering.	<b>P7S_UK (O)</b>
KB_U14	can design foundations of selected quasi-static and quasi-dynamic loaded building units.	<b>P7S_UW (I)</b>
KB_U15	are able to prepare a building unit design and technical documentation in the environment of selected CAD software, including the usage of BIM technology.	<b>P7S_UW (I)</b>
KB_U16	applying scientific rules and skills, are able to formulate and test hypotheses related to simple research problems, in order to solve engineering, technological and organisational problems in construction engineering; can prepare studies preparing for research work.	<b>P7S_UW (O)</b> <b>P7S_UU (O)</b>
KB_U17	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	<b>P7S_UW (O)</b>

	conclusions, formulate, justify, discuss and present opinions.	
KB_U18	can make plans autonomously, carry out lifelong learning processes and direct others in this respect; can apply the obtained knowledge into building engineering in order to communicate with different target groups using specialized terminology and discuss important problems of building industry.	<b>P7S_UK (O)</b> <b>P7S_UU (O)</b>
KB_U19	can manage team work, cooperate with other people and take the leading part in teams.	<b>P7S_UO (O)</b>
<b>SOCIAL COMPETENCE</b>		
KB_K01	take responsibility for the reliability of working results and their interpretation.	<b>P7S_KK (O)</b>
KB_K02	are responsible for the safety of own work and team work.	<b>P7S_KR (O)</b>
KB_K03	are ready to autonomously complete and broaden (extend) knowledge in the field of modern processes and technologies of building engineering.	<b>P7S_KR (O)</b>
KB_K04	are aware how important is sustainable development in building engineering	<b>P7S_KO (O)</b>
KB_K05	can realise that it is necessary to improve professional and personal competence; are ready to critically evaluate the knowledge and received content.	<b>P7S_KK (O)</b> <b>P7S_KR</b>
KB_K06	understand the need to transfer to the society the knowledge about building engineering, transfer the knowledge in a clear and easily comprehensible manner.	<b>P7S_KO (O)</b> <b>P7S_KR (O)</b>
KB_K07	understand that it is necessary to protect the intellectual property, are ready to obey the principles of professional ethics and to take care of the achievements and traditions of the engineer's profession.	<b>P7S_KR (O)</b>
KB_K08	are ready to think and act in a business-like way.	<b>P7S_KO (O)</b>
KB_K09	participate in cultural events of a town, city region and country and uphold the history and traditions of local communities.	<b>P7S_KO (O)</b>
KB_K10	can realise how important it is to take care of health and physical fitness.	<b>P7S_KR (O)</b>